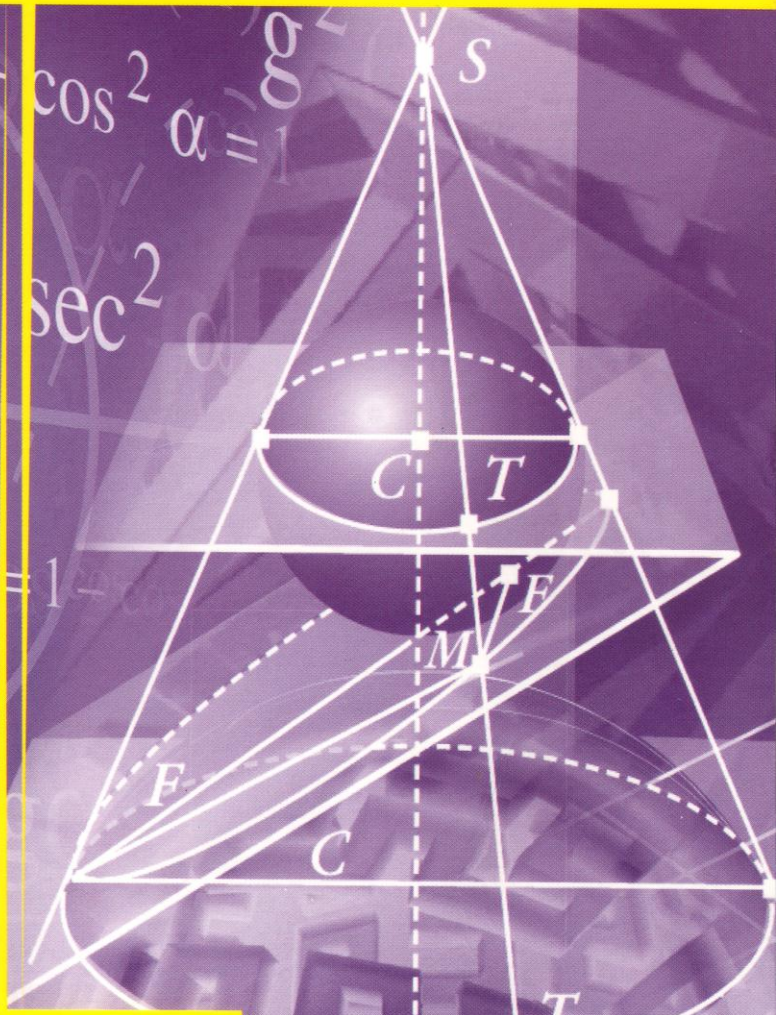
MATEMATIKA

DAVLAT TEST MARKAZI

2019



TEST TOPSHIRIQLARI TO‘PLAMI

- Mutaxassislar tavsiyalari
- Bilimlarni onlayn tekshirish xizmati
- Tekshirish uchun javoblar varaqalari

DTM

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2019-yil

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To‘plamdan O‘zbekiston Respublikasi oliy ta’lim muassasalari bakalavriatiga 2019-2020-o‘quv yili uchun kirish test sinovlarida foydalanilgan test topshiriqlari o‘rin olgan. Test topshiriqlari mazkur fan bo‘yicha umumiy o‘rta maktab hamda akademik litsey va kasb-hunar kollejlari o‘quv dasturlarida keltirilgan mavzular doirasida shakllantirilgan. To‘plam o‘qituvchilar, oliy ta’lim muassasalariga kirish uchun tayyorgarlik ko‘rayotgan abituriyentlar va keng jamoatchilik uchun mo‘ljallangan.

Shuningdek, to‘plamda testologiya sohasida ko‘p yillardan beri faoliyat yuritayotgan fan mutaxassislari tomonidan fan mavzularini o‘zlashtirish, test topshiriqlarini yechish bo‘yicha maslahat va tavsiyalar berilgan.

To‘plamning o‘ziga xos xususiyatlaridan yana biri shundaki, kelgusida abituriyent fan mavzularini qay darajada o‘zlashtira olganligini tekshirishga imkon beruvchi onlayn xizmat ko‘rsatish tizimini ishga tushirish rejalashtirilgan. Tizimdan foydalanishda to‘plamga ilova qilingan javoblar varaqalari yordam beradi. Xizmat ko‘rsatish tizimidan foydalanish tartibi haqida batafsil ma’lumotni Davlat test markazining http://dtm.uz rasmiy saytidan olish mumkin.

Abituriyentlarning o‘zlashtirgan bilimlarini tekshirib borishlaridagi faolliklari keng jamoatchilik bilan Davlat test markazi o‘rtasidagi muloqotni rivojlantiradi va bu o‘z navbatida test topshiriqlari bazasi hamda test sinovlari jarayonlarini takomillashtirishga xizmat qiladi.

Barcha abituriyentlarga omad tilagan holda, ushbu to‘plam fan bo‘yicha bilimlarni yanada chuqurroq o‘zlashtirish uchun xizmat qilishiga umid qilib qolamiz.

Davlat test markazi

ABITURIYENTLARGA MASLAHAT

Abituriyentlar bilan suhbat jarayonida aksariyat hollarda «Bilib turib shoshildim» yoki «Bilib turib boshqasini belgilab qo'ydim, hayajonlanib qoldim» va shu kabi fikrlarni eshitamiz. Ana shunday xatoga yo'l qo'ymaslik uchun quyidagilar tavsiya etiladi:

1. Tasavvur qiling, test jarayonlari boshlandi, test topshiriqlarini bajarish uchun belgilangan joyga o'tirdingiz.

2. Shoshilmang, avvalo, test topshiriqlarini bajarishda nimalarga ahamiyat berish kerakligi haqidagi ma'lumotlarni diqqat bilan tinglang.

3. Test topshiriqlari kitobidagi savollarni diqqat bilan o'qib chiqing. Siz, eng avvalo, savolning mohiyatini tushunib oling, buning uchun savolni shoshilmasdan o'qib chiqing.

4. Sizga savol va uning javobi osondek ko'rinsa ham, belgilashga shoshilmang, barcha javob variantlarini o'qib chiqing va yana bir tahlil qilib oling, ishonch hosil qilganingizdan so'nggina belgilang.

5. Agar sizga biror test topshirig'i qiyinchilik tug'dirsa, ortiqcha vaqt sarflamang, yaxshisi, shu savol raqamini belgilab qo'ying, barcha savol-topshiriqlarni bajarib bo'lganingizdan keyin shu savolni yana qayta ko'rib chiqing.

6. Siz savollar kitobidagi barcha test topshiriqlarini xuddi shu tarzda o'qing va belgilab chiqing.

7. Savollar kitobidagi barcha test topshiriqlarini bajarib bo'lgandan so'ng, javoblar varag'ini oling va diqqat bilan bo'yab chiqing.

8. Har bir test topshirig'ini bajarish uchun ketadigan vaqtni to'g'ri taqsimlab chiqing.

9. Test topshiriqlarini bajarish uchun vaqtingiz yetarli ekanligiga va ortiqcha hayajonga asos yo'qligiga o'zingizda ishonch hosil qiling.

Yuqoridagi tavsiyalarga rioya etsangiz, bu, albatta, yaxshi natijalarga erishishingizga yordam beradi.

Siz qaysi javob varianti asosida test topshirig'ini bajargan bo'lar edingiz?

A) savolni darhol olib o'qiyman, albatta, tanish bo'lgan javob variantini belgilab chiqaman

B) savolga emas, javob variantlariga qarayman va keyin savolni o'qiyman

C) savolni o'qib chiqishga shoshilmayman, o'zim to'g'ri deb tanlagan javob variantini belgilayman

D) savolni aniq tushunib olaman, barcha javoblar variantini o'qib chiqaman va to'g'riligiga ishonch hosil qilgan javobni belgilayman

MATEMATIKA FANIDAN ABITURIYENTLARGA TAVSIYALAR

Masala yechimini topishni (eslab qolish emas) o'rganish – kishining hayotdagi maqsadi. Ta'lim olish jarayonidagi masalalarini yechish – hayotiy masalalarni yechishdagi tayyorgarlikning muhim bosqichidir hamda kelgusi ta'lim olishda zarur bo'lgan asosiy matematik faktlarni o'zlashtirish va ulardan amaliy faoliyatda foydalanishning ishonchli mezonidir.

Ushbu to'plamdan 2019 yilgi test sinovlarida foydalanilgan test topshiriqlari o'rin olgan. Bu test topshiriqlarini to'plam sifatida chop etishdan maqsad – abituriyentlarning matematika fanidan test sinovlariga tayyorlanishlariga, topshiriqlarni yechib ko'rish yo'li bilan fan materiallarini o'zlashtirish darajasini tekshirishlariga yordam ko'rsatishdir. Bu esa kelgusida yangi bilimlarni unumliroq o'zlashtirishlariga zamin tayyorlaydi.

To'plamda keltirilgan test topshiriqlari:

– matematikaning asosiy materiallarini ishga solish;

– topshiriqni yechishda turli usullarni tanlash va qo'llashda ijodkorlikni namoyon etish;

– o'z kuchini his etib, ixtiyoriy masalani yechishda eng asosiy usulni bilib olishga qaratilgan.

Test topshiriqlarini yechishda quyidagilar tavsiya etiladi:

– test topshirig'ini yechish usullarini tahlil qilish;

– bir necha yechish yo'llari mavjud bo'lsa, eng qisqa va qulayini tanlash;

– mantiqiy fikrlash va tasavvurni ishga solish.

Joriy yilda matematika fanidan test topshiriqlari bazasini shakllantirishda grafik, diagramma va chizmalar keltirilgan, mantiqiy fikrlashga qaratilgan hamda kompleks topshiriqlardan foydalanilgan. Namuna sifatida kombinatorika va ehtimollar nazariyasi bo'limidan olingan test topshiriqlarining tahlilini keltiramiz.

1. 52314 sonning raqamlari joylarini almashtirib, 1 bilan tugaydigan nechta har xil son hosil qilish mumkin?

A) 30 B) 25 C) 24 D) 20

Ushbu masalani yechishni ikki xil usulda ko'rsatamiz.

I. 52314 soni beshta raqamdan iborat. 1 bilan tugaydigan 5 xonali nechta son borligiga javob berishdan avval mazkur raqamlar yordamida (ya'ni, faqat ularning joylashuvini almashtirgan holda) nechta turli son hosil qilish mumkinligi to'g'risidagi savolga javob beramiz. Ma'lumki, o'zaro joy almashishlar soni

$$P_n = n!$$

formula orqali aniqlanadi, bu yerda n o'zaro joy almashayotgan elementlar sonidir.

Bizning misolimizda elementlar (raqamlar) soni $n = 5$ bo'lganligi sababli, $P_5 = 5! = 120$. Lekin, masala shartida hosil bo'lgan son 1 raqami bilan tugashi kerakligi so'ralgan. 1 raqamini oxirgi birlik xonasiga mustahkamlaymiz:

□ □ □ □ 1.

Qolgan to‘rtta o‘rinda to‘rtta raqam o‘zaro joy almashishi mumkin. Buni yuqoridagi formulaga qo‘yib, joy almashuvlar soni $P_4 = 4! = 24$ ekanligini topamiz.

Demak, test topshirig‘ining to‘g‘ri javobi **C) 24.**

II. 5 xonali sonni 5, 2, 3, 1, 4 raqamlari yordamida (ularning joylarini o‘zaro almashtirib) hosil qilish kerak. Faqat oxirgi raqami 1 bo‘lishi lozim.

				1
o‘n minglik	minglik	yuzlik	o‘nlik	birlik

10 minglik xonaga to‘rtta raqamdan (5, 2, 3, 4) birini qo‘yish mumkin. Minglik xonaga esa uchta raqamdan birini qo‘yish mumkin, chunki 10 minglik xonada foydalanilgan raqamdan minglik xonada foydalana olmaymiz. Huddi shunday davom etib, quyidagicha imkoniyatlar sonini olamiz:

4	3	2	1	1
imkoniyat	imkoniyat	imkoniyat	imkoniyat	

Bundan ko‘rinadiki, 5, 2, 3, 1, 4 raqamlari yordamida oxirgi raqami 1 bilan tugaydigan 24ta besh xonali son hosil qilish mumkin ekan.

2. Merganning nishonga tekkizish ehtimoli 0,8 ga teng. U nishonga 3 marta o‘q uzganda barcha o‘qlari nishonga tegishining ehtimolligini toping.

A) 0,912 B) 0,8 C) 0,72 D) 0,512

Masala shartidan $p = 0{,}8$, $n = 3$ lar ma’lum. Bitta o‘q uzishda nishonga tekkizish ehtimoli 0,8 ga teng bo‘lsa, ikkita o‘q uzishda nishonga tekkizish ehtimolligi $0{,}8 \cdot 0{,}8 = 0{,}64$; uchta o‘q uzishda esa $0{,}8 \cdot 0{,}8 \cdot 0{,}8 = 0{,}512$ bo‘ladi.

Bu yerda hodisalar bog‘liqsizligidan foydalaniladi. Agar A va B hodisalar bog‘liqsiz bo‘lsa, AB hodisalar ehtimolligi quyidagi formula orqali aniqlanadi:

$$P(AB) = P(A) \cdot P(B).$$

Bundan hodisalarni $A_1 =$ {1-o‘qning nishonga tegishi}, $A_2 =$ {2-o‘qning nishonga tegishi}, $A_3 =$ {3-o‘qning nishonga tegishi}, $B =$ {3ta o‘qning nishonga tegishi} deb belgilab olsak, A_1, A_2, A_3 hodisalar bog‘liqsizligidan $P(B) = P(A_1A_2A_3) = P(A_1) \cdot P(A_2) \cdot P(A_3)$ kelib chiqadi, ya’ni $P(B) = 0{,}8 \cdot 0{,}8 \cdot 0{,}8 = 512$

Bundan ko‘rinib turibdiki, testning to‘g‘ri javobi **0,512.**

Test topshirig‘ini yechish istagi va o‘z kuchiga bo‘lgan ishonch, qat’iy mehnat bilan birgalikda, shubhasiz muvaffaqiyat olib keladi. Sizga omad!

Natural sonlar

1. Faqat 3 ta natural bo'luvchiga ega bo'lgan ikki xonali natural sonlarning eng kattasini toping.

A) 49 B) 81
C) 51 D) 46

2. 353^{353} sonini 5 ga bo'lgandagi qoldiqni toping.

A) 3 B) 4
C) 1 D) 2

3. Agar $2m + 3n = 72$ $(m, n \in N)$ bo'lsa, n ning eng katta qiymatini toping.

A) 18
B) 20
C) 22
D) 24

4. $25^{13} + 16^{127} + 27$ yig'indi qanday raqam bilan tugaydi?

A) 5
B) 8
C) 3
D) 6

5. a va b raqamlar yig'indisi 7 ga qoldiqsiz bo'linadi. Agar $\overline{aba}$ ko'rinishidagi uch xonali sonlarni 7 ga bo'lganda bir xil qoldiq qolsa, shu qoldiqni toping.

A) 0
B) 4
C) 2
D) 6

6. Agar a va b natural sonlar yig'indisi 7 ga qoldiqsiz bo'linsa, $37a + 9b$ ni 7 ga bo'lgandagi qoldiqni toping.

A) 2 B) 1
C) 0 D) 6

7. a va b raqamlar yig'indisi 13 ga qoldiqsiz bo'linadi. Agar $\overline{aba}$ ko'rinishdagi uch xonali sonlarni 13 ga bo'lganda bir xil qoldiq qolsa, shu qoldiqni toping.

A) 6 B) 4
C) 0 D) 2

8. Agar n, m va k natural sonlar uchun $nm = 25$ va $mk = 4$ bo'lsa, $n + m + k$ ifodaning qiymatini toping.

A) 30 B) 42
C) 35 D) 19

9. Agar $48 \cdot n$ $(n \in N)$ ifoda biror natural sonning kvadratiga teng bo'lsa, $n + 13$ ning eng kichik qiymatini toping.

A) 15
B) 18
C) 16
D) 17

10. $(25369 + 14368) \cdot 35698$ ni 5 ga bo'lgandagi qoldiqni toping.

A) 1
B) 3
C) 2
D) 4

11. Ketma-ket kelgan uchta tub sonlar yig'indisi quyidagi sonlardan qaysi biriga teng bo'lishi mumkin?

A) 9 B) 15 C) 6 D) 21

12. $43 \cdot 47 \cdot 28 \cdot 32 - 18 \cdot 63 \cdot 27$ ayirma qanday raqam bilan tugaydi?

A) 6 B) 8
C) 2 D) 4

13. $5^9 + 1$ natural son uchun quyidagi fikrlardan qaysi biri to'g'ri?

A) juft va tub son
B) toq va tub son
C) toq va murakkab son
D) juft va murakkab son

14. $2 \cdot 11^6 - 5$ natural son qaysi raqam bilan tugaydi?

A) 7 B) 5 C) 2 D) 6

15. Ikkita natural sonning yig'indisi 15 ga teng bo'lsa, ularning ko'paytmasi quyidagi sonlardan qaysi biriga teng bo'lishi mumkin?

A) 34 B) 35 C) 36 D) 37

16. Quyidagi fikrlardan qaysi biri natural sonlar uchun har doim to'g'ri?

A) ikkita tub sonlar ko'paytmasi toq son bo'ladi
B) faqat uchta natural bo'luvchiga ega bo'lgan son biror tub sonning kvadratiga teng bo'ladi
C) barcha tub sonlar toq sonlardir
D) ikkita tub sonlar yig'indisi juft son bo'ladi

17. Quyidagi jumlalardan qaysilari noto'g'ri?

1) agar natural son 6 ga bo'linsa, u holda 12 ga ham bo'linadi;
2) agar natural son 12 ga bo'linsa, u holda 6 ga ham bo'linadi;
3) agar natural son 12 ga bo'linmasa, u holda 6 ga ham bo'linmaydi;
4) agar natural son 6 ga bo'linmasa, u holda 12 ga ham bo'linmaydi.

A) 1, 2
B) 3, 4
C) 2, 3
D) 1, 3

18. $13^5 - 13$ ni 10 ga bo'lgandagi qoldiqni toping.

A) 0 B) 6
C) 7 D) 3

19. $2 \cdot 7 \cdot 11 \cdot 19 \cdot 23$ son quyidagi sonlardan qaysi biriga ko'paytirilsa, uning natural bo'luvchilari soni ikki marta ortadi?

A) 11
B) 7
C) 2
D) 3

20. $7^3 + 11 \cdot 7$ ni 6 ga bo'lgandagi qoldiqni toping.

A) 2 B) 3
C) 1 D) 0

21. $113 \cdot 114 \cdot 115 - 2$ ni 6 ga bo'lgandagi qoldiqni toping.

A) 1 B) 3
C) 4 D) 2

22. Ikkidan katta bo'lgan barcha tub sonlarni 4 ga bo'lganda qanday qoldiqlar qoladi?

A) 1, 2, 3
B) 0, 1, 2, 3
C) 1, 3
D) 2, 3

23. a soni quyidagilardan qaysi biriga teng bo'lganda a; $a + 6$ va $a + 14$ sonlar tub sonlar bo'ladi?

A) 13
B) 11
C) 17
D) 19

24. $5 \cdot 19^5$ ni 6 ga bo'lgandagi qoldiqni toping.

A) 2
B) 3
C) 5
D) 4

25. Ikki natural sonning EKUKi 168 ga teng va ularning nisbati 3:4 kabi bo'lsa, kichik sonni toping.

A) 48 B) 42
C) 56 D) 36

26. Ikki natural sonning EKUKi va EKUBi mos ravishda 420 va 35 ga teng bo'lsa, ularning ko'paytmasi 35^2 dan necha marta katta?

A) 16
B) 10
C) 12
D) 15

27. Agar a eng katta musbat uch xonali son, b esa eng kichik manfiy to'rt xonali son bo'lsa, $b - a$ ni hisoblang.

A) –9099 B) –9000
C) –1 D) –10998

28. Ketma-ket kelgan ikkita toq natural sonlarning kvadratlari farqi 72 ga teng bo'lsa, shu sonlarning kichigini toping.

A) 13 B) 19
C) 17 D) 15

29. Hisoblang:

$139 \cdot 163 - 160 \cdot 139 + 141 \cdot 175 - 172 \cdot 141$.

A) 840 B) 852
C) 870 D) 864

30. 6237 soniga nisbatan quyidagi tasdiqlardan qaysi biri to'g'ri?

A) 39 ga qoldiqsiz bo'linadi
B) tub son
C) 18 ga qoldiqsiz bo'linadi
D) 21 ga qoldiqsiz bo'linadi

31. 4680 sonini tub ko'paytuvchilarga ajrating.

A) $2^3 \cdot 3^2 \cdot 5^3$
B) $2^3 \cdot 3^2 \cdot 5 \cdot 11$
C) $2^3 \cdot 3 \cdot 5^2 \cdot 13$
D) $2^3 \cdot 3^2 \cdot 5 \cdot 13$

32. $x = 35 \cdot 47$, $y = 63 \cdot 28$, $z = 95 \cdot 39$, $t = 48 \cdot 35$.

Berilgan sonlardan qaysilari 15 ga qoldiqsiz bo'linadi?

A) x, y va t B) faqat z
C) x va y D) z va t

33. $a = 14{,}88 \cdot 10^{14}$; $b = 28{,}42 \cdot 10^{8}$ va $c = 34{,}317 \cdot 10^{11}$ sonlardan qaysilari 12 ga qoldiqsiz bo'linadi?

A) faqat b
B) faqat c
C) barchasi
D) a va c

34. $x = 0{,}495 \cdot 10^{15}$; $y = 0{,}537 \cdot 10^{8}$ va $z = 0{,}4953 \cdot 10^{14}$ sonlardan qaysilari 15 ga qoldiqsiz bo'linadi?

A) faqat x va z
B) faqat y
C) barchasi
D) faqat x va y

Haqiqiy sonlar

1. Hisoblang: $\dfrac{4{,}3253^2 - 5{,}6747^2}{5{,}6747 - 4{,}3253}$.

A) –10 B) 10
C) 9 D) –1,3494

2. Hisoblang:
$1 - 2 + 3 - 4 + 5 - 6 + \ldots + 195 - 196$.

A) –98
B) –100
C) –97
D) –99

3. Hisoblang:

$$\underbrace{-2019 + 2019 - 2019 + \ldots + 2019 - 2019}_{2019\ ta}$$

A) 0
B) 2019
C) –2019
D) 2018

4. 1:(2:3) son 1:2:3 sonidan qanchaga katta?

A) $\dfrac{4}{3}$
B) $-\dfrac{4}{3}$
C) 9
D) 0

5. 8,6(7) – 3,(8) ni hisoblang.

A) $\dfrac{451}{99}$ B) $\dfrac{431}{99}$
C) $\dfrac{431}{90}$ D) $\dfrac{451}{90}$

6. $0{,}0016 \cdot 0{,}004 \cdot 0{,}050 \cdot 10^{6}$ ko'paytmaning qiymati quyidagilardan qaysi biriga teng?

A) 32
B) 3,2
C) 0,32
D) 0,032

7. Hisoblang:
$(-9)^3 : (-9)^2 + (-10)^3 : (-10) - (-2)^8 : (-2)^7$.

A) –89
B) 93
C) 89
D) –197

8. $x = 3{,}61(91)$, $y = 3{,}62$, $z = 3{,}6(191)$ va $t = 3{,}619(1)$ sonlarini kamaytirish tartibida yozing.

A) $y > x > z > t$
B) $y > x > t > z$
C) $x > z > y > t$
D) $y > t > z > x$

9. 0,6(8) son 0,(31) sondan necha marta katta?

A) 2 B) 3,(3)
C) 2,2 D) 2,(2)

10. $2019\frac{5}{26} - 2017\frac{2}{13}$ ni hisoblang.

A) $\frac{27}{13}$
B) $\frac{51}{26}$
C) $\frac{24}{13}$
D) $\frac{53}{26}$

11. $\left(4\frac{3}{8} - 1\frac{3}{4}\right) : 1\frac{3}{4}$ ni hisoblang.

A) 1,5 B) 0,75
C) 1,25 D) 0,25

12. Quyida berilgan sonlardan eng kattasini toping.

A) $\frac{7}{12}$
B) $\frac{5}{9}$
C) $\frac{23}{36}$
D) $\frac{47}{72}$

13. Hisoblang:

$$\left(2020\frac{7}{8} - 2019\frac{3}{8}\right) : \left(2019\frac{1}{3} - 2018\frac{5}{6}\right).$$

A) 3 B) 4
C) 1 D) 2

14. Hisoblang: $\frac{111}{333} + \frac{222}{666} + \frac{333}{999}$.

A) 1
B) 1,5
C) 2
D) 1,6

15. Hisoblang: $1 - \cfrac{1}{1 - \cfrac{1}{1 - \frac{1}{5}}}$.

A) 6
B) 5
C) 5,6
D) 6,5

16. Hisoblang: $\frac{8}{7} + \cfrac{\frac{7}{8} - 1}{\frac{7}{8}} + \frac{1}{2}$.

A) $\frac{1}{7}$ B) $\frac{3}{2}$
C) $\frac{2}{3}$ D) $\frac{8}{7}$

17. Hisoblang: $\left(2018 - \frac{1}{2018}\right) : \left(1 - \frac{1}{2018}\right)$.

A) 2018
B) 2019
C) $2018\frac{1}{2018}$
D) 2017

18. n natural sonning qanday qiymatida $2 + \cfrac{1}{1 + \frac{2}{n}} = \frac{13}{5}$ tenglik o'rinli bo'ladi?

A) 1 B) 3
C) 4 D) 2

19. –1,25 soniga qarama-qarshi bo'lgan sonning teskarisi 0,1 dan qanchaga katta?

A) 1,15 B) 0,3
C) 0,7 D) 0,4

20. 0,372 + 3,649 + 4,8463 yig'indining qiymatini yuzdan birlar xonasigacha yaxlitlang.

A) 7,87 B) 8,87
C) 8,84 D) 7,84

21. 12,37267 – 8,674 ayirmaning qiymatini mingdan birlar xonasigacha yaxlitlang.

A) 3,699
B) 3,69
C) 3,679
D) 3,68

22. Hisoblang:

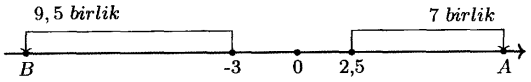
$3{,}6\cdot4{,}8 + 5{,}4\cdot3{,}6 + 4{,}8\cdot9{,}2 - 4{,}8\cdot5{,}6.$

A) 54 B) 48
C) 72 D) 43,2

23. Hisoblang: $0{,}84\cdot10^9:7000000$.

A) 1200 B) 240
C) 12 D) 120

24. Rasmda A va B nuqtalar son o'qida tasvirlangan. $2A + B$ ning son qiymatini toping.



A) 8
B) 9,5
C) 6,5
D) 12,5

25. Hisoblang:

$$\underbrace{2{,}2 + 2{,}2 + \ldots + 2{,}2}_{8\ ta} + \underbrace{1{,}1 + 1{,}1 + \ldots + 1{,}1}_{16\ ta}.$$

A) 52,8
B) 17,6
C) 70,4
D) 35,2

26. Quyidagi sonlardan nechtasi irratsional son?

$1)\ \dfrac{\pi - 3{,}14}{2}$; $2)\ \sqrt{5 + \sqrt{1 + 2\sqrt{16}}}$; $3)\ \dfrac{7}{33}$;
$4)\ \sin\dfrac{\pi}{3}$.

A) 1 B) 2
C) 4 D) 3

27. Quyidagi sonlardan nechtasi butun son?

$1)\ \sqrt{2 + \sqrt{144}}$; 2) 7,12; 3) π – 1,14;
$4)\ -\dfrac{2{,}48}{1{,}24}$.

A) 4 B) 1
C) 3 D) 2

28. Hisoblang:

$-(-3{,}8) + (-6{,}2) - (-(+2{,}8) + (-8{,}4))$.

A) –13,6
B) 8,8
C) –1,2
D) 13,6

29. Hisoblang:
$-16{,}28 + 8{,}192 - 2{,}131 + 9{,}42$.

A) –0,789
B) –0,799
C) –0,648
D) –0,668

30. Hisoblang: $0{,}04 \cdot 10^{-8} \cdot 2{,}3 \cdot 10^{12}$.

A) 92 B) 9200
C) 920 D) 9,2

31. m ning qanday qiymatida $\dfrac{9m+7}{6}$ ifodaning qiymati $11\dfrac{2}{3}$ ga teng bo'ladi?

A) 11 B) 8
C) 13 D) 7

32. Agar n va m natural sonlar uchun $\dfrac{6n-4m}{n} = 1$ tenglik bajarilsa, $\dfrac{1}{n} + \dfrac{2}{m}$ ifodaning eng katta qiymatini toping.

A) $\dfrac{7}{10}$
B) $\dfrac{9}{10}$
C) $\dfrac{6}{10}$
D) $\dfrac{13}{20}$

33. Agar n va m natural sonlar uchun $n^2 - m^2 = 25$ tenglik bajarilsa, $n + 2m$ ifodaning qiymatini toping.

A) 11 B) 37
C) 25 D) 32

34. $\dfrac{1}{10} \cdot \dfrac{2}{10} \cdot \dfrac{3}{10} \cdot \dfrac{4}{10} \cdot \dfrac{5}{10} \cdot \dfrac{6}{10} \cdot \dfrac{7}{10} \cdot \dfrac{8}{10} \cdot \dfrac{9}{10}$ ko'paytmani standart shaklga keltiring.

A) $3{,}6288 \cdot 10^{-6}$
B) $3{,}6288 \cdot 10^{-5}$
C) $3{,}6288 \cdot 10^{-3}$
D) $3{,}6288 \cdot 10^{-4}$

35. $\dfrac{2}{10} \cdot \dfrac{2}{100} \cdot \dfrac{2}{1000} \cdot \ldots \cdot \dfrac{2}{\underbrace{100\ldots0}_{10\ ta}} : 128$ sonni standart shaklga keltiring.

A) $8 \cdot 10^{-55}$
B) $8 \cdot 10^{-54}$
C) $8 \cdot 10^{-45}$
D) $8 \cdot 10^{-44}$

36. $83{,}4 \cdot 0{,}625 - 3{,}34 \cdot 2{,}5 - 8{,}34 \cdot 3{,}75$ ni hisoblang.

A) 1,25
B) 12,5
C) 12,75
D) 1,275

37. Hisoblang: $\dfrac{4{,}(2) + 4{,}(4) + 4{,}(6)}{4{,}(3) + 4{,}(5) + 4{,}(7)}$.

A) $\dfrac{40}{41}$
B) $\dfrac{39}{40}$
C) $\dfrac{38}{39}$
D) $\dfrac{42}{43}$

38. $9{,}14^2 + 2{,}76 \cdot 0{,}86 - 9{,}14 \cdot 6{,}38$ ni hisoblang.

A) 27,6 B) 91,4
C) 2,76 D) 8,6

39. Hisoblang: $\dfrac{16 - 0{,}36^2}{1{,}4 \cdot 4{,}12 - 1{,}52 \cdot 1{,}4}$.

A) 3,64
B) 2,6
C) 2,36
D) 4,36

40. $\frac{3}{4}+\frac{34}{44}+\frac{334}{444}+\frac{3334}{4444}$ yig'indining qiymati qaysi oraliqda yotadi?

A) (1; 2)
B) (3; 4)
C) (0; 1)
D) (2; 3)

41. a va b natural sonlar uchun $a+\frac{b}{3}=10$ bo'lsa, u holda ab ifodaning eng katta qiymatini toping.

A) 54 B) 63
C) 75 D) 72

42. $\frac{27}{13}+\frac{77}{19}-\frac{70}{23}$ sonli ifodaning qiymati quyidagi oraliqlardan qaysi birida yotadi?

A) (0; 1)
B) (1; 2)
C) (3; 4)
D) (2; 3)

43. Agar a va b ratsional sonlar uchun $a+b\cdot\frac{\sqrt{3}}{3}=3$ bo'lsa, u holda a^2+b^2 ifodaning qiymatini toping.

A) 9 B) 27 C) 7 D) 13

44. Agar n natural son uchun $\frac{n^2-n+3}{n+1}$ kasrning qiymati (2; 3) oralig'ida joylashgan bo'lsa, kasrning shu oraliqdagi qiymatini toping.

A) 2,75 B) 2,5
C) 2,25 D) 2,4

45. a va b natural sonlar uchun $\frac{a}{5}=\frac{9}{b+2}$ bo'lsa, u holda $a+b$ ifodaning eng katta qiymatini toping.

A) 45 B) 44
C) 16 D) 12

46. Hisoblang: $\frac{21^3+19^3}{7^2-3^2}-21\cdot 19$.

A) 9 B) 16 C) 3 D) 4

47. Hisoblang: $\frac{200^2-198^2+198\cdot 398}{199}-274$.

A) 126 B) 146
C) 144 D) 124

48. Ushbu $\frac{3n^2+2n-18}{n}$ kasrning qiymati natural son bo'ladigan $n(n\in N)$ ning barcha qiymatlari yig'indisini toping.

A) 36 B) 38
C) 39 D) 33

49. Hisoblang: $\frac{0,4(2)-0,2(8)}{0,(8)+0,(7)}$.

A) 0,4 B) 0,8
C) 0,36 D) 0,08

50. a, b, c sonlar uchun $7a=2b=3c$ va $\frac{3}{a}-\frac{5}{b}+\frac{2}{c}=3\frac{2}{5}$ tengliklar o'rinli bo'lsa, $\frac{b}{c}-a$ ning qiymatini toping.

A) $-\frac{3}{14}$ B) $1\frac{1}{14}$
C) $\frac{11}{14}$ D) $-\frac{5}{7}$

51. Hisoblang:

$12{,}4:3{,}1 + (1{,}2\cdot 8{,}5 - 6{,}3\cdot 2{,}8):0{,}3.$

A) –18,6
B) –24,8
C) –16,6
D) –20,8

52. Hisoblang: $\dfrac{0{,}0432}{0{,}16} + \dfrac{0{,}099}{0{,}3} + \dfrac{0{,}128}{0{,}008}$.

A) 2,2
B) 19,57
C) 22
D) 16,6

53. Hisoblang: $\dfrac{6{,}84\cdot 3{,}28 + 3{,}42}{1{,}14\cdot 14{,}24 - 6{,}68\cdot 1{,}14}$.

A) 1,5
B) 12
C) 3
D) 4,5

54. Hisoblang: $\dfrac{5{,}34^2 + 10{,}68\cdot 3{,}66 + 3{,}66^2}{9\cdot 12{,}72 + 5{,}28\cdot (4{,}73 + 4{,}27)}$

A) 2 B) $\frac{1}{2}$
C) 3 D) $\frac{1}{3}$

55. $\frac{1}{3}$ va $\frac{5}{6}$ sonlar orasida maxraji 24 bo'lgan, qisqarmaydigan barcha kasrlar yig'indisini toping.

A) 2,5
B) 5,5
C) $4\frac{1}{6}$
D) 1,5

56. Hisoblang:

$7{,}16\cdot(8{,}21 - 6{,}18) + 12{,}84\cdot(7{,}81 - 5{,}78).$

A) 20,3 B) 42,8
C) 40,6 D) 21,4

57. Hisoblang:

$\left(7\frac{17}{36} - 9\frac{7}{12}\right) : \frac{2}{9} - \frac{3}{26}\cdot 4\frac{1}{3} + 3.$

A) –6 B) 1
C) 13 D) –7

58. Hisoblang:

$1\frac{1}{2}\cdot 3\frac{3}{5} + 2\frac{3}{4}\cdot 3\frac{3}{5} - 3\frac{3}{5}\cdot 3\frac{5}{6} - 1\frac{1}{2}.$

A) 0,5 B) –1,5
C) –0,5 D) 0

59. Hisoblang:

$\left(1{,}08 - \frac{2}{25}\right) : \frac{4}{7} - 0{,}25 : 0{,}(33) + 0{,}(8).$

A) $\frac{2}{3}$ B) $3\frac{8}{9}$ C) $1\frac{2}{9}$ D) $1\frac{8}{9}$

60. Hisoblang:

$(0{,}(2) + 3{,}6(1)) : \left(1\frac{5}{6} - 1{,}91(6)\right) + 42{,}5.$

A) 0,5 B) –3,5
C) –0,5 D) 3,5

61. $a = 0{,}6^{\frac{1}{3}}\cdot 1{,}3^{-\frac{2}{5}}$, $b = 0{,}7^{-\frac{2}{3}}\cdot 0{,}3^{-\frac{1}{5}}$ va $c = 1{,}8^{\frac{1}{3}}\cdot 0{,}3^{-\frac{2}{5}}$ sonlardan qaysilari 1 dan katta?

A) a va b B) a va c
C) faqat b D) b va c

62. Hisoblang:

$$\frac{4^9 \cdot 81^2 + 15 \cdot 64^3 \cdot 9^3}{12^9 + 4^5 \cdot 6^8} \cdot (0,(4))^{-1}.$$

A) 0,5
B) 1,5
C) 0,(1)
D) 4

63. Hisoblang: $\dfrac{(27+79) \cdot \left(2 + \frac{16}{45}\right) \cdot 45^{-1}}{\left(0,(55) + \frac{1}{0,(555)}\right)^2} \cdot 0,(5) \cdot$

A) 1 B) 0,(5)
C) 9 D) $1\frac{4}{5}$

Matnli masalalar, foiz va proporsiya

1. Agar $a-2$; $b+3$; 2 va 7 sonlar proporsiyaning ketma-ket hadlari bo'lsa, $\frac{b}{6} - \frac{7a}{12}$ ning qiymatini toping.

A) $-1\frac{2}{3}$
B) $-2\frac{1}{3}$
C) $2\frac{2}{3}$
D) $1\frac{2}{3}$

2. Bir nechta natural sonlarning yig'indisi 47 ga teng. Agar shu sonlarning har biri 2 ga ortirilib yig'indisi hisoblansa, u 63 ga teng bo'ladi. Yig'indida nechta son qatnashgan?

A) 7 B) 8
C) 6 D) 9

3. 1 dan 1000 gacha bo'lgan natural sonlarning nechtasi 17 ga qoldiqsiz bo'linadi?

A) 57
B) 59
C) 56
D) 58

4. 5 ta sonning o'rta arifmetigi 13 ga teng. Shu sonlarga qaysi son qo'shilsa ularning o'rta arifmetigi 14 ga teng bo'ladi?

A) 18 B) 21
C) 17 D) 19

5. Biri ikkinchisidan 3 marta katta bo'lgan ikki sonning yig'indisi 9,64 ga teng. Shu sonlarning kichigini toping.

A) 2,31
B) 2,41
C) 2,16
D) 2,21

6. Oltita sonning yig'indisi 70 ga teng. Ulardan birini 2 marta oshirib, qolganlarini o'zgartirmagan holda yig'indisi 78 ga teng bo'lsa, o'zgartirilmagan beshta sonning yig'indisini toping.

A) 62 B) 67
C) 63 D) 66

7. Ota o'g'lidan 3 marta katta, qizidan esa 25 yoshga katta. Agar ota 51 yoshda bo'lsa, o'g'li qizidan necha yoshga kichik?

A) 8 B) 7
C) 9 D) 10

8. Piyoda 3 soatda 7,8 km yo'l yurdi. Agar piyoda shu tezlik bilan yursa, 4 soatda necha km yo'l yuradi?

A) 10,6
B) 10,4
C) 10,8
D) 10,5

9. Uzunligi 80 metr bo'lgan sim uzunliklari 5:7:13 nisbatda bo'lingan. Hosil bo'lgan simlardan eng yengilining uzunligini (m) toping.

A) 16
B) 17
C) 16,6
D) 16,4

10. 6,3; 4,4; –3,8; x va 7,6 sonlarning o'rta arifmetigi 3,3 ga teng. x ning qiymatini toping.

A) 2,6
B) 2
C) 1,8
D) 2,3

11. $3a - 4$, $a + 3$ va 6 sonlarning o'rta arifmetigi $a - 3$ ga teng. a ning qiymatini toping.

A) –4 B) –14
C) 5 D) 14

12. Uchta sonning o'rta arifmetigi 24,3 ga teng. Agar ulardan ikkitasi 34,8 va 18,9 bo'lsa, uchinchi sonni toping.

A) 18,6
B) 21,1
C) 19,8
D) 19,2

13. Birinchi son ikkinchi sondan 12 ga ortiq. Ularning o'rta arifmetigi 49 ga teng. Ikkinchi sonni toping.

A) 45 B) 39 C) 46 D) 43

14. Zokirning 25000 so'm, Azizaning esa 17000 so'm puli bor. Zokir pulining necha foizini Azizaga bersa, ularning pullari miqdori teng bo'ldi?

A) 18,5
B) 14,5
C) 16
D) 18

15. Agar charxpalak 5 minutda $23\frac{3}{4}$ marta aylansa, u 12 minutda necha marta aylanadi?

A) $54\frac{1}{2}$
B) 53
C) 57
D) 61

16. 117 soni 90 sonidan necha foizga ortiq?

A) 40 B) 30
C) 25 D) 35

17. a sonining 24%i 108 ning 18%iga teng bo'lsa, a ni toping.

A) 76 B) 81
C) 72 D) 88

18. n ning qanday qiymatida $2n + 3$ ning 60%i 45 ga teng bo'ladi?

A) 42 B) 36
C) 24 D) 32

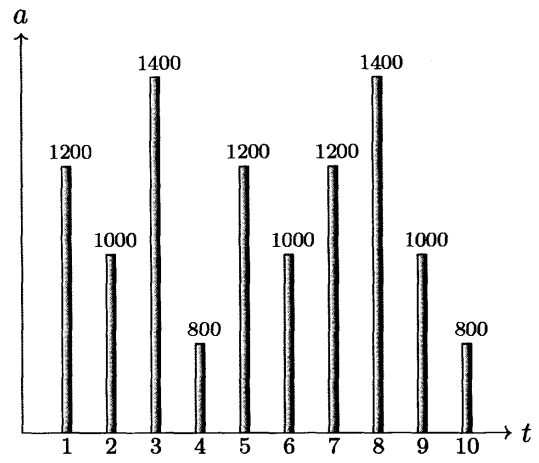
19. Ikki shahar orasidagi masofa 126 km. Bu masofa 1:6000000 masshtabli xaritada necha millimetrga teng bo'ladi?

A) 210
B) 2,1
C) 0,21
D) 21

20. 540 soni 25%ga oshirildi. Hosil bo'lgan sonning 20%ini toping.

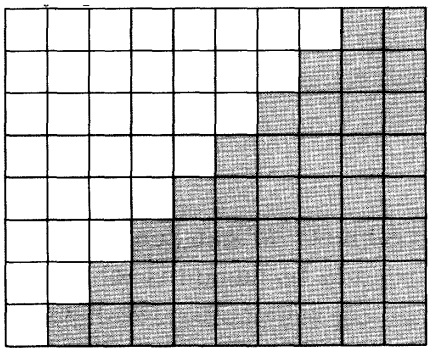
A) 155
B) 130
C) 135
D) 125

21. Rasmda ishchilar tomonidan 10 kunda tayyorlangan detallarning diagrammasi tasvirlangan. Ishchilar bu 10 kunda o'rtacha kuniga nechtadan detal tayyorlagan? (bu yerda t – kunlar, a – detallar soni)



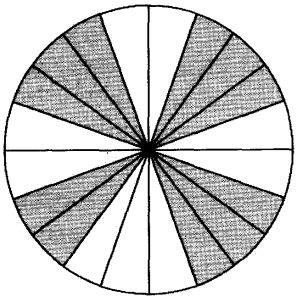
A) 1080
B) 1120
C) 1100
D) 1160

22. Rasmda to'g'ri to'rtburchak teng bo'laklarga bo'lingan. To'g'ri to'rtburchakning necha foizi bo'yalgan?



A) 52,5 B) 57,5
C) 57 D) 55

23. Rasmda doira teng bo'laklarga (sektorlarga) bo'lingan. Doiraning necha foizi bo'yalgan?



A) 55
B) 62,5
C) 65
D) 60,5

24. Umida bitta son o'yladi, u o'ylagan sonini 3 ga ko'paytirdi va 15 ni qo'shdi. Hosil bo'lgan sonni 2 ga ko'paytirdi va o'ylagan sonini ayirdi. Natijada 90 soni hosil bo'ldi. Umida qanday son o'ylagan?

A) 15 B) 9
C) 10 D) 12

25. Toza suvga tuz aralashtirilgandan so'ng massasi 850 gramm bo'ldi. Agar tuzning massasi toza suvning massasidan 75%ga kam bo'lsa, toza suvning massasi necha gramm bo'lgan?

A) 660 B) 680
C) 620 D) 640

26. Kitobning narxi 12500 so'm edi. Dastlab uning narxi 16%ga arzonlashdi, so'ng 1850 so'mga qimmatlashdi. Kitobning oxirgi narxi necha so'm bo'ldi?

A) 12350
B) 12260
C) 12220
D) 12450

27. 7 soat 12 minut 40 sekundni sekundlarda ifodalang.

A) 25880
B) 25920
C) 25860
D) 25960

28. 4 m^2 12 dm^2 16 cm^2 necha cm^2 ga teng?

A) 40136 B) 41216
C) 43016 D) 52016

29. 8; 19 va $3m$ sonlarning o'rta arifmetigi n dan 12 ga ortiq bo'lsa, m ni n orqali ifodalang.

A) $n - 21$
B) $n - 3$
C) $\frac{n-3}{3}$
D) $n + 3$

30. Detal uzunligi 1:8 masshtabli xaritada 4,5 cm bo'lsa, 1:5 masshtabli xaritada necha santimetr bo'ladi?

A) 6,8 B) 7
C) 7,8 D) 7,2

31. Magazinda birinchi kuni 76% tarvuz sotildi. Ikkinchi kuni esa qolgan 54 ta tarvuz sotildi. Birinchi kuni nechta tarvuz sotilgan?

A) 171 B) 176
C) 163 D) 168

32. Sayyoh belgilangan yo'lning $\frac{1}{6}$ qismini bosib o'tgach, yo'l yarmigacha yana 16 km qolgan bo'lsa, belgilangan yo'l uzunligini (km) toping.

A) 42 B) 54
C) 48 D) 36

33. Litrda ifodalang: 4 dm^3 400 cm^3.

A) 4,4 B) 0,44
C) 44 D) 4,04

34. Ikki shahar orasidagi masofa 240 km. 1:6000000 masshtabli xaritada bu masofa necha santimetrga teng bo'ladi?

A) 4 B) 1,2
C) 0,4 D) 40

35. Mahsulotning narxi ketma-ket ikki marta oshirilgach yangi narxi dastlabkisidan 124 foizga oshdi. Narx 1-marta 60 foizga oshirilgan bo'lsa, 2-marta necha foizga oshirilgan?

A) 30 B) 40
C) 32 D) 64

36. Suv solingan idishdan 80 foiz suv olindi, so'ngra yana qolgan suvning 25 foizi olindi. Idishda necha foiz suv qolgan?

A) 30 B) 18
C) 20 D) 15

37. Agar 8 litr dengiz suvida o'rtacha 300 g tuz bo'lsa, 5 m^3 dengiz suvida o'rtacha necha kilogramm tuz bo'ladi?

A) 166
B) 150,5
C) 224,5
D) 187,5

38. Ma'lum bir ishni birinchi ishchi 18 soatda, ikkinchi ishchi 24 soatda bajaradi. Agar shu ishni birinchi ishchi 3 soat ishlaganidan keyin unga ikkinchi ishchi qo'shilib 4 soat birgalikda ishlasa, ishning qancha qismi bajarilmay qoladi?

A) $\frac{2}{9}$
B) $\frac{2}{3}$
C) $\frac{5}{8}$
D) $\frac{4}{9}$

39. Qisqarmaydigan oddiy kasrning maxraji suratidan 3 birlikka katta. Agar kasrning suratiga 1, maxrajiga 2 qo'shilsa, hosil bo'lgan kasrning qiymati $\frac{2}{3}$ ga teng bo'ladi. Berilgan kasrning maxraji quyidagi sonlardan qaysi biriga qoldiqsiz bo'linadi?

A) 5 B) 3
C) 6 D) 8

40. –3; 6; 8 va x sonlarining o'rta arifmetigi y ning $\frac{1}{3}$ qismiga teng. Agar $3x - 2y = 15$ bo'lsa, y ning qiymatini toping.

A) 18
B) 24
C) 32
D) 28

41. Kasrning maxraji suratidan 8 ga ortiq bo'lib, ularning yig'indisi 30 ga teng. Bu kasrning suratidan 1 ni ayirib, maxrajiga 1 ni qo'shsak, kasrning qiymati quyidagilardan qaysi biriga teng bo'ladi?

A) $\frac{3}{7}$
B) $\frac{1}{2}$
C) $\frac{5}{6}$
D) $\frac{2}{5}$

42. Matematikadan yozma ish topshirgan o'quvchilarning $\frac{1}{8}$ qismi "5" baho, $\frac{7}{12}$ qismi "4" baho olgan. "3" baho olganlar esa "5" baho olganlar sonidan 6 taga ko'p. Agar 2 ta o'quvchi "2" baho olgan bo'lsa, nechta o'quvchi "4" baho olgan?

A) 35
B) 12
C) 28
D) 14

43. Karim ota 71 yoshda. Uning nabiralarining o'rtacha yoshi 21 da. Nabiralari bilan Karim otaning yoshlari o'rta arifmetigi 26 ga teng. Karim otaning nechta nabirasi bor?

A) 8 B) 9
C) 10 D) 12

44. Mis, rux va qo'rg'oshindan iborat bo'lgan 15 kg li qotishmaning tarkibida 20% mis bo'lib, rux va qo'rg'oshinning og'irliklari mos ravishda 5:1 nisbatda. Qotishmadagi ruxning og'irligi misning og'irligidan necha kilogrammga ko'p?

A) 4,5 B) 7
C) 6 D) 5

45. Ikki sonning yig'indisi 78 ga teng. Agar shu sonlardan birining 40%i ikkinchisining $\frac{1}{4}$qismiga teng bo'lsa, berilgan sonlardan kattasini toping.

A) 48
B) 44
C) 40
D) 56

46. A aralashmaning bir kilogrammi 12000 so'm, B aralashmaning bir kilogrammi 18000 so'm. A va B aralashmalardan mos ravishda 4:1 nisbatda tayyorlangan 1 kg aralashmaning narxini (so'm) aniqlang.

A) 14200
B) 13200
C) 14800
D) 12800

47. Bitta daftar 600 so'm va u bitta qalamning narxidan 400 so'mga qimmat. O'quvchi 3600 so'mga daftarlar va qalamlar sotib oldi. Quyida keltirilgan sonlardan qaysi biri xarid qilingan qalamlarning soni bo'la oladi?

A) 4 B) 5
C) 3 D) 1

48. a ning 18%i 60 ning $\frac{3}{5}$qismiga teng.

a ning $\frac{1}{5}$qismi 15 sonidan qanchaga ko'p?

A) 15 B) 10
C) 20 D) 25

49. Ishchi birinchi kuni ish normasining $\frac{1}{4}$qismini bajardi. Ikkinchi kuni birinchi kunda bajarilgan ishning $\frac{1}{8}$qismicha ko'p ish bajardi. Ishchi shu ikki kunda ish normasining qancha qismini bajargan?

A) $\frac{9}{16}$ B) $\frac{5}{8}$
C) $\frac{19}{32}$ D) $\frac{17}{32}$

50. Mis va ruxdan iborat qotishmaning massasi 18 kg. Qotishmaning 60%ini rux tashkil qiladi. Qotishmaning 50%ini mis tashkil qilishi uchun unga necha kilogramm mis qo'shish kerak?

A) 3,4
B) 1,8
C) 3,6
D) 4,2

51. Agar qisqarmaydigan kasrning surati 3 ga orttirilsa, kasrning qiymati $\frac{6}{7}$ga, maxraji 2 ga kamaytirilsa, kasrning qiymati $\frac{3}{4}$ga teng bo'ladi. Berilgan kasrning $\frac{7}{27}$ qismini toping.

A) $\frac{1}{12}$ B) $\frac{1}{6}$ C) $\frac{2}{3}$ D) $\frac{3}{4}$

52. Yog'liligi 5% bo'lgan 12 litr sut bilan yog'liligi 2% bo'lgan necha litr sut aralashtirilsa, yog'liligi 4,4% bo'lgan sut hosil bo'ladi?

A) 4,2 B) 3 C) 2 D) 2,5

53. 20%li va 40%li eritmalar aralashtirilib, 34%li 500 gramm eritma hosil qilindi. Har bir eritmadan necha grammdan aralashtirilgan?

A) 100 va 400
B) 150 va 350
C) 250 va 250
D) 200 va 300

54. 1 gektar maydonga o'rtacha 0,6 sentner zig'ir urug'i ekiladi. 1:10000 masshtabli xaritada bo'yi 20 cm va eni 12 cm bo'lgan to'g'ri to'rtburchak shaklidagi yer maydoniga zig'ir urug'i ekish uchun o'rtacha necha sentner kerak bo'ladi?

A) 14,4 B) 40
C) 400 D) 144

55. Masofa 5%ga orttirilib, tezlik 30%ga kamaytirilsa, harakatlanish vaqti necha foizga ortadi?

A) 35 B) 50
C) 25 D) 45

56. Farxod, Anvar va Jahongir birgalikda 57,8 kg uzum yig'ishdi. Anvar Farxodga nisbatan 2,4 kg ko'p, Jahongir esa Farxod bilan Anvarning birgalikdagi yig'ganidan 20,6 kg kam yig'gan. Anvar va Jahongir birgalikda necha kg uzum yig'ishgan?

A) 38,8
B) 39,4
C) 36,8
D) 40,2

Ratsional ko'rsatkichli daraja, ildizlar

1. Kasrni qisqartiring: $\frac{10^{n+1}-4\cdot 10^n}{10^{n+1}+5\cdot 10^n}$.

A) $\frac{2}{5}$
B) $\frac{3}{2}$
C) $\frac{2}{3}$
D) $\frac{5}{2}$

2. Hisoblang: $\left(\sqrt[6]{4}-1\right)\left(\sqrt[3]{4}+\sqrt[3]{2}+1\right)$.

A) 2 B) $2\sqrt{2}$
C) $\sqrt{2}$ D) 1

3. $x=\sqrt[3]{4}$, $y=\sqrt{2}$ va $z=\sqrt[12]{105}$ sonlarni kamayish tartibida joylashtiring.

A) $x>z>y$ B) $y>x>z$
C) $x>y>z$ D) $y>z>x$

4. $\underbrace{6^{12}+6^{12}+6^{12}+\ldots+6^{12}+6^{12}}_{32\ ta}$ yig'indining $\frac{3}{4}$ qismi quyidagilardan qaysi biriga teng?

A) $4\cdot6^{12}$
B) $2\cdot6^{13}$
C) $2^{14}\cdot3^{12}$
D) $2^{15}\cdot3^{13}$

5. $19^{123}-27\cdot26\cdot23\cdot22$ ayirma qanday raqam bilan tugaydi?

A) 4
B) 5
C) 9
D) 7

6. $\left(\left(a^{-2}\right)^{-3}\cdot\left(a^{3}\right)^{-1}\cdot a^{-2}\right)^{3}:a$ ifodaning $a=-\frac{1}{6}$ dagi qiymatini toping.

A) $\frac{1}{36}$
B) -6
C) $-\frac{1}{6}$
D) 36

7. Hisoblang:

$125^{\frac{2}{3}}\cdot4\cdot\sqrt[3]{(0{,}027)^2}+3$.

A) 12 B) 13
C) 6 D) 3

8. Hisoblang: $\sqrt{\left(3^{-2}\right)^{-1}+\left(2^{-2}\right)^{-2}}+1$.

A) 6 B) 5
C) 8 D) 4

9. Hisoblang:

$27\cdot\left(\left(3^{-1}\right)^{3}+\left(3^{-2}\right)^{3}-\left(3^{-3}\right)^{2}\right)+3$.

A) 5 B) 4
C) 3 D) 6

10. Agar a va b haqiqiy sonlar uchun $a<0<b$ bo'lsa, u holda $-\sqrt[3]{a^3}+\sqrt[3]{b^3}+\sqrt{a^2}-\sqrt{b^2}$ ni soddalashtiring.

A) 0
B) $2b$
C) $-2a$
D) $2b-2a$

11. Hisoblang: $\frac{\sqrt{32}+\sqrt{50}-\sqrt{72}}{\sqrt{18}}$.

A) 3 B) $\frac{\sqrt{5}}{3}$
C) 1 D) 2

12. Hisoblang: $\frac{5\sqrt{7}+7\sqrt{5}}{\sqrt{35}}-\sqrt{5}$.

A) $\sqrt{7}+\sqrt{5}$
B) $\sqrt{7}$
C) $\sqrt{7}-\sqrt{5}$
D) $\sqrt{5}$

13. Agar $a=7$ bo'lsa, $\sqrt{a^2-6a+9}+\sqrt{a^2-12a+36}$ ifodani qiymatini toping.

A) 4
B) 5
C) 7
D) 6

14. Hisoblang: $\frac{3}{3-\sqrt{12}}+\frac{3}{\sqrt{3}}+\sqrt{3}$.

A) 3 B) –2
C) 2 D) –3

15. Hisoblang: $\sqrt{17-\frac{3}{2}\sqrt{1-\frac{5}{9}}}$.

A) 4 B) 3
C) 2 D) 3,8

16. Hisoblang: $\sqrt{3-\frac{2}{9}}+\sqrt{1+\frac{7}{9}}$.

A) $\frac{4}{3}$
B) 3
C) 4
D) $\frac{5}{3}$

17. Hisoblang: $\sqrt{8-2\sqrt{7}}-\sqrt{7}-2$.

A) 0 B) –1
C) –2 D) –3

18. Hisoblang: $\sqrt{98\cdot 0{,}02\cdot 225}$.

A) 21
B) 20,1
C) 2,1
D) 21,1

19. $\frac{a^4\cdot\left(a^3\right)^6}{\left(a^5\right)^3}$ ifodaning daraja ko'rsatkichini aniqlang.

A) 5 B) 6
C) 8 D) 7

20. $15\cdot 2^{21}\cdot 5^{17}$ ko'paytma nechta nol bilan tugaydi?

A) 19 B) 18
C) 21 D) 22

21. $0{,}009\cdot 0{,}02\cdot 10^6$ ko'paytmani standart shaklga keltiring.

A) $1{,}8\cdot 10^{-1}$
B) $1{,}8\cdot 10$
C) $1{,}8\cdot 10^{2}$
D) $1{,}8\cdot 10^{-2}$

22. Agar $x=2n+1$ (n – natural son) bo'lsa, $\frac{(-1)^{x+1}+(-1)^{2x}}{(-1)^x}$ ifodaning qiymatini aniqlang.

A) –2
B) 2
C) 0
D) –2 yoki 0

23. Agar $a=\frac{2\sqrt{3}}{3}$ bo'lsa, $\frac{\left(a-2\sqrt{3}\right)^2}{a\left(\sqrt{3}-a\right)}$ ifodaning qiymatini toping.

A) –14 B) –8
C) 14 D) 8

24. $\frac{\sqrt{10}\cdot\sqrt{12}\cdot\sqrt{18}\cdot\sqrt{20}}{a}$ kasrning qiymati natural son bo'lishi uchun a quyidagi sonlardan qaysi biriga teng bo'lishi kerak?

A) $\sqrt{2}$
B) $\sqrt{3}$
C) $\sqrt{6}$
D) $\sqrt{5}$

25. Soddalashtiring, $(a \neq 0)$:

$$\left(\underbrace{(-2a)^3 \cdot (-2a)^3 \cdot \ldots \cdot (-2a)^3}_{14\ marta}\right) : \left(\underbrace{(-2a)^4 \cdot (-2a)^4 \cdot \ldots \cdot (-2a)^4}_{10\ marta}\right)$$

A) $-2a$ B) $4a^2$
C) $-8a^3$ D) 1

26. Hisoblang:

$$\frac{2^{23}+2^{23}+2^{23}+2^{23}+2^{23}+2^{23}}{16^6+16^6+16^6}.$$

A) $\frac{1}{4}$ B) 1 C) 8 D) 4

27. $\sqrt[3]{2\sqrt{\sqrt{2}}} : \sqrt{2}$ ni hisoblang va natijani ratsional ko'rsatkichli daraja shaklida tasvirlang.

A) $2^{-\frac{5}{12}}$
B) $2^{-\frac{7}{12}}$
C) $2^{-\frac{3}{4}}$
D) $2^{-\frac{1}{12}}$

28. Hisoblang: $70 \cdot 10^{-5} + 1{,}8 \cdot 10^{-4}$.

A) $8{,}8 \cdot 10^{-4}$
B) $88 \cdot 10^{-6}$
C) $0{,}88 \cdot 10^{-1}$
D) $8{,}8 \cdot 10^{-3}$

29. $\left(-x^3\right)^4 \cdot \left(x^2\right)^3 : \left(-x^5\right)^3$ ifodaning $x = -2$ dagi qiymatini toping.

A) -8 B) 0,5
C) 8 D) -4

30. Hisoblang: $32^{\frac{3}{5}} : 16^{\frac{1}{2}} - \sqrt{\sqrt{81}}$.

A) -2 B) 2
C) 1 D) -1

31. $\frac{x-25}{5+\sqrt{x}} + \frac{x^2-6}{\sqrt{6}-x}$ ifodaning $x = 6$ dagi qiymatini toping.

A) -11 B) $-2\sqrt{6}$
C) 1 D) -1

32. Hisoblang: $\frac{512 \cdot \left(2^4\right)^3}{\left(2^7\right)^2 \cdot 128} \cdot \left(2^{-4}\right)^{-3} \cdot 4^{-5}$.

A) 4 B) $\frac{1}{2}$
C) 1 D) 8

33. $\frac{x^{12} \cdot \left(x^{-3}\right)^{-5}}{\left(x^{-4}\right)^{-4} \cdot \left(x^2\right)^7}$ ifodaning $x = 3$ dagi qiymatini toping.

A) 9 B) $\frac{1}{9}$
C) 27 D) $\frac{1}{27}$

34. $\frac{\sqrt{2}-15}{\sqrt{\sqrt{2}+1}-4} - \sqrt{\sqrt{2}+1}$ ni hisoblang.

A) -2 B) 4
C) 2 D) 0

35. $\frac{\sqrt{11}-4}{\sqrt{\sqrt{11}-3}+1} - \frac{\sqrt{11}-12}{\sqrt{\sqrt{11}-3}-3}$ ni hisoblang.

A) -2 B) 4
C) -4 D) 2

36. Hisoblang: $\sqrt{28-10\sqrt{3}}-\dfrac{1}{\sqrt{7+4\sqrt{3}}}$.

A) $7-2\sqrt{3}$
B) 3
C) 7
D) $3-2\sqrt{3}$

37. Hisoblang:
$$\frac{\left(\sqrt{19}+\sqrt{2}\right)\cdot\left(\sqrt{38}+\sqrt{57}-\sqrt{6}-2\right)}{\sqrt{3}+\sqrt{2}}.$$

A) 18 B) 15
C) 19 D) 17

38. Hisoblang: $2-\sqrt{14}+\dfrac{9\sqrt{70}}{14\sqrt{5}-5\sqrt{14}}-\sqrt{5}$.

A) 1
B) 2
C) –1
D) 0

39. Hisoblang:
$$\left(\frac{1}{2-\sqrt{3}}-\frac{1}{2+\sqrt{3}}\right)\cdot\left(\sqrt{12}-\sqrt{75}\right).$$

A) –9
B) –15
C) –12
D) –18

40. Hisoblang:
$$2\sqrt{12{,}5}+\frac{6\sqrt{14}}{2\sqrt{7}+\sqrt{14}}-11\sqrt{2}+16.$$

A) 8
B) 9
C) 11
D) 10

41. Agar $a=6^{3x-2y}$ va $b=6^{3x+2y}$ bo'lsa, $4\cdot6^{x}+3\cdot6^{y}$ ni a va b orqali ifodalang.

A) $4\cdot\sqrt[6]{ab}+3\cdot\sqrt[4]{\dfrac{b}{a}}$
B) $4\cdot\sqrt[3]{ab}+3\cdot\sqrt{\dfrac{b}{a}}$
C) $4\cdot\sqrt[4]{ab}+3\cdot\sqrt[6]{\dfrac{a}{b}}$
D) $4\cdot\sqrt[4]{ab}+3\cdot\sqrt[3]{\dfrac{a}{b}}$

42. Agar $x=9$ bo'lsa, $\dfrac{x\sqrt{x}+8}{\sqrt{x}+2}-\dfrac{x^2+4x+16}{x+2\sqrt{x}+4}$ ifodaning qiymatini toping.

A) 1
B) 0
C) –1
D) 2

43. Agar $b>a>c>0$ bo'lsa, $\sqrt{(a-b)^2\cdot(a-c)^2\cdot(b-c)^2}$ ifoda quyidagilardan qaysi biriga teng?

A) $(a-b)(a-c)(b-c)$
B) $(c-a)(a-b)(b-c)$
C) $(c-b)(c-a)(a-b)$
D) $(b-a)(a-c)(c-b)$

44. Agar $m=0{,}09$, $n=0{,}16$ va $p=0{,}12$ bo'lsa, $\left(\sqrt{\dfrac{mnp+4}{m}}+4\sqrt{\dfrac{np}{m}}\right):\left(2+\sqrt{mnp}\right)$ ifodaning qiymatini toping.

A) $3\dfrac{1}{3}$ B) 0,12
C) 0,48 D) $1\dfrac{1}{4}$

45. Ifodani soddalashtiring ($x > 0$):

$$\sqrt[4]{\frac{7-2\sqrt{6}}{3x}} \cdot \left(3\sqrt{2x} + \sqrt{3x}\right)^{0,5}.$$

A) 2 B) 5 C) $\sqrt{3}$ D) $\sqrt{5}$

46. Kasrni qisqartiring:

$$\frac{3^{m+1} + 3^{1-m}}{\left(9^m + 1\right)\left(3^{2-m} + 3^{1-m}\right)}.$$

A) $\frac{1}{4}$ B) $\frac{1}{8}$

C) 3^{1-m} D) $\frac{1}{4 \cdot 3^m}$

47. Hisoblang:

$$6\sqrt[3]{108} - 5\sqrt[3]{256} + 12\sqrt[4]{32} - 8\sqrt[4]{162}.$$

A) $-\sqrt[4]{2}$ B) $2\sqrt[3]{4}$

C) $-2\sqrt[3]{4}$ D) 0

48. Hisoblang:

$$72 \cdot \left(-\frac{5}{6}\sqrt{15}\right)^2 + (-45) \cdot \left(-2\sqrt{\frac{10}{3}}\right)^2 + \\ + \frac{1}{6} \cdot \left(\sqrt[3]{-312}\right)^3.$$

A) 98
B) 106
C) 23
D) 1298

49. Hisoblang:

$$\left(10\sqrt{27} - 4\sqrt{75} + 11\sqrt{48}\right) : \left(2\sqrt{3}\right) - \\ - \left(-\frac{1}{3}\sqrt[4]{81}\right)^2.$$

A) 26 B) $8\frac{1}{3}$

C) 16 D) 24

50. Soddalashtiring:

$$2\sqrt{\left(1-\sqrt{10}\right)^2} - \sqrt[4]{\left(2\sqrt{10}-4\right)^4}.$$

A) $-4\sqrt{10}$ B) 6

C) 2 D) $4\sqrt{10}$

51. Kasrnipng maxrajini irratsionallikdan qutqaring: $\frac{\sqrt{3}}{2\sqrt{3} - \sqrt{13} - 1}$.

A) $\frac{1 - 2\sqrt{3} - \sqrt{13}}{2}$

B) $\frac{1 - 2\sqrt{3} - \sqrt{13}}{4}$

C) $\frac{1 - 2\sqrt{3} + \sqrt{13}}{4}$

D) $\frac{1 - 2\sqrt{3} + \sqrt{13}}{2}$

52. Hisoblang: $\left(2^{\sqrt{10-2\sqrt{21}}}\right)^{\left(\sqrt{3}+\sqrt{7}\right)} - 14\frac{2}{3}$.

A) $-6\frac{2}{3}$

B) $17\frac{1}{3}$

C) $-12\frac{2}{3}$

D) $1\frac{1}{3}$

53. Ifodani soddalashtiring:

$$\frac{a^{-\frac{7}{2}} - \frac{1}{a^2}}{a^{-\frac{5}{2}} - a^{-1}} + a^2 - \frac{1}{a} - 1.$$

A) $a + 1$
B) $a - 1$
C) $1 - a^2$
D) $a^2 - 1$

54. $\dfrac{2a^{-\frac{1}{6}} - \sqrt[3]{ab}}{a^{\frac{2}{3}}b^{\frac{1}{3}} - 2\sqrt[6]{a}} + \dfrac{3}{\sqrt[3]{a}}$ ifodaning $a = 64$, $b = 0{,}4$ dagi qiymatini toping.

A) $\dfrac{1}{3}$

B) $\dfrac{2}{5}$

C) $\dfrac{1}{6}$

D) $\dfrac{1}{2}$

55. Ifodani soddalashtiring: $(b > 0;\ b \neq 81)$

$$\frac{\left(b^{\frac{7}{12}} - 3b^{\frac{1}{3}}\right)\left(4b^{\frac{1}{4}} + 12\right)}{b^{\frac{5}{6}} - 9b^{\frac{1}{3}}}.$$

A) $4b^{\frac{1}{12}}$ B) 4

C) -4 D) $4b^{\frac{1}{3}}$

56. Hisoblang: $\left(\sqrt{11 - 6\sqrt{2}} - 2\right)^2 + 2\sqrt{2}$.

A) 4

B) 3

C) $-2\sqrt{2}$

D) 1

57. $\dfrac{b^{-\frac{5}{3}} + 2b^{-\frac{4}{3}} + b^{-1}}{b^{-\frac{4}{3}} + \dfrac{1}{b}} + 8b$ ifodaning

$b = \dfrac{1}{8}$ bo'lgandagi qiymatini toping.

A) 12 B) 4

C) $3\dfrac{1}{8}$ D) $2\dfrac{1}{2}$

58. Hisoblang: $\sqrt{3 - 2\sqrt{2}} + \sqrt{3 + 2\sqrt{2}}$.

A) $2\sqrt{2}$

B) $\sqrt{2} - 1$

C) $\sqrt{2}$

D) $\sqrt{2} + 1$

59. Hisoblang: $\sqrt{2017 \cdot 2021 + 4}$.

A) 2011

B) 2009

C) 2021

D) 2019

60. Hisoblang: $\sqrt{2019^2 - 2017 \cdot 2021}$.

A) 18 B) 2 C) 8 D) 12

61. Hisoblang:

$$\left(\frac{\sqrt{\sqrt{1009} + 12\sqrt{7}}}{\sqrt{\sqrt{1009} - 12\sqrt{7}}} + \frac{\sqrt{\sqrt{1009} - 12\sqrt{7}}}{\sqrt{\sqrt{1009} + 12\sqrt{7}}}\right)^2.$$

A) 2019 B) 4036

C) 4038 D) 2018

62. Hisoblang: $\dfrac{3}{\sqrt{8} - \sqrt{5}} + \dfrac{3}{\sqrt{2} - \sqrt{5}} - 1$.

A) $\sqrt{3} - 1$

B) $2\sqrt{2} + \sqrt{3}$

C) $2\sqrt{2} - \sqrt{3}$

D) $\sqrt{2} - 1$

63. Agar $3^x = 2$ bo'lsa,

$\dfrac{243^x}{32} + \dfrac{5 \cdot 27^x}{8} - 81^x$ ning qiymatini toping.

A) -5 B) -9

C) -2 D) -10

64. Ifodani soddalashtiring ($a > 0$):

$$\frac{2}{\sqrt[16]{a}+1}\cdot\frac{a-1}{\sqrt[8]{a}+1}\cdot\frac{1}{\sqrt[4]{a}+1}\cdot\frac{1}{\sqrt{a}+1}.$$

A) $2\left(\sqrt[16]{a}-1\right)$

B) $\sqrt[16]{a}-1$

C) $2\left(a^2-1\right)$

D) $\sqrt[16]{a}+1$

65. Agar $m = 8$ bo'lsa,

$$\sqrt{\left(\sqrt{m}+3\right)^2-12\sqrt{m}}-\sqrt{\left(\sqrt{m}-2\right)^2+8\sqrt{m}}$$

ifodaning qiymatini toping.

A) $4\sqrt{2}-1$

B) $1-4\sqrt{2}$

C) $-4\sqrt{2}-1$

D) -5

66. n – natural soni uchun

$\dfrac{n^2-6}{3^{35}+18\cdot3^{16}+1}=3$ tenglik o'rinli bo'lsa,

$\dfrac{n-3}{81^4}$ ning qiymatini toping.

A) 9

B) 27

C) $\dfrac{1}{3}$

D) $\dfrac{1}{9}$

67. O'zaro teskari sonlarni aniqlang.

1) $\dfrac{10}{\sqrt{5}}$ va $\dfrac{1}{2\sqrt{5}}$; 2) $\dfrac{8\sqrt{3}}{3}$ va $\dfrac{\sqrt{3}}{24}$;

3) $\left(2\sqrt{3}-3\right)$ va $\left(3+2\sqrt{3}\right)$;

4) $\left(2\sqrt{2}-3\right)$ va $\left(3+2\sqrt{2}\right)$.

A) hammasi B) 1, 2 va 4

C) faqat 1 D) 1 va 3

68. $\dfrac{\sqrt{mn}\cdot\sqrt[4]{m}}{(m+2)\cdot\sqrt[4]{m^{-1}n^2}}-\dfrac{m^2+4}{m^2-4}$ ifodaning

$m = 6$ va $n = 4\sqrt{3}$ bo'lgandagi qiymatini toping.

A) 2 B) –0,5

C) $\sqrt{3}$ D) $-2\sqrt{3}$

69. $\dfrac{a^2-2a\sqrt{5}-\sqrt[3]{4}+5}{a-\sqrt{5}}$ ifodaning $a=\sqrt{5}-\sqrt[3]{2}$ bo'lgandagi qiymatini toping.

A) 1 B) 0

C) $\sqrt{5}$ D) $2\sqrt[3]{2}$

70. Soddalashtiring: ($a < 0$)

$$3\sqrt{-a}+\frac{a}{\sqrt{-a}}.$$

A) $4\sqrt{a}$ B) $2\sqrt{-a}$

C) $2\sqrt{a}$ D) $4\sqrt{-a}$

Sonli ketma-ketliklar, progressiyalar

1. Agar $f(x) = 10\cdot6^x$ bo'lsa,
$f(-1) + f(-2) + f(-3) + f(-4) + \ldots$ ni hisoblang.

A) $\dfrac{215}{108}$ B) 1 C) 2 D) $\dfrac{5}{3}$

2. 1 dan 120 gacha (120 ning o'zi ham) bo'lgan natural sonlar orasida 3 ga ham, 5 ga ham bo'linmaydiganlari nechta?

A) 56 B) 64

C) 61 D) 60

3. Agar $b = -3$ bo'lsa, $\frac{(b^{17}-1)(b+1)}{b^{16}+b^{15}+b^{14}+...+b+1}$ ifodaning qiymatini toping.

A) 16 B) 8
C) 4 D) 15

4. Hisoblang:
$(10^{-2} + 10^{-4} + 10^{-6} + 10^{-8} + ...) + 0,(26)$.

A) $\frac{9}{11}$
B) $\frac{10}{9}$
C) $\frac{1}{3}$
D) $\frac{3}{11}$

5. x ning qanday qiymatida $\frac{4}{x-3}; \frac{2}{3}$ va $\frac{8-x}{x-3}$ lar berilgan tartibda arifmetik progressiyaning ketma-ket hadlari bo'ladi?

A) $4\frac{6}{7}$
B) $4\frac{3}{7}$
C) $6\frac{6}{7}$
D) $6\frac{3}{7}$

6. Hadlari $x_n = 4n^2 + cn + 2$ formula bilan berilgan ketma-ketlikda $x_4 - x_2 = 52$ bo'lsa, bu ketma-ketlikning uchinchi hadini toping.

A) 44 B) 52
C) 56 D) 50

7. (b_n) geometrik progressiyada $b_6 - b_3 = 84$ va $b_5 - b_2 = 42$ bo'lsa, $b_2 + b_4$ ni toping.

A) 27 B) 30
C) 36 D) 51

8. Sakkizta haddan iborat arifmetik progressiyaning toq o'rindagi hadlari yig'indisi 168 ga, juft o'rindagi hadlari yig'indisi 200 ga teng. Shu progressiyaning oltinchi hadini toping.

A) 58 B) 42
C) 66 D) 50

9. Arifmetik progressiyada $a_{n+1} = a_n + 2$ va $a_4 = 4$ bo'lsa, uning dastlabki 12 ta hadi yig'indisini toping.

A) 108 B) 126
C) 114 D) 96

10. $1\frac{1}{6}; 1\frac{1}{12}; 1; ...$ sonlar arifmetik progressiyaning hadlari bo'lsa, eng kichik musbat hadini toping.

A) $\frac{1}{3}$
B) $\frac{1}{4}$
C) $\frac{1}{24}$
D) $\frac{1}{12}$

11. Arifmetik progressiyani tashkil etuvchi $n + 3; n + 9; n + 15; ...; n + 123$ ketma-ketlikning o'n birinchi hadi 65 ga teng bo'lsa, bu ketma-ketlikning uchinchi hadini toping.

A) 18 B) 16 C) 14 D) 17

12. Umumiy hadi $x_n = \frac{3n}{2} + 1$ formula bilan berilgan ketma-ketlikning dastlabki yigirmata hadining o'rta arifmetigini toping.

A) $16\frac{3}{4}$

B) $14\frac{3}{4}$

C) $14\frac{1}{4}$

D) $16\frac{1}{4}$

13. Tenglamani yeching:

$(3x + 1) + (3x + 3) + (3x + 5) + ... + + (3x + 19) = 40.$

A) 2 B) –2 C) –1 D) –3

14. Agar $a_3 + a_6 + a_9 + ... + a_{3n} = 736$ va $a_{2n+1} + a_{n+2} = 23$ bo'lsa, $a_1; a_2; a_3; ...; a_{3n}$ arifmetik progressiyaning hadlari sonini toping.

A) 213
B) 204
C) 189
D) 192

15. $1\frac{1}{6}; 1\frac{1}{2}; 1\frac{5}{6}; ...$ sonlar arifmetik progressiyaning hadlari bo'lsa, uchinchi hadi o'ninchi hadining necha foizini tashkil etadi?

A) 24
B) 66
C) 52
D) 44

16. To'rtinchi hadi 20 ga teng bo'lgan arifmetik progressiyaning dastlabki o'n yettita hadi yig'indisi 680 ga teng. Progressiyaning oltinchi hadini toping.

A) 24 B) 18
C) 23 D) 28

17. 14,2; 14,8; 15,4; ...; 20,8 sonlar arifmetik progressiyaning hadlari bo'lsa, ularning yig'indisini toping.

A) 245
B) 222,5
C) 210
D) 220,5

18. $2m + 3; 3m + 5; 4m + 7; ...$ hadlari berilgan arifmetik progressiyaning dastlabki to'qqizta hadi yig'indisi 153 ga teng. m ning qiymatini toping.

A) 1 B) 2 C) 3 D) –1

19. 24; 36; 48; ... arifmetik progressiyada $a_n = 180$ bo'lsa, $\frac{2n+5}{n-3}$ ning qiymatini toping.

A) $3\frac{4}{7}$

B) $3\frac{1}{10}$

C) 1,5
D) 3

20. (24; 204] oraliqda 3 ga karrali bo'lgan barcha natural sonlar yig'indisi qanday raqam bilan tugaydi?

A) 6 B) 2
C) 5 D) 0

21. 12 ta qatordan iborat bo'lgan musiqa zalining birinchi qatorida 28 ta o'rindiq bor. Keyingi har bir qatordagi o'rindiqlar soni oldingi qatordagidan 4 taga ko'p. Musiqa zalida jami nechta o'rindiq bor?

A) 504
B) 600
C) 612
D) 576

22. Ketma-ketlikning istalgan 2 ta ketma-ket hadining yig'indisi 10 ga teng. Agar uchinchi hadi 7 ga teng bo'lsa, ketma-ketlikning dastlabki to'qqizta hadi yig'indisini toping.

A) 37 B) 45
C) 43 D) 47

23. Agar geometrik progressiyaning umumiy hadi $b_n = 3 \cdot 2^n$ bo'lsa,
$b_1^2 + b_2^2 + b_3^2 + ... + b_8^2$ yig'indini hisoblang.

A) $12 \cdot (2^{16} - 1)$
B) $3 \cdot (2^{16} - 1)$
C) $3 \cdot (2^{14} - 1)$
D) $12 \cdot (2^{14} - 1)$

24. Agar geometrik progressiyaning umumiy hadi $b_n = 3 \cdot 2^n$ bo'lsa, $\frac{1}{b_1} + \frac{1}{b_2} + ... + \frac{1}{b_{10}}$ yig'indini hisoblang.

A) $\frac{681}{512}$
B) $\frac{341}{1024}$
C) $\frac{341}{512}$
D) $\frac{681}{1024}$

25. (a_n) arifmetik progressiyaning dastlabki o'n ikkita hadining yig'indisi 432 ga teng. Agar $a_9 - a_5 = 16$ bo'lsa, to'rtinchi hadini toping.

A) 28
B) 26
C) 22
D) 24

26. Arifmetik progressiyada $a_4 = 1\frac{1}{6}$ va $d = \frac{1}{6}$ bo'lsa, $a_n < 2$ tengsizlikni qanoatlantiruvchi n ning eng katta qiymatini toping.

A) 8 B) 9
C) 10 D) 7

27. Arifmetik progressiyaning ikkinchi va oltinchi hadlarining yig'indisi 72 ga teng. Arifmetik progressiyaning ikkinchi hadining beshinchi hadiga nisbati $\frac{7}{10}$ ga teng bo'lsa, uning oltinchi hadini toping.

A) 40
B) 42
C) 44
D) 48

28. 41; 39; 37; ...; 25; 23 sonlar arifmetik progressiyaning hadlari bo'lsa,
$41^2 - 39^2 + 37^2 - 35^2 + ... + 25^2 - 23^2$ ni hisoblang.

A) 620
B) 640
C) 580
D) 680

29. Sportchi seshanba kuni yugurish mashg'ulotini boshlab, 1350 metr masofaga yugurdi. Keyingi har bir kunda esa oldingisidan 180 metr masofaga ortiq yugurdi. Sportchi 4410 metr masofaga yugurgan kuni mashg'ulotini tugatdi. Sportchi haftaning qaysi kuni mashg'ulotini tugatgan?

A) chorshanba
B) juma
C) payshanba
D) shanba

30. Arifmetik progressiyaning yettinchi hadi birinchi hadining 25%iga teng. Agar $a_2 + a_4 + a_6 = 90$ bo'lsa, birinchi va beshinchi hadi yig'indisini toping.

A) 72
B) 78
C) 82
D) 76

31. Arifmetik progressiyaning dastlabki to'rtta hadi yig'indisi 254 ga teng. Agar $a_7 - a_3 = -36$ va $a_n = 5$ bo'lsa, n ni toping.

A) 7 B) 11
C) 12 D) 9

32. Arifmetik progressiyaning dastlabki sakkizta hadi yig'indisi 248 ga, dastlabki o'n to'rtta hadi yig'indisi esa 686 ga teng. Arifmetik progressiyaning beshinchi hadini toping.

A) 40
B) 36
C) 42
D) 34

33. $a_1; a_2; a_3; \ldots; a_{n+1}; a_{n+2}$ arifmetik progressiyaning yig'indisi 390 ga teng. Agar $a_3 + a_n = 30$ bo'lsa, $\frac{n+3}{9}$ ning qiymatini toping.

A) 2
B) 3
C) $2\frac{2}{3}$
D) $3\frac{1}{3}$

34. Oltita musbat son geometrik progressiyani tashkil qiladi. Geometrik progressiyaning dastlabki ikkita hadining ko'paytmasi $\frac{9}{8}$ga, oxirgi ikkita hadining ko'paytmasi esa 288 ga teng. Shu progressiyaning oxirgi ikkita hadining yig'indisini toping.

A) 36
B) 18
C) 48
D) 34

35. −14,6; −13,8; −13; −12,2; ... arifmetik progressiyaning dastlabki o'n ikkita hadlari yig'indisini toping.

A) −123,2
B) −122,4
C) −124,8
D) −120,8

36. (a_n) arifmetik progressiya uchun $a_{13} = 106$ va $S_{13} = 754$ bo'lsa, a_3 ni toping.

A) 28
B) 26
C) 34
D) 22

37. Cheksiz kamayuvchi geometrik progressiyaning yig'indisi $9\left(\sqrt{3}+1\right)$ ga, birinchi hadi $6\sqrt{3}$ ga teng. Uning uchinchi hadini toping.

A) $2\sqrt{3}$ B) 3
C) $\sqrt{6}$ D) $3\sqrt{3}$

38. Dastlabki n ta hadining yig'indisi $S_n = 6n - 2n^2$ formula bo'yicha hisoblanadigan arifmetik progressiyaning ayirmasini toping.

A) –2 B) 2 C) –4 D) 4

39. Arifmetik progressiyaning dastlabki o'n ikkita hadining yig'indisi 168 bo'lsa, $a_5 + a_8$ ni toping.

A) 28 B) 56
C) 13 D) 14

40. Umumiy hadi $x_n = 3 + 5n - n^2$ formula bo'yicha berilgan sonli ketma-ketlikning eng katta hadi 15 dan qanchaga kam?

A) 5,75
B) 9,25
C) 6
D) 13

Trigonometriya asoslari

1. Hisoblang: $\dfrac{\sin 12° - \sin 10°}{\sin 10° + \sin 12°} - \dfrac{\text{tg}1°}{\text{tg}11°} + \dfrac{3}{2}$.

A) 1 B) 1,5
C) 2 D) –1

2. Agar $\sin\alpha\cdot\cos\alpha = -0{,}25$ va $1{,}6 < \alpha < 3{,}1$ bo'lsa, $\cos\alpha - \sin\alpha$ ning qiymatini toping.

A) $-\sqrt{1{,}5}$
B) $\sqrt{2}$
C) $\sqrt{1{,}5}$
D) $-\sqrt{2}$

3. Hisoblang:

$\log_{0,25}\text{tg}\dfrac{\pi}{4} + \log_{0,25}\cos\dfrac{\pi}{4} + \log_{0,25}\text{ctg}\dfrac{\pi}{4}$.

A) $-\dfrac{1}{2}$
B) 0
C) 1
D) $\dfrac{1}{4}$

4. Hisoblang:

$\log_2\text{ctg}\dfrac{\pi}{4} - \log_4\sin\dfrac{\pi}{12} - \log_4\cos\dfrac{\pi}{12}$.

A) 0 B) 1
C) –2 D) 2

5. Agar $\text{tg}\alpha = \sqrt{7}$ bo'lsa, $\dfrac{4\sin^4\alpha}{5\sin^2\alpha + 15\cos^2\alpha}$ ifodaning qiymatini toping.

A) 0,5 B) 0,49
C) 0,47 D) 0,48

6. $\dfrac{1}{2}(1 + \cos^{-1}2\alpha + \text{tg}2\alpha)(1 - \cos^{-1}2\alpha + \text{tg}2\alpha)$ ifodaning $\alpha = 15°$ dagi qiymatini toping.

A) $\dfrac{2}{\sqrt{3}}$
B) $2\sqrt{3}$
C) $\dfrac{1}{\sqrt{3}}$
D) $\sqrt{3}$

7. $2\left(1-\sin 2\alpha+\operatorname{ctg}\left(\frac{3\pi}{4}-\alpha\right)\cdot\cos 2\alpha\right)+1$ ifodaning $\alpha = 15°$ dagi qiymatini toping.

A) 1 B) $\sqrt{2}$
C) 0 D) –1

8. Ifodani soddalashtirting:

$$\frac{\cos\left(\frac{5\pi}{2}-6\alpha\right)+\sin(\pi+4\alpha)+\sin(3\pi+\alpha)}{\sin\left(\frac{5\pi}{2}+6\alpha\right)+\cos(4\alpha-2\pi)+\cos(\alpha+\pi)}.$$

A) cosα
B) tgα
C) sinα
D) ctgα

9. Ifodani soddalashtirting:

$$\frac{\sin 4\alpha}{1+\cos 4\alpha}\cdot\frac{\cos 2\alpha}{1+\cos 2\alpha}-\frac{\sin 2\alpha}{1+\cos 2\alpha}+1.$$

A) tgα + 1
B) sinα + 1
C) cosα + 1
D) 1

10. (tgα – ctgα)·(tgα + ctgα) ifodaning $\alpha = 75°$ bo'lgandagi qiymatini toping.

A) $8\sqrt{3}$ B) $4\sqrt{2}$
C) 8 D) $-8\sqrt{3}$

11. Ifodani soddalashtirting:

$$\frac{\sin\alpha+\sin 2\alpha+\sin 3\alpha}{\cos\alpha+\cos 2\alpha+\cos 3\alpha}.$$

A) tgα
B) ctgα
C) ctg2α
D) tg2α

12. Agar $\frac{4\sin\alpha+\cos\alpha}{5\sin\alpha-3\cos\alpha}=2$ bo'lsa tgα ning qiymatini toping.

A) $-\frac{6}{7}$ B) $\frac{6}{7}$
C) $\frac{7}{6}$ D) $-\frac{7}{6}$

13. Ifodani soddalashtiring:

$$\sin 2\alpha+\cos(2\alpha-2\pi)\cdot\operatorname{ctg}\left(\alpha-\frac{9\pi}{4}\right)+1.$$

A) 0 B) sinα
C) cosα D) 1

14. Hisoblang:

$$\frac{1}{2}+\frac{\sin 112°}{16\sin 7°}-\cos 7°\cdot\cos 14°\cdot\cos 28°\cdot\cos 56°.$$

A) 1 B) 0
C) $\frac{3}{4}$ D) $\frac{1}{2}$

15. Hisoblang: (tg435° – tg375°):sin120°.

A) 4 B) 1 C) 3 D) 2

16. Hisoblang:

$$\frac{\cos 68°\cdot\cos 8°-\cos 82°\cdot\cos 22°}{\cos 53°\cdot\cos 23°-\cos 67°\cdot\cos 37°}.$$

A) $\frac{3}{4}$ B) 1
C) 0 D) $\frac{1}{2}$

17. Agar $\sin\beta+\cos\beta = 1{,}35$ bo'lsa, β burchakka mos keluvchi nuqta qaysi chorakda joylashgan?

A) III B) I
C) II D) IV

18. $\left(\frac{1}{\sin^2\alpha}-\frac{1}{\cos^2\alpha}\right)\cdot\frac{\sin 2\alpha\,\mathrm{tg}\alpha}{1-\mathrm{tg}^2\alpha}$ ifodani soddalashtiring.

A) 2 B) 1
C) $\sin\alpha$ D) $\cos\alpha$

19. $y = 4\cos^3 2x + \sin^2 2x$ funksiyaning qiymatlari sohasini toping.

A) [–4; 4]
B) $[0; \sqrt{17}]$
C) $[1; \sqrt{17}]$
D) [0; 4]

20. $y = 4\cos^2 2x - 3\sin^2 2x$ funksiyaning qiymatlari sohasini toping.

A) [0; 4]
B) [1; 5]
C) [–3; 4]
D) [0; 5]

21. $\cos 4x = \cos 5x$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{8\pi}{9}$ B) $\frac{2\pi}{9}$
C) $\frac{2\pi}{3}$ D) $\frac{\pi}{9}$

22. $\sin 4x = \sin 3x$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{6\pi}{7}$
B) $\frac{2\pi}{7}$
C) $\frac{\pi}{7}$
D) $\frac{4\pi}{7}$

23. $(\sin x - 3\cos x)\cdot(1 + \cos x) = 4\sin^2 x$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{2\pi}{3}$ B) $\frac{\pi}{3}$
C) π D) $\frac{\pi}{2}$

24. $\cos^2 2x = \frac{2+\sqrt{3}}{4}$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{\pi}{3}$
B) $\frac{2\pi}{3}$
C) $\frac{\pi}{12}$
D) $\frac{\pi}{24}$

25. Tenglamani yeching: $\sqrt{3}\,\mathrm{tg}\left(4x-\frac{\pi}{4}\right)=1$.

A) $x = \frac{5\pi}{16} + \frac{\pi k}{4},\ k \in Z$
B) $x = \frac{5\pi}{36} + \frac{\pi k}{4},\ k \in Z$
C) $x = \frac{5\pi}{24} + \frac{\pi k}{4},\ k \in Z$
D) $x = \frac{5\pi}{48} + \frac{\pi k}{4},\ k \in Z$

26. Tenglamani yeching:
$\mathrm{tg}(2x + 3) = \mathrm{tg}(3x - 2)$.

A) $x = 5 + \pi k,\ k \in Z$
B) $x = 1 + \pi k,\ k \in Z$
C) $x = \frac{1+\pi k}{5},\ k \in Z$
D) $x = \pi k,\ k \in Z$

27. Tenglamani yeching:

$2\cos\left(2\pi x - \frac{\pi}{3}\right) + \sqrt{2} = 0.$

A) $x_1 = \frac{13}{24} + k,\ k \in Z;$

$x_2 = -\frac{5}{24} + k,\ k \in Z$

B) $x_1 = -\frac{13}{12} + k,\ k \in Z;$

$x_2 = \frac{5}{12} + k,\ k \in Z$

C) $x_1 = -\frac{13}{6} + k,\ k \in Z;\ x_2 = \frac{5}{6} + k,\ k \in Z$

D) $x_1 = -\frac{13}{24} + k,\ k \in Z;$

$x_2 = \frac{5}{24} + k,\ k \in Z$

28. Tenglamani yeching:

$\text{tg}(4x + \pi)\cdot\text{tg}(3x) = 1.$

A) $x = \frac{\pi}{4} + \frac{\pi k}{7},\ k \in Z$

B) $x = \frac{\pi}{14} + \frac{\pi k}{7},\ k \in Z$

C) $x = \frac{\pi}{7} + \frac{\pi k}{7},\ k \in Z$

D) $x = \frac{\pi}{3} + \frac{\pi k}{7},\ k \in Z$

29. $\sin\left(\frac{\pi}{4} + x\right)\cdot\cos\left(4x + \frac{\pi}{2}\right) = 0$ tenglamani yeching.

A) $x = \frac{\pi k}{4},\ k \in Z$

B) $x = \frac{\pi k}{2},\ k \in Z$

C) $x = \frac{\pi}{4} + \pi k,\ k \in Z$

D) $x = -\frac{\pi}{4} + \pi k,\ k \in Z$

30. $\text{tg}\left(\frac{\pi}{4} - x\right)\cdot\text{ctg}\left(x - \frac{\pi}{6}\right) = 0$

tenglamaning eng katta manfiy yechimini toping.

A) $-\frac{\pi}{6}$ B) $-\frac{3\pi}{4}$

C) $-\frac{\pi}{4}$ D) $-\frac{\pi}{3}$

31. $2\sin^2\left(x + \frac{\pi}{6}\right) + 3\sin\left(x + \frac{\pi}{6}\right) - 2 = 0$

tenglamaning eng kichik musbat yechimini toping.

A) $x = \frac{2\pi}{3}$

B) $x = \frac{3\pi}{4}$

C) $x = \frac{\pi}{6}$

D) $x = \frac{\pi}{4}$

32. $\frac{\text{tg}4x\cdot\text{tg}x}{\text{tg}2x} = 0$ tenglamani yeching.

A) $x = \frac{\pi}{4} + \pi k,\ k \in Z$

B) $x = \frac{\pi}{2} + \pi k,\ k \in Z$

C) Ø

D) $x = \frac{3\pi}{4} + \pi k,\ k \in Z$

33. Hisoblang:

$\sin 14^\circ + \cos 14^\circ\cdot\text{tg}38^\circ - 1.$

A) 2
B) 0
C) –1
D) 1

34. Hisoblang: $\dfrac{\sin 43^\circ + \sin 17^\circ}{2\cos 13^\circ + 3\sin 77^\circ}$.

A) $\frac{1}{2}$ B) $\frac{1}{5}$ C) $\frac{2}{3}$ D) 1

35. Hisoblang: $\dfrac{16\sin 251^\circ - 12\cos 161^\circ}{2\cos 19^\circ}$.

A) 2 B) –2 C) 3 D) –3

36. Agar $\sin\alpha = -\frac{2}{5}$ bo'lsa, $\dfrac{\sin 2\alpha - \sin 3\alpha + \sin 5\alpha}{1 + \cos\alpha - 2\sin^2 2\alpha}$ ning qiymatini toping.

A) $-\frac{4}{5}$ B) $\frac{2}{5}$

C) $-\frac{2}{5}$ D) $\frac{5}{4}$

37. Agar $x^2 - 7x + 12 = 0$ tenglamaning ildizlari tgα va tgβ bo'lsa, tg(α + β) ifodaning qiymatini toping.

A) $\frac{7}{11}$ B) $-\frac{7}{11}$

C) $\frac{7}{6}$ D) $-\frac{7}{6}$

38. $\cos\left(\frac{\pi}{2} - 8x\right) + 2\sin\left(\frac{3\pi}{2} + 4x\right) \cdot \sin(\pi + 4x) = 0$ tenglamaning barcha yechimlarini toping.

A) $x = \frac{\pi}{2} + \pi k,\ k \in Z$

B) $x = \frac{\pi}{4} + \pi k,\ k \in Z$

C) $(-\infty; +\infty)$

D) $x = \frac{\pi k}{8},\ k \in Z$

39. $\sin x + \sqrt{3}\cos x - 2 = 0$ tenglamaning barcha ildizlarini toping.

A) $x = \frac{\pi}{6} + 2\pi k,\ k \in Z$

B) $x = -\frac{\pi}{6} + 2\pi k,\ k \in Z$

C) $x = -\frac{\pi}{6} + \pi k,\ k \in Z$

D) $x = \frac{\pi}{6} + \pi k,\ k \in Z$

40. $\sin x + 2\cos\left(x + \frac{\pi}{6}\right) = 0$ tenglamaning barcha ildizlarini toping.

A) $x = \frac{\pi}{6} + 2\pi k,\ k \in Z$

B) $x = -\frac{\pi}{3} + \pi k,\ k \in Z$

C) $x = \frac{\pi}{2} + \pi k,\ k \in Z$

D) $x = \frac{\pi}{3} + 2\pi k,\ k \in Z$

41. $\sin x = \sin 1$ tenglamaning barcha yechimlarini toping.

A) $x = 1 + 2\pi k,\ k \in Z$

B) $x = (-1)^k + \pi k,\ k \in Z$

C) $x = -1 + 2\pi k,\ k \in Z$

D) $x = 1 + \pi k,\ k \in Z$

42. Hisoblang: $\operatorname{tg}\left(\pi - \arccos\frac{\sqrt{2}}{2}\right)$.

A) –1

B) 1

C) $-\frac{\sqrt{3}}{3}$

D) $\frac{\sqrt{3}}{3}$

43. Agar $\sin5°\cdot\cos5°\cdot\cos10°\cdot\cos20°\cdot\cos40° = m$ bo'lsa, $\frac{1}{2}\sin80°$ ni m orqali ifodalang.

A) $4m$
B) $-4m$
C) $16m$
D) $8m$

44. Agar $\sin^4x - \cos^4x = m$ bo'lsa, $\cos^2x$ ni m orqali ifodalang.

A) $\frac{1+m}{2}$
B) $-\frac{m+1}{2}$
C) $\frac{m-1}{2}$
D) $\frac{1-m}{2}$

45. Agar $m = \cos2°$ bo'lsa, $\frac{1-\operatorname{tg}^2178°}{\operatorname{tg}^2178°+1}$ ni m orqali ifodalang.

A) $1 - 2m^2$
B) $2m^2 - 1$
C) $4m$
D) $2m$

46. $\cos x + \sin\frac{x}{2} = 1$ tenglama $[0; 2\pi]$ da nechta ildizga ega?

A) 5 B) 3
C) 4 D) 6

47. $|\cos x| + \sqrt{\sin 2x} = 0$ tenglama $[0; 2\pi]$ kesmada nechta ildizga ega?

A) 2 B) 1
C) 0 D) 3

48. Agar $\sin\alpha = \frac{1}{\sqrt{10}}$ va $\alpha \in \left(0; \frac{\pi}{2}\right)$ bo'lsa, $\operatorname{tg}2\alpha$ ning qiymatini toping.

A) $\frac{1}{3}$ B) $\frac{3}{8}$
C) $\frac{3}{4}$ D) $-\frac{3}{4}$

49. α, β va γ – uchburchakning ichki burchaklari. Agar $\operatorname{ctg}\beta = -\frac{2}{3}$ bo'lsa, $\operatorname{tg}(\alpha+\gamma)$ ning qiymatini toping.

A) $-1\frac{1}{2}$
B) $\frac{2}{3}$
C) $-\frac{2}{3}$
D) $1\frac{1}{2}$

50. Quyida berilgan sonlardan qaysi biri $\sqrt{3}\operatorname{tg}\left(\frac{3\pi x}{2}\right) - 1 = 0$ tenglamaning ildizi bo'la olmaydi?

A) $\frac{1}{9}$ B) $2\frac{1}{9}$
C) $\frac{2}{3}$ D) $\frac{7}{9}$

51. $\left(\frac{1}{4}; 2\frac{1}{4}\right)$ oraliqda $\sin\left(\frac{2\pi x}{3}\right) + 1 = 0$ tenglama nechta ildizga ega?

A) 2
B) 0
C) 3
D) 1

52. Hisoblang:

$\sqrt{3}\,\mathrm{tg}(-690°) + 2\cos(-480°) + \sqrt{3}$.

A) $\sqrt{3}$ B) $\sqrt{3}+1$

C) 0 D) $\sqrt{3}-2$

53. Agar $\sin\alpha = -\frac{4}{5}$ va $\alpha \in \left(\frac{3\pi}{2}; 2\pi\right)$ bo'lsa, $\sin^2\frac{\alpha}{2}$ ning qiymatini toping.

A) 0,2
B) 0,8
C) 0,1
D) 0,4

54. Hisoblang:

$\sin\frac{\pi}{12}\cdot\cos^3\frac{\pi}{12} - \cos\frac{\pi}{12}\cdot\sin^3\frac{\pi}{12}$.

A) $\frac{\sqrt{3}}{4}$ B) $\frac{1}{8}$

C) $\frac{\sqrt{3}}{6}$ D) $\frac{\sqrt{3}}{8}$

55. $\sin\alpha\cdot\cos^3\alpha - \cos\alpha\cdot\sin^3\alpha$ ifodaning $\alpha = \frac{3\pi}{16}$ dagi qiymatini toping.

A) $\frac{\sqrt{2}}{4}$ B) $\frac{\sqrt{2}}{8}$

C) $-\frac{\sqrt{2}}{4}$ D) $\frac{1}{4}$

56. $3^{\frac{1}{\log_{0,25}3}} - 0,25^{1+\cos^2(5\pi-3x)}$ ifodaning eng kichik qiymatini toping.

A) 0 B) $-\frac{3}{4}$

C) $\frac{3}{16}$ D) $-\frac{1}{4}$

57. Hisoblang:

$$\frac{\sin(\log_3 8)-\sin(\log_3 2)}{\sin(\log_3 2)+\sin(\log_3 8)} - \frac{\mathrm{tg}(\log_3 2)}{\mathrm{tg}(\log_3 4)}.$$

A) 1 B) 0

C) –1 D) 2

58. Soddalashtiring:

$$\frac{\sin(2\alpha+\beta)+\sin(2\alpha-\beta)}{\sin(2\alpha-\beta)-\sin(2\alpha+\beta)} - \frac{\mathrm{tg}\beta-\mathrm{tg}2\alpha}{\mathrm{tg}\beta}.$$

A) 1 B) –1

C) 2 D) 0

59. Soddalashtiring:

$$\frac{\sin(\log_2 3+\log_3 2)+\sin(\log_2 3-\log_3 2)}{\sin(\log_2 3-\log_3 2)-\sin(\log_2 3+\log_3 2)} - \frac{2\mathrm{tg}\log_3 2 - \mathrm{tg}\log_2 3}{\mathrm{tg}\log_3 2}.$$

A) –2
B) 1
C) 0
D) –1

60. Agar $\sin\alpha + \sin\beta = -\sqrt{2}$ va $\cos\alpha + \cos\beta = -1$ bo'lsa, $\cos(\alpha-\beta)$ ning qiymatini toping.

A) –0,2
B) –1,5
C) 0,5
D) 0,2

61. Hisoblang:

$$2\cdot\left(\frac{\sin^3 1-\cos^3 1}{\sin 1-\cos 1} - \frac{\sin^2 1+\cos^2 1}{\mathrm{tg}1+\mathrm{ctg}1}\right)+1.$$

A) 1,25
B) 3
C) 2
D) 1,5

62. Hisoblang: $\log_{\frac{3}{4}}\left(\cos\frac{\pi}{12}+\sin\frac{\pi}{12}\right)-$
$-\log_{\frac{4}{3}}\left(\cos\frac{\pi}{12}-\sin\frac{\pi}{12}\right)$.

A) 0 B) $\frac{1}{2}$
C) $-\frac{1}{2}$ D) 1

63. Agar $\sin\alpha=\frac{2}{5}$ bo'lsa,
$\cos^6\alpha+\sin^6\alpha+3\cos^2\alpha\sin^2\alpha-1$ ning qiymatini toping.

A) 1 B) $\frac{1}{2}$
C) 0 D) $\frac{\sqrt{3}}{2}$

64. Agar $\sin\alpha=\frac{2}{5}$ bo'lsa,
$\cos^6\alpha-3\cos^4\alpha+3\cos^2\alpha+\sin^6\alpha-1$ ning qiymatini toping.

A) 1 B) –2
C) –1 D) 0

65. Hisoblang:
$\sin^61-3\sin^41+3\sin^21+\cos^61+1$.

A) 0
B) 2
C) –1
D) –2

66. Hisoblang: $\sin^6\frac{\pi}{7}-3\sin^4\frac{\pi}{7}+2\sin^2\frac{\pi}{7}+$
$+\cos^6\frac{\pi}{7}-\cos^2\frac{\pi}{7}$.

A) 0 B) 2 C) 1 D) –1

67. Hisoblang: $\cos^611°-3\cos^411°+2\cos^211°+$
$+\sin^611°-\sin^211°$.

A) 1 B) 2
C) 0 D) –1

68. Agar $\operatorname{tg}\alpha+\operatorname{ctg}\alpha=3$ bo'lsa,
$\operatorname{tg}^2\alpha-2\operatorname{tg}\alpha+\operatorname{ctg}\alpha$ ifodaning qiymatini toping.

A) 1 B) 4
C) 2 D) 3

69. Ifodani soddalashtiring:
$\sin\alpha+\sin\left(\alpha-\frac{14\pi}{3}\right)+\sin\left(\alpha+\frac{8\pi}{3}\right)$.

A) 0
B) $\cos\alpha$
C) $\sin\alpha$
D) 1

70. Ifodani soddalashtiring:
$\sin\left(2\alpha-\frac{3\pi}{2}\right)+\cos\left(2\alpha-\frac{8\pi}{3}\right)+$
$+\cos\left(2\alpha+\frac{2\pi}{3}\right)+1$.

A) $\sin2\alpha$
B) 2
C) $\cos2\alpha$
D) 1

71. Hisoblang:
$\cos^4\frac{\pi}{8}+\cos^4\frac{5\pi}{8}+\cos^4\frac{3\pi}{8}+\cos^4\frac{9\pi}{8}+1$.

A) $\frac{3}{2}$ B) $\frac{3}{4}$
C) $\frac{1}{2}$ D) $\frac{5}{2}$

72. Hisoblang:

$\sin^4\frac{\pi}{12}+\sin^4\frac{7\pi}{12}+\sin^4\frac{5\pi}{12}+\sin^4\frac{11\pi}{12}+3.$

A) $\frac{3}{4}$

B) $4\frac{3}{4}$

C) $2\frac{3}{4}$

D) $3\frac{3}{4}$

73. Hisoblang: $(\text{tg}435^\circ - \text{tg}375^\circ)\cdot$
$\cdot\sin^2 70^\circ\cdot\sin^2 50^\circ\cdot\sin^2 10^\circ : \sin 120^\circ.$

A) $\frac{1}{16}$

B) $\frac{1}{8}$

C) 1

D) $\frac{1}{4}$

74. $y = \cos^2 2x - \text{tg}2x\text{ctg}2x$ funksiyaning qiymatlari sohasini toping.

A) $[0; 1]$

B) $[-1; 0]$

C) $(-1; 0)$

D) $(-2; -1)\cup(-1; 0)$

75. Tenglamaning barcha yechimlarini toping.

$\cos^2 5x + \sin^2 7x = 1$

A) $x = \pi k,\ k \in Z$

B) $x = \frac{\pi k}{12},\ k \in Z$

C) $x = \frac{\pi k}{2},\ k \in Z$

D) $x = \frac{\pi k}{6},\ k \in Z$

76. $\sin 2x = \cos 3x$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{\pi}{5}$

B) $\frac{\pi}{10}$

C) $\frac{3\pi}{5}$

D) $\frac{\pi}{2}$

77. $\sin 2x = \cos^4 x - \sin^4 x$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{\pi}{8}$ B) $\frac{3\pi}{4}$

C) $\frac{3\pi}{8}$ D) $\frac{5\pi}{8}$

78. $\cos^4 13x - \sin^4 13x = \cos 24x$ tenglamaning barcha yechimlarini toping.

A) $x = \frac{\pi k}{4},\ k \in Z$

B) $x = \pi k,\ k \in Z$

C) $x = \frac{\pi k}{5},\ k \in Z$

D) $x = \frac{\pi k}{25},\ k \in Z$

79. $\sin 3x = \cos\left(x - \frac{\pi}{6}\right)$ tenglamaning $[0; \pi]$ kesmadagi barcha yechimlari yig'indisini toping.

A) $\frac{5\pi}{6}$

B) $\frac{\pi}{6}$

C) $\frac{2\pi}{3}$

D) $\frac{\pi}{3}$

80. $2\cos^2 x - \cos x - 1 = 0$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{3\pi}{4}$ B) $\frac{2\pi}{3}$

C) $\frac{\pi}{6}$ D) $\frac{\pi}{4}$

81. $8\cos\frac{3x}{2}\cdot\cos\frac{x}{2} - 3 = 6\cos 2x$ tenglamaning eng kichik musbat yechimi π dan qanchaga kam?

A) $\frac{3\pi}{2}$

B) $\frac{2\pi}{3}$

C) $\frac{3\pi}{4}$

D) $\frac{5\pi}{6}$

82. Hisoblang: $\left(\operatorname{tg}\frac{5\pi}{16} + \operatorname{tg}\frac{3\pi}{16}\right)\cdot\cos\frac{\pi}{8} - 1$.

A) -1 B) 0

C) 2 D) 1

83. Hisoblang:

$\cos^2 47^\circ + \cos^2 73^\circ + \cos 47^\circ\cdot\cos 73^\circ + \frac{1}{2}$.

A) $\frac{2}{3}$ B) $\frac{1}{2}$

C) $\frac{5}{4}$ D) 1

84. Agar $\sin\alpha + \cos\alpha = \sqrt{2}$ bo'lsa, $\operatorname{tg}^3\alpha + \operatorname{ctg}^3\alpha$ ning qiymatini toping.

A) 3 B) 1

C) 4 D) 2

85. Agar $\operatorname{tg}\alpha = \frac{5}{6}$ bo'lsa,

$\frac{\sin\alpha + \sin 3\alpha + \sin 5\alpha + \sin 7\alpha}{\cos\alpha - \cos 3\alpha + \cos 5\alpha - \cos 7\alpha}$ ning qiymatini toping.

A) $\frac{5}{6}$ B) $\frac{5}{4}$

C) $\frac{6}{5}$ D) $-\frac{4}{5}$

86. $\frac{\cos 6x}{2\sin 4x} + \frac{\sin 2x}{2} = 0$ tenglamaning barcha yechimlarini toping.

A) $x = \frac{\pi}{4} + \pi k,\ k \in Z$

B) $x = \frac{\pi}{8} + \frac{\pi k}{4},\ k \in Z$

C) $x = \frac{\pi}{2} + \pi k,\ k \in Z$

D) $x = \frac{3\pi}{4} + \pi k,\ k \in Z$

87. $\frac{1}{\cos x} + \frac{\sqrt{3}}{\sin x} = 4$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{\pi}{3}$ B) $\frac{2\pi}{9}$

C) $\frac{2\pi}{3}$ D) $\frac{\pi}{6}$

88. $2\cos(2\pi x - \frac{\pi}{3}) + \sqrt{2} = 0$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{21}{24}$ B) $\frac{11}{12}$

C) $\frac{13}{24}$ D) $\frac{13}{12}$

89. $\sin x - \sin\frac{3x}{2}\cos\frac{x}{2} = 0$ tenglamaning $[0; \pi]$ kesmadagi turli yechimlari yig'indisini toping.

A) $\frac{5\pi}{6}$ B) π

C) $\frac{4\pi}{3}$ D) $\frac{\pi}{3}$

90. $\cos 5x = \cos(5 + x)$ tenglamaning eng kichik musbat yechimini toping.

A) $\frac{5}{6}$

B) $\frac{5}{3}$

C) $\frac{5}{4}$

D) $\frac{\pi}{3} - \frac{5}{6}$

91. Agar $\cos 34^\circ = a$ va $\sin 31^\circ = b$ bo'lsa, $\sin 22^\circ + \sin 28^\circ$ ni a va b orqali ifodalang.

A) $2(b^2 - a^2)$
B) $a^2 - b^2$
C) $b^2 - a^2$
D) $2(a^2 - b^2)$

92. Agar $0 < \alpha, \beta < \frac{\pi}{2}$ lar uchun $\operatorname{tg}\alpha = \frac{1}{7}$ va $\sin\beta = \frac{1}{\sqrt{10}}$ bo'lsa, $\operatorname{tg}(\alpha + 2\beta)$ ni hisoblang.

A) 0
B) $\sqrt{3}$

C) $\frac{\sqrt{3}}{3}$

D) 1

93. Agar $0 < \alpha, \beta < \frac{\pi}{2}$ lar uchun $\operatorname{tg}\alpha = \frac{1}{2}$ va $\sin\beta = \frac{15}{17}$ bo'lsa, $\sin 2\alpha + \operatorname{tg}\frac{\beta}{2}$ ni hisoblang.

A) $\frac{7}{5}$ B) $\frac{5}{2}$

C) $\frac{5}{7}$ D) $\frac{2}{5}$

94. Agar $0 < \alpha, \beta < \frac{\pi}{2}$ lar uchun $\operatorname{tg}\alpha = 3$ va $\sin\beta = \frac{2\sqrt{2}}{3}$ bo'lsa, $\sin 2\alpha + \cos\beta$ ni hisoblang.

A) $\frac{4}{5}$ B) $\frac{5}{4}$

C) $\frac{14}{15}$ D) $\frac{15}{14}$

95. $\frac{\sin^2 x - 1}{1 - \operatorname{tg} x} = 0$ tenglamaning $[0; \pi]$ kesmadagi ildizlari yig'indisini toping.

A) $\frac{3\pi}{2}$
B) tenglama ildizga ega emas
C) $\frac{\pi}{2}$
D) π

96. Tenglamani yeching:

$(\sin(x + 1{,}5\pi) - 1)\cdot\operatorname{tg}\frac{x}{2} = 0.$

A) $\frac{\pi}{2} + \pi k,\ k \in Z$
B) $\pi + 2\pi k,\ k \in Z$
C) $2\pi k,\ k \in Z$
D) $\pi k,\ k \in Z$

Algebraik ifodalar

1. Algebraik ifodaning qiymatini toping. $0{,}25ab - 0{,}3b^2$, bunda $a = 4$ va $b = 3$.

A) –0,3 B) 3
C) 0,3 D) –3

2. Soddalashtiring: $3a - (5a - (3a - (2a + b)))$.

A) $a - b$
B) $-a - b$
C) $-a + b$
D) $a + b$

3. $\left(2\frac{1}{4}a^2b^3\right)\cdot\left(-3\frac{1}{3}a^3b^4\right)$

ifodani soddalashtiring.

A) $-7\frac{1}{12}a^5b^7$
B) $-7\frac{1}{2}a^5b^7$
C) $-7\frac{1}{3}a^5b^7$
D) $-7\frac{1}{4}a^5b^7$

4. $\frac{1}{2}x + \frac{1}{3}y + \frac{1}{3}x - \frac{1}{6}x - \frac{1}{2}y$ ifodani soddalashtiring.

A) $-\frac{2}{3}x - \frac{1}{6}y$
B) $\frac{2}{3}x - \frac{1}{6}y$
C) $\frac{2}{3}x + \frac{1}{6}y$
D) $-\frac{2}{3}x + \frac{1}{6}y$

5. Agar $P = 3a^2 + 4b$, $Q = -2a^2 - 3b$ bo'lsa, $P + Q + 4b$ ni toping.

A) $a^2 + 5b$
B) $-a^2 - 5b$
C) $-a^2 + 5b$
D) $a^2 - 5b$

6. $(5a - 3b) - (-4b + 7a)$ ifodani soddalashtiring.

A) $-2a - b$
B) $2a + b$
C) $-2a + b$
D) $2a - b$

7. $3(4x - 3y) - 2(-3y + 4x)$ ifodani soddalashtiring.

A) $-4x + 3y$
B) $4x - 3y$
C) $4x + 3y$
D) $-4x - 3y$

8. $(-1{,}5a^2b^3)^2\cdot(-100a^3b^4)$ ifodani soddalashtiring.

A) $225a^7b^9$
B) $-225a^7b^9$
C) $-225a^7b^{10}$
D) $225a^7b^{10}$

9. Agar $x = 3$, $y = 4$ bo'lsa, $xy^2x^2y - 13xyxy$ ifodaning qiymatini toping.

A) 72
B) 144
C) –144
D) –72

10. $2(5a-3)-3(4a-5)+4(a-5)$ ifodani soddalashtiring.

A) $2a+11$
B) $-2a+11$
C) $2a-11$
D) $-2a-11$

11. Ko'phadlarni ko'paytiring:
$(3a+4)\cdot(4a-3)$.

A) $12a^2-25a-12$
B) $12a^2+25a-12$
C) $12a^2-7a-12$
D) $12a^2+7a-12$

12. Ko'phadlarni ko'paytiring:
$(x^2+2x+1)\cdot(x-1)$.

A) x^3-x^2-x-1
B) x^3-x^2+x-1
C) x^3+x^2-x-1
D) x^3+x^2+x-1

13. Ko'phadlarni ko'paytiring:
$(a+3)\cdot(a+1)\cdot(a-3)$.

A) a^3+a^2-9a-9
B) a^3+a^2+9a-9
C) a^3-a^2+9a-9
D) a^3-a^2-9a-9

14. $\left(-1\frac{1}{2}a^4b^3c^2\right):\left(-\frac{4}{3}a^2b^2c^2\right)$ bo'lishni bajaring.

A) $-1\frac{1}{8}a^2b$
B) $2a^2b$
C) $1\frac{1}{8}a^2b$
D) $-2a^2b$

15. Ifodani soddalashtiring: $(4a^2b^3)^3:(-2a^2b^3)^2$.

A) $-3a^2b^3$ B) $16a^2b^3$
C) $-16a^2b^3$ D) $3a^2b^3$

16. Ko'paytuvchilarga ajrating:
$ac-bc+b^2-ab$.

A) $(b-a)\cdot(c+b)$
B) $(a-b)\cdot(c-b)$
C) $(a-b)\cdot(b-c)$
D) $(a-b)\cdot(b+c)$

17. Ko'paytuvchilarga ajrating:
$x(3x-4y)-6x+8y$.

A) $(x+2)\cdot(3x-4y)$
B) $(x-2)\cdot(4y-3x)$
C) $(x-2)\cdot(3x+4y)$
D) $(x-2)\cdot(3x-4y)$

18. Ko'paytuvchilarga ajrating:
$2bx-3ay-6by+ax$.

A) $(a+2b)\cdot(3y-x)$
B) $(a+2b)\cdot(x-3y)$
C) $(2b-a)\cdot(x+3y)$
D) $(a-2b)\cdot(x+3y)$

19. $(-2a+3b)^2$ algebraik ifoda quyidagilardan qaysi biriga aynan teng?

A) $4a^2-6ab+9b^2$
B) $4a^2-12ab+9b^2$
C) $4a^2+6ab+9b^2$
D) $4a^2+12ab+9b^2$

20. $(2x-1)^2\cdot(2x+1)^2$ algebraik ifoda quyidagilardan qaysi biriga aynan teng?

A) $16x^4-8x^2+1$
B) $16x^4+8x^2+1$
C) $16x^4-4x^2+1$
D) $16x^4+4x^2+1$

21. Ko'paytirishni bajaring:

$$\left(3x^2 - \frac{1}{2}y\right) \cdot \left(3x^2 + \frac{1}{2}y\right).$$

A) $9x^4 - \frac{1}{4}y^2$

B) $18x^4 - \frac{1}{4}y^2$

C) $9x^4 - \frac{1}{8}y^2$

D) $9x^4 - \frac{1}{2}y^2$

22. Ko'paytuvchilarga ajrating:
$(3a + 2b)^2 - (2a + 3b)^2$.

A) $(5a + b)\cdot(a - b)$
B) $(a + 5b)\cdot(a - b)$
C) $-5(a + b)\cdot(a - b)$
D) $5(a + b)\cdot(a - b)$

23. Ifodani soddalashtiring:

$$-\frac{9a^4b^3}{16c^3d^2} \cdot \left(-2\frac{2}{3} \cdot \frac{c^3d}{a^3b^2}\right).$$

A) $-\frac{3ab}{2d}$ B) $\frac{3a^2b}{2d}$

C) $-\frac{3a^2b}{2d}$ D) $\frac{3ab}{2d}$

24. Ifodani soddalashtiring:

$$\frac{5(a-b)}{3(a^2+b^2)} : \frac{a^2-b^2}{(a+b)^2-2ab}.$$

A) $\frac{5}{3(a+b)}$

B) $-\frac{5}{3(a+b)}$

C) $\frac{5}{3(a-b)}$

D) $-\frac{5}{3(a-b)}$

25. Ifodani soddalashtiring:

$$\frac{4a^2-16a+16}{a+3} : \frac{(a-2)^2}{-a^2+9}.$$

A) $4a - 12$
B) $2a - 12$
C) $12 - 4a$
D) $6 - 2a$

26. Ifodani soddalashtiring:

$$\frac{a-3}{36} - \frac{a+5}{12} - \frac{a-8}{6}.$$

A) $\frac{15-4a}{18}$

B) $\frac{4a-15}{18}$

C) $\frac{-2a-9}{9}$

D) $\frac{2a-9}{9}$

27. Amallarni bajaring: $\frac{1}{6x^3} - \frac{2}{3x^2y} - \frac{3}{4y^2}$.

A) $\frac{2y^2-8xy^2-9x^3}{12x^3y^2}$

B) $\frac{2y^2-8xy-9x^3}{12x^3y^2}$

C) $\frac{2y^2-8xy-9x^2}{12x^3y^2}$

D) $\frac{2y^2-8x^2y-9x^3}{12x^3y^2}$

28. Ko'paytuvchilarga ajrating:
$(a + b)^2 - c^2$.

A) $(a + b - c)\cdot(a + b + c)$
B) $(a + b - c)\cdot(a - b - c)$
C) $(a - b - c)\cdot(a + b + c)$
D) $(a + b - c)\cdot(a - b + c)$

29. $(3-a)(a+4)-a(-a-6)$ ifodaning $a=2\frac{2}{5}$ bo'lgandagi qiymatini toping.

A) $10\frac{2}{5}$ B) 21

C) 24 D) $8\frac{3}{5}$

30. $(a^2-b^2)(a^2+b^2)(a^4+b^4)(a^8+b^8)$ ifodaning $a=\sqrt[8]{6}$, $b=\sqrt[4]{2}$ bo'lgandagi qiymatini toping.

A) 4 B) 20

C) 2 D) –10

31. Agar $xy>0$ va $xy^{-1}+x^{-1}y=2$ bo'lsa, $\frac{xy-4x^2}{5xy-2y^2}$ ifodaning qiymatini toping.

A) 0 B) 2

C) 1 D) –1

32. Agar $xy=5$ va $x+y=-5$ bo'lsa, $(3+2x)^2\cdot y+(3+2y)^2\cdot x$ ifodaning qiymatini toping.

A) 5

B) –5

C) 0

D) –25

33. Agar $x=1$ va $y=2$ bo'lsa,

$$\left(\frac{x}{x-y+6}-\frac{6}{x+y+6}\right):$$

$$:\frac{x^2+y^2+2xy-36}{x^2-y^2+12x+36}+\frac{y}{x+y+6}$$ ni hisoblang.

A) 1 B) 3

C) 0 D) 2

34. Agar $x=\sqrt{13}$ bo'lsa, $\frac{x-4}{\sqrt{x-3}-1}-\sqrt{x-3}-3$ ni hisoblang.

A) 2

B) –4

C) –2

D) 4

35. Agar $x=10$ bo'lsa, $(4-x)^{-1}\cdot\sqrt{x^3-9x^2+24x-16}$ ifodaning qiymatini toping.

A) –3 B) 3

C) 2 D) –2

36. Agar $x=17$ bo'lsa,

$$\left(\frac{x\sqrt{x}-64}{x-16}+\frac{4\sqrt{x}}{\sqrt{x}+4}\right):\left(\frac{8}{4-\sqrt{x}}-1\right)-4$$

ifodaning qiymatini toping.

A) –4

B) $-\sqrt{17}$

C) 4

D) $\sqrt{17}$

37. Agar $3^a+3^{-a}=3$ bo'lsa, $3^{2a}-2\cdot3^a+3^{-a}$ ifodaning qiymatini toping.

A) 3 B) 1

C) 4 D) 2

38. $\frac{3a^7+2a^6-3a-2}{(3a+2)\cdot(a^4+a^2+1)}$ ifodaning qiymati 8 ga teng bo'ladigan a ning barcha qiymat(lar)ini toping.

A) ±3

B) $\pm\sqrt{7}$

C) 2

D) ±2

39. Agar $x = -\frac{5}{6}$ bo'lsa,

$\frac{x+4}{2x-4} \cdot \left(\frac{x}{x^2-16} - \frac{x-4}{x^2+4x} \right) - (x-4)^{-1}$

ifodaning qiymatini toping.

A) $-1\frac{1}{5}$ B) $1\frac{5}{6}$

C) $1\frac{1}{5}$ D) $-1\frac{5}{6}$

40. $\left(\left(\frac{m}{n} \right)^2 + \left(\frac{n}{m} \right)^{-1} + 1 \right) : \frac{m^3 - n^3}{n^2} : (n+m)^{-1}$

ifodaning $m = \frac{1}{3}$ va $n = \frac{1}{6}$ dagi qiymatini toping.

A) -2 B) 3

C) 2 D) $\frac{1}{3}$

41. Ifodani soddalashtiring $(a \in (-2; -1))$:

$\frac{|a^2-4|}{2-a} - \frac{|a^2-9|}{a-3} + \frac{|a^2-1|}{1-a}$.

A) $-a + 2$

B) $a + 4$

C) $a + 2$

D) $-3(a + 2)$

42. Ifodani soddalashtiring $(x > 0)$:

$\frac{2}{x(x+2)} + \frac{2}{(x+2)(x+4)} + \frac{2}{(x+4)(x+6)}$.

A) $\frac{24}{x^2+6x}$

B) $\frac{12}{x^2+6x}$

C) $\frac{2x+12}{x^2+6x}$

D) $\frac{6}{x^2+6x}$

43. $(2x-3)^2 - 4(2-x)^2 - 3\left(x - 1\frac{1}{3}\right)$

ifodaning $x = \frac{2}{3}$ dagi qiymatini toping.

A) $-2\frac{1}{3}$

B) -1

C) $2\frac{1}{3}$

D) -3

44. Agar $\frac{a^2+bc-ac-ab}{ab-bc+ac-c^2} + \frac{b}{c+b} = 2$ tenglikda $a = 18$, $b = -2$ bo'lsa, c ning qiymatini toping.

A) 11

B) 20

C) -19

D) 9

45. Agar $m = -3$ bo'lsa,

$\left(\frac{m^3 - 10m^2}{8+m^3} - \frac{2m}{m+2} - \frac{4}{m^2-2m+4} \right) \cdot$

$\cdot (m^2 - 2m + 4)$ ning qiymatini toping.

A) -25 B) 25

C) -1 D) 1

46. x va y lar uchun $y^2 + 2x(x + y) + 3(2x + 3) = 0$ tenglik o'rinli bo'lsa, $\frac{x^2+y^2}{6}$ ifodaning qiymatini toping.

A) 3

B) 1

C) 2

D) $\frac{4}{3}$

47. Agar $a=\dfrac{\sqrt{3}\cdot(3+2\sqrt{3})}{4}$ bo'lsa,

$\dfrac{2}{1-\dfrac{2}{2+\dfrac{1}{a-2}}}$ ifodaning qiymatini toping.

A) $3\sqrt{3}$ B) $\dfrac{3\sqrt{3}+1}{2}$

C) $3\sqrt{3}+2$ D) $\sqrt{3}$

48. Agar $a=\dfrac{2}{3}$ bo'lsa,

$\dfrac{a+4}{a^2-5a}\cdot\sqrt{\dfrac{a^2-10a+25}{a^2+8a+16}}-2\dfrac{1}{2}$ ifodaning qiymatini toping.

A) $-1\dfrac{1}{2}$ B) -4 C) $-2\dfrac{1}{2}$ D) -1

49. Ifodani soddalashtiring:

$$\left(\frac{\sqrt[4]{m}-4}{\sqrt[4]{m}+4}-\frac{\sqrt[4]{m}+4}{\sqrt[4]{m}-4}\right)^{-1}\cdot\left(\frac{4\sqrt[4]{m}}{\sqrt[4]{m}-4}\right).$$

A) $\dfrac{\sqrt[4]{m}+4}{4}$

B) $-\dfrac{\sqrt[4]{m}+4}{4}$

C) $-\sqrt[4]{m}-4$

D) $-4(\sqrt[4]{m}+4)$

50. Agar $m=4$, $n=\dfrac{3}{7}$ bo'lsa,

$\dfrac{m^2-6n+3m-2mn}{m^2-6n-3m+2mn}:\dfrac{m^2+6n-3m-2mn}{m^2+6n+3m+2mn}$ ifodaning qiymatini toping.

A) $\dfrac{9}{49}$ B) 14

C) 49 D) 1

51. Ifodani soddalashtiring:

$$\left(\frac{n^2}{m^3-mn^2}+\frac{1}{n+m}\right):\left(\frac{m-n}{m^2+mn}-\frac{m}{n^2+mn}\right).$$

A) $\dfrac{n}{n-m}$ B) $\dfrac{n}{m-n}$

C) $\dfrac{m}{m+n}$ D) $\dfrac{m}{n-m}$

52. Agar $a=3\sqrt{3}-2$ bo'lsa,

$$\left(\frac{a^4+5a^3+15a-9}{a^6+3a^4}+9a^{-4}\right):\left(\frac{a^5+2a^4}{a+3}\right)^{-1}-4$$ ning qiymatini toping.

A) 5 B) $3\sqrt{3}$

C) 23 D) $12\sqrt{3}$

53. $\left(\dfrac{a^2-12\sqrt{6}+6a-2a\sqrt{6}}{(a-6)^9+a^2+(6-a)^9-24}\right)^{-1}\cdot\dfrac{36-a^2}{a+\sqrt{24}}$ ifodaning $a=6+\sqrt{5}$ dagi qiymatini toping.

A) $\sqrt{5}$ B) 31

C) $-\sqrt{5}$ D) -1

54. $\left(\dfrac{m^{\frac{3}{4}}-m^{\frac{1}{4}}}{1-m^{\frac{1}{2}}}+\dfrac{1+m^{\frac{1}{2}}}{m^{\frac{1}{4}}}\right)^{2}:\left(1+2m^{-\frac{1}{2}}+m^{-1}\right)^{0,5}$ ifodaning $m=36^{-1}$ bo'lgandagi qiymatini toping.

A) $\dfrac{1}{7}$ B) $\dfrac{6}{7}$

C) 5 D) $\dfrac{1}{6}$

55. $\dfrac{1+mn^{-1}}{(mn)^{-1}} \cdot \dfrac{m^{-1}}{m^{-1}n - n^{-1}m} : \dfrac{mn^{-1}}{n-m} \cdot \left(\dfrac{n}{m}\right)^{-2}$ ifodaning $m = 4$ va $n = 2{,}5$ bo'lgandagi qiymatini toping.

A) –1,5 B) 16
C) 10 D) 1,6

56. $\left(x + y - \dfrac{4xy}{y+x}\right) :$
$: \left(\dfrac{x}{y+x} - \dfrac{y}{y-x} - \dfrac{2xy}{x^2-y^2}\right) + 2y$
ifodaning $x = 2\dfrac{1}{3}$ va $y = 2$ bo'lgandagi qiymatini toping.

A) $4\dfrac{1}{3}$ B) $\dfrac{1}{3}$
C) 7 D) 2

57. $\left(\dfrac{m^2-mn}{n^2+mn} - \dfrac{(m-n)^2}{m^2+mn}\right) :$
$: \left(\dfrac{n^2}{m^3-mn^2} + \dfrac{1}{n+m}\right)$ ifodaning $m = -2$ va $n = -10$ bo'lgandagi qiymatini toping.

A) 72
B) –14,4
C) –6,4
D) 32

58. Agar $m = 0{,}25$ bo'lsa,
$\dfrac{2(m-1)^{-1} - \dfrac{m+2}{m^2-m}}{(m-1)^{-1} - \dfrac{4-m}{m^2-m}} : \left(\dfrac{4}{m}\right)^{-1}$ ifodaning qiymatini toping.

A) 4 B) 0,5
C) 2 D) 8

59. $\dfrac{(2a-3b+3)^2 - 4(a-2b-1)^2}{7b-4a-1} + 2a + b$
ifodaning $a = 8$ va $b = 8 - \sqrt{3}$ bo'lgandagi qiymatini toping.

A) $-\sqrt{3}$
B) $\sqrt{3}$
C) 11
D) 21

60. $\dfrac{a^3b + 2a^2b - 3ab}{a^3 + 5a^2 + 6a} \cdot \left(\dfrac{1-a^2}{a^2+3a+2}\right)^{-1} + 2b$
ifodaning $a = \dfrac{1}{3}$, $b = -6$ dagi qiymatini toping.

A) –6 B) $\dfrac{1}{3}$
C) $-6\dfrac{1}{3}$ D) 9

61. $(m^2 - n^{-1}m + n^{-2})(m^{-1} + n) - m(mn)^{-2}$
ifodaning $m = \dfrac{3}{4}$, $n = 0{,}(4)$ dagi qiymatini toping.

A) $1\dfrac{3}{4}$ B) 4
C) 1 D) 0,25

62. Ushbu $\left(\dfrac{a^{\frac{3}{2}} + b^{\frac{3}{2}}}{a-b} - \dfrac{a-b}{a^{\frac{1}{2}} + b^{\frac{1}{2}}}\right) \cdot \dfrac{a-b}{\sqrt{ab}} - \sqrt{a}$
ifodaning $a = \sqrt{2}$, $b = 8$ dagi qiymatini toping.

A) $-\sqrt{2}$
B) $2\sqrt{2}$
C) 0
D) 2

63. Ifodani soddalashtiring:

$$\left(\frac{1}{a\cdot(a+1)}+\frac{1}{(a+1)\cdot(a+2)}+\right.$$
$$\left.+\frac{1}{(a+2)\cdot(a+3)}\right)\cdot\frac{a^2+3a}{9}.$$

A) a B) $\frac{1}{3}$

C) $\frac{1}{9}$ D) $a+3$

64. Ushbu $\frac{3xyz}{xy+yz+zx}-$
$$-\left(\frac{x-1}{x}+\frac{y-1}{y}+\frac{z-1}{z}\right):\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$$
ifodaning $x=0{,}1$; $y=5$; $z=8$ dagi qiymatini toping.

A) 4
B) 1
C) 13,1
D) 40

Ko'rsatkichli funksiya. Ko'rsatkichli tenglamalar va tengsizliklar

1. $y=\sqrt{2^{2x}-3\cdot2^{x+1}-16}$ funksiyaning aniqlanish sohasini toping.

A) $x\le1$, $x\ge4$ B) $x\ge3$
C) $x\le2$, $x\ge3$ D) $x\ge2$

2. $x^4\cdot5^x+25\ge25x^4+5^x$ tengsizlikni yeching.

A) $(-\infty;\,1]\cup[2;\,\infty)$
B) $(-\infty;\,1]\cup[1;\,\infty)$
C) $(-\infty;\,-1]\cup[1;\,2]$
D) $[-1;\,1]\cup[2;\,\infty)$

3. $\left(\frac{1}{4}\right)^x-\left(\frac{1}{2}\right)^x\le12$ tengsizlikning $(-4;\,4)$ oralig'idagi butun yechimlar sonini toping.

A) 3 B) 2
C) 5 D) 6

4. $x^2\cdot3^{\sqrt{x+2}}-9x^2=6\cdot3^{\sqrt{x+2}}-54$ tenglamaning ildizlari kvadratlarining yig'indisini toping.

A) 16 B) 4
C) 10 D) 12

5. $\frac{4^{x^2-5x+6}-1}{2^{x^2-4x+4}-1}=1$ tenglamaning ildizlari yig'indisi (yoki ildizi, agar u bitta bo'lsa) 12 dan qanchaga kam?

A) 4
B) 8
C) 6
D) 10

6. Agar $2^{x-3}\cdot3^{x+1}=15$ tenglamaning ildizi x_0 bo'lsa, $x_0-\frac{1}{\lg6}$ ni toping.

A) $\log_612$
B) $3\log_62$
C) $2\log_62$
D) $\log_62$

7. $\sqrt{6x-x^2}\cdot\left(2^x-5\right)>0$ tengsizlikni nechta butun son qanoatlantiradi?

A) 3
B) 0
C) 4
D) cheksiz ko'p

8. $\left(\frac{2}{3\sqrt{3}-1}\right)^{x^2-(2x+1)^2} \le 1$ tengsizlikni yeching.

A) $\left[-1; -\frac{2}{3}\right]$

B) $\left[-1; -\frac{1}{3}\right]$

C) $(-\infty; -1] \cup \left[-\frac{2}{3}; \infty\right)$

D) $(-\infty; -1] \cup \left[-\frac{1}{3}; \infty\right)$

9. $\frac{3^x - p}{x-2} = 0$ tenglama yechimga ega bo'ladigan p ning barcha qiymatlarini toping.

A) $(-\infty; 9) \cup (9; \infty)$
B) $(9; \infty)$
C) $(0; 2) \cup (2; \infty)$
D) $(0; 9) \cup (9; \infty)$

10. $\left(\sqrt{5}-2\right)^{\frac{x^2-10x+16}{x-2}} \ge 1$ tengsizlikni yeching.

A) $(-\infty; 8]$
B) $[8; \infty)$
C) $(-\infty; 2) \cup (2; 8]$
D) $(2; 8) \cup (8; \infty)$

11. $\sqrt[4]{4^{x+1}} = \frac{8^x \cdot 4^{x-1}}{\sqrt{2}}$ tenglamani yeching.

A) $\frac{1}{3}$

B) $\frac{2}{3}$

C) $-\frac{5}{6}$

D) 54

12. Tenglamani yeching:
$3 \cdot 2^{x-2} - 5 \cdot 2^{x-4} = 18 - 2^{x-3}$.

A) –2 B) 3
C) 4 D) 5

13. $f(x) = \frac{3^{x+1} + 3^{x+2} + 3^{x+3}}{5^{x+2} + 14 \cdot 5^x}$ funksiya berilgan bo'lsa, $9 \cdot f(-2)$ ni hisoblang.

A) 25
B) 1,44
C) 9
D) 0,36

14. Agar $4^x = 125$ va $8^y = 5$ bo'lsa, $\frac{2x-y}{y}$ ni toping.

A) –6 B) 8
C) 6 D) –8

15. Agar $3^x + 3^{3-x} = 12$ tenglamaning ildizlari x_1 va x_2 bo'lsa, $x_1 + x_2 + x_1 \cdot x_2$ ni hisoblang.

A) 5 B) 6
C) 4 D) 7

16. $2^{\sqrt{5+x}} = 4 \cdot 2^{\sqrt{x-3}}$ tenglamaning ildizi x_0 bo'lsa, $x_0^2 - 2x_0 + 3$ ni hisoblang.

A) 13
B) 11
C) 12
D) 10

17. $8^{5-\frac{x^2}{3}} < \frac{1}{2}$ tengsizlikning eng kichik natural yechimini toping.

A) 3 B) 6
C) 5 D) 4

18. $\left(\frac{9}{4}\right)^{3x+5} > \left(\frac{27}{8}\right)^{1+\frac{x^2}{3}}$ tengsizlikni yeching.

A) $(-\infty; -1)$ B) $(-1; 7)$
C) $(7; +\infty)$ D) $(-\infty; -1) \cup (7; +\infty)$

19. $4^{\frac{x+3}{x-3}} \le \frac{1}{16}$ tengsizlikni yeching.

A) $(-\infty; -1]$
B) $[1; 3)$
C) $(-\infty; -1] \cup (3; +\infty)$
D) $(3; +\infty)$

20. $3 \cdot 9^{2x} + 2 \cdot 9^{x} - 1 \le 0$ tengsizlikni yeching.

A) $(-\infty; -0{,}5]$ B) $(-\infty; 2) \cup [3; +\infty)$
C) $(-\infty; 2)$ D) $[0{,}5; +\infty)$

21. $\frac{\left(7^{x+1} - 1\right) \cdot \left(2^{x} - 4\right)}{x - 2} > 0$ tengsizlikni yeching.

A) $(-1; +\infty)$
B) $(2; +\infty)$
C) $(-1; 2) \cup (2; +\infty)$
D) $(-\infty; -1) \cup (2; +\infty)$

22. $\frac{3^{|x|} - 27}{x - 3} \ge 0$ tengsizlikni yeching.

A) $[0; 3) \cup (3; +\infty)$
B) $[-3; +\infty)$
C) $(-\infty; 3) \cup (3; +\infty)$
D) $[-3; 3) \cup (3; +\infty)$

23. $\frac{2^{x+2} - 24}{2^{x+1} - 8} \ge 1$ tengsizlikni yeching.

A) $(2; +\infty)$
B) $(0; 2)$
C) $(-\infty; 2) \cup [3; +\infty)$
D) $\left(\frac{1}{2}; +\infty\right)$

24. $\left|2^{\frac{x+1}{3}} - \frac{5}{2}\right| < \frac{11}{2}$ tengsizlikni yeching.

A) $(-\infty; 8)$
B) $(8; +\infty)$
C) $\left(-\infty; \frac{1}{8}\right)$
D) $(0; 8)$

25. $f(x) = 3^{|x|} - 2$ funksiyaning qiymatlar sohasini toping.

A) $(-2; +\infty)$ B) $(-1; +\infty)$
C) $[-1; +\infty)$ D) $(0; +\infty)$

26. $8 \cdot 2^{8x+5} = \sqrt[5]{16^{x+100}}$ tenglamani yeching.

A) 10 B) 9
C) 11 D) 12

27. $7 \cdot 3^{x+1} - 5^{x+2} = 3^{x+4} - 5^{x+3}$ tenglamaning ildizi quyidagi oraliqlardan qaysi biriga tegishli?

A) $(0; 1]$
B) $(-2; -1]$
C) $(-1; 0]$
D) $(0; 2]$

28. $8^{\frac{2x-2}{x}} = \sqrt{4^{x-1}}$ tenglamaning ildizlari x_1 va x_2 bo'lsa, $|x_1 - x_2|$ ni toping.

A) 1 B) 4
C) 5 D) 6

29. $9^{-4x-3} = 9^{1,5} \left(9\sqrt{3}\right)^{-2x}$ tenglamani yeching.

A) 2 B) 3
C) -2 D) -3

30. $\left(\sqrt[4]{2}\right)^{4x+5} = \left(\sqrt{2}\right)^{\frac{-2x}{3}}$ tenglamani yeching.

A) $-\frac{15}{16}$
B) $-\frac{21}{16}$
C) $-\frac{9}{16}$
D) $-\frac{17}{16}$

31. $y = 3^{x-3} + 12$ funksiyaning qiymatlar sohasini toping.

A) $(15; \infty)$ B) $(-\infty; \infty)$
C) $(12; \infty)$ D) $[12; \infty)$

32. $b = \frac{1}{10^{-a}}$ va $c = \frac{1}{10^{-b}}$ bo'lsa, a ni c orqali ifodalang.

A) $a = c$
B) $a = \lg\lg c$
C) $a = \lg c$
D) $a = 10^{1-c}$

33. $2^x = 2 - x$ tenglama nechta haqiqiy ildizga ega?

A) 1
B) 2
C) yechimga ega emas
D) aniqlab bo'lmaydi

Logarifmik funksiya. Logarifmik tenglamalar va tengsizliklar

1. $(\sqrt{3})^{2\log_{0,01}(x^2+1)} = \frac{1}{3 \cdot 3^{\log_{0,01}(x^2+1)}}$ tenglamaning eng katta ildizini toping.

A) $3\sqrt{11}$
B) ildizga ega emas
C) $2\sqrt{2}$
D) 3

2. Agar $0 < a < 1$ bo'lsa, quyidagilardan qaysi biri ma'noga ega?

A) $\log_2\log_a(a+1)$
B) $\log_a\log_a\frac{\pi}{4}$
C) $\log_2\log_a\log_2 3$
D) $\lg\lg\lg a$

3. Hisoblang: $7^{\frac{1}{\log_{64} 49}} - \log_3(\log_2 \sqrt[3]{\sqrt[9]{2}}) + 1$.

A) 11 B) 12 C) 9 D) 6

4. Hisoblang:
$10 \cdot \left(3^{\log_{\sqrt[3]{4}} 4} - 7^{2\log_{343} 8} + 12\right) : 7^{\log_{49} 196}$.

A) 25 B) 20
C) 35 D) 42

5. Hisoblang:
$\sqrt{(\log_2 3 + 4\log_3 2 - 4) \cdot \log_2 3} + \log_2 12$.

A) 4 B) $\log_2 9$
C) 2 D) 8

6. $y = \sqrt{\frac{2}{\lg(x-2)} - 3} - 1$ funksiya grafigi abssissalar o'qini qaysi nuqtada kesib o'tadi?

A) (102; 0)
B) kesib o'tmaydi
C) (0; 102)
D) $(\sqrt{10} + 2; 0)$

7. Agar $f(x) = \log_2 x^3 + 1$ bo'lsa, $f(2) + f\left(\frac{1}{x}\right) = f(x)$ tenglamani yeching.

A) $\sqrt[4]{8}$
B) 2
C) $\sqrt[3]{4}$
D) $2\sqrt{2}$

8. Agar $f(x+2) = \log_3(x^2 - 6x + 27) + 6$ bo'lsa, $f(2)$ ning qiymatini toping.

A) $6 + \log_3 7$
B) $6 + \log_3 19$
C) 9
D) 8

9. $4 \cdot 2^{\lg x^2} + 11 \cdot 2^{\lg x} = 3$ tenglamani yeching.

A) 0,1
B) 10
C) 100
D) 0,01

10. $\log_3^2(27x) = \log_3 x^6$ tenglamaning ildizini toping.

A) haqiqiy ildizga ega emas
B) 27
C) 9
D) 3

11. $\log_2(x-1) + \log_{(x-1)}\frac{1}{4} = 1$ tenglama ildizlarining yig'indisini toping.

A) $6\frac{1}{2}$
B) $4\frac{1}{4}$
C) $4\frac{1}{2}$
D) 5

12. $\log_2(16 \cdot 4^{3(1-x)+1}) + 1 = 0$ tenglamani yeching.

A) $3\frac{1}{3}$ B) $2\frac{1}{6}$
C) $3\frac{2}{3}$ D) $2\frac{1}{3}$

13. $\begin{cases} \log_2(x-4)^2 \le 2 \\ (x-1)^2 > 4 \end{cases}$ tengsizliklar sistemasi nechta butun yechimga ega?

A) cheksiz ko'p
B) 2 ta
C) 3 ta
D) butun yechimga ega emas

14. $(x-3)^{\log_{(x-3)}(49-x^2)} \le 13$ tengsizlikni yeching.

A) $(3; 4) \cup (4; 6]$
B) $(-7; -6] \cup [6; 7)$
C) $(3; 7)$
D) $[6; 7)$

15. $y = \log_{(1-2x)}(2 - \sqrt{3-x})$ funksiyaning aniqlanish sohasini toping.

A) $(0; 0{,}5)$
B) $(-1; 0{,}5)$
C) $(0; 0{,}5) \cup (0{,}5; 3]$
D) $(-1; 0) \cup (0; 0{,}5)$

16. $x^{\log_2 x - 5} = \frac{1}{64}$ tenglamaning ildizlari ko'paytmasini toping.

A) 16
B) 64
C) $\frac{1}{4}$
D) 32

17. $\frac{\sqrt{10-3x}}{\log_2|x-3|} < 0$ tengsizlikni yeching.

A) $\left(3; 3\frac{1}{3}\right) \cup \left(3\frac{1}{3}; 4\right)$

B) $(2; 3) \cup \left(3; 3\frac{1}{3}\right)$

C) $\left(3; 3\frac{1}{3}\right)$

D) $\left(2; 3\frac{1}{3}\right)$

18. Tengsizlikni yeching:
$25^{\log_5(x-2)} + (x-2)^2 > 32$.

A) $(6; \infty)$ B) $(-\infty; -2) \cup (6; \infty)$
C) $(2; 6)$ D) $(2; 6) \cup (6; \infty)$

19. Tengsizlikni yeching:
$|x-6| \cdot (\log_{\frac{1}{3}}(x-2) + 1) < 0$.

A) $(5; 6) \cup (6; \infty)$
B) $(2; 5)$
C) $(5; \infty)$
D) $(2; 6) \cup (6; \infty)$

20. Agar $\log_{20}250 = m$ bo'lsa, $\log_2 5$ ni m orqali ifodalang.

A) $\frac{2m-1}{m-3}$ B) $\frac{1-2m}{m-3}$
C) $\frac{1-3m}{m-2}$ D) $\frac{2m-3}{m-2}$

21. Tengsizlikni yeching:
$\log_{\frac{1}{3}}(\log_2(2-x)) + 1 \geq 0$.

A) $(1; 2)$
B) $[-6; 2) \cup (2; \infty)$
C) $[-6; 2)$
D) $[-6; 1]$

22. $\log_2^2 x + 2 \geq 3\log_2 x$ tengsizlikni yeching.

A) $(0; 2] \cup [4; \infty)$
B) $[2; 4]$
C) $\left(0; \frac{1}{4}\right] \cup \left[\frac{1}{2}; \infty\right)$
D) $(-\infty; 2] \cup [4; \infty)$

23. $\log_2^2(8x) = 3\log_2 x + 27$ tenglamaning ildizlari ko'paytmasini toping.

A) $\frac{1}{4}$
B) 2
C) 4
D) $\frac{1}{8}$

24. $\lg(\log_3(2 + \log_3(x-2))) = 0$ tenglamaning ildizi x_0 bo'lsa, $3x_0 - 2$ ning qiymatini toping.

A) 5 B) 13
C) 10 D) 7

25. Hisoblang: $\frac{\log_3 12 + \log_4 12}{\log_3 12 \cdot \log_4 12} + \frac{1}{2} \cdot \log_2 4$.

A) 0 B) 3
C) 1 D) 2

26. Hisoblang: $\frac{\log_4 28 \cdot \log_7 28}{\log_4 7 + \log_7 4 + 2}$.

A) 3 B) 0
C) 2 D) 1

27. Hisoblang: $\frac{\log_3 153}{\log_{51} 3} - \frac{\log_3 459}{\log_{17} 3}$.

A) 0 B) 2
C) 1 D) 3

28. Hisoblang: $\frac{3^{1+\log_4 5}\cdot 4^{\log_5 3}\cdot 5^{\log_3 4}}{3^{\log_5 4}\cdot 4^{\log_3 5}\cdot 5^{\log_4 3}}$.

A) 3 B) 4 C) 2 D) 1

29. Agar $\lg(x+3)-\lg\frac{1}{x}=1$ bo'lsa, x ni toping.

A) 2 B) 5 C) –5 D) –2

30. $y=\log_3^3 x-12$ funksiyaning qiymatlar to'plamini toping.

A) $(12;\infty)$ B) $(-\infty;\infty)$
C) $(0;\infty)$ D) $(-\infty;12)$

31. Hisoblang: $5^{\frac{\lg 3+\lg 5}{\lg 25-\lg 5}}$.

A) 5 B) 10
C) 1 D) 15

32. $\log_3^2(x-1)-2\log_3(x-1)>3$ tengsizlikning barcha haqiqiy yechimlari to'plamini toping.

A) $\left(-\infty;\frac{4}{3}\right)\cup(28;+\infty)$
B) $(28;+\infty)$
C) $\left(1;\frac{4}{3}\right)$
D) $\left(1;\frac{4}{3}\right)\cup(28;+\infty)$

33. $\log_2(x+1)+\log_2(8-x)>3$ tengsizlikni yeching.

A) (0; 7)
B) (7; 8)
C) $(-1;0)\cup(7;8)$
D) (–1; 8)

34. Agar $\log_2 a=2,(3)$ va $\log_2 b=3,(6)$ bo'lsa, $a\cdot b+1$ ning qiymatini toping.

A) 33 B) $2^{5,9}+1$
C) 65 D) $2^{1,3}+1$

35. $25^{\log_5 x}-5\cdot 2^{\log_2 x}=24$ tenglamaning ildizi x_0 bo'lsa, $x_0^2-5x_0+7$ ning qiymatini toping.

A) 33 B) 32 C) 31 D) 30

36. $f(x)=8^{\log_2 x}-2$ funksiyaning qiymatlari sohasini toping.

A) $(0;+\infty)$
B) $(-2;+\infty)$
C) $(-\infty;+\infty)$
D) $(-2;0)\cup(0;+\infty)$

37. $|x-7|\cdot\log_2(x-2)=3\cdot(x-7)$ tenglamaning ildizlari yig'indisini toping.

A) $9\frac{1}{8}$ B) 17
C) $17\frac{1}{8}$ D) $19\frac{1}{8}$

38. Tenglamalar sistemasini yeching:

$$\begin{cases}2\cdot 3^x+3y=4\\ 3^{x+1}-2y=6\end{cases}.$$

A) $\left(\log_3 4;\frac{1}{3}\right)$ B) $\left(\log_3 2;\frac{2}{3}\right)$
C) $(\log_3 2;0)$ D) $(0;\log_3 2)$

39. $y=\sqrt{6-x}+\log_{(4-x)}(x^2-4)$ funksiyaning aniqlanish sohasini toping.

A) $(2;3)\cup(3;4)\cup(4;6)$
B) $(-\infty;-2)\cup(2;3)\cup(3;4)$
C) (2; 4)
D) $(-\infty;-2)\cup(2;4)$

Tenglamalar

1. $\dfrac{\dfrac{2}{x-12}+\dfrac{1}{x+11}}{\dfrac{3}{x+11}-\dfrac{2}{x-12}}=\dfrac{1}{5}$ tenglamaning ildizini toping.

A) $-7\dfrac{5}{7}$

B) $-6\dfrac{4}{7}$

C) 18,5

D) $2\dfrac{3}{14}$

2. Agar $43-2(x-6(1-2(2-3x)))=63x$ tenglamaning ildizi x_0 bo'lsa, x_0^2-3 ning qiymatini toping.

A) 1 B) 13

C) –2 D) 6

3. Tenglamani yeching: $\dfrac{3}{4-\dfrac{3}{\dfrac{2(1-2x)}{x-3}}}=\dfrac{2}{3}$.

A) 8 B) $-\dfrac{1}{8}$

C) 4 D) $\dfrac{1}{4}$

4. $\dfrac{(x+3)^2-4}{x+5}\cdot(x-1)=24$ tenglamaning ildiziga nisbatan quyidagilardan qaysi biri to'g'ri?

A) tub son

B) 3 ga karrali son

C) manfiy son

D) 2 ga karrali son

5. $(x+2)^2+15=8|x+2|$ tenglamaning barcha ildizlari yig'indisini toping.

A) –14

B) –8

C) 6

D) 16

6. $\dfrac{(x^4-16)\sqrt{12-x-x^2}}{\sqrt{-x}}=0$ tenglamaning haqiqiy ildizlari ko'paytmasini toping.

A) 16

B) 8

C) 6

D) –8

7. m ning qanday qiymatlarida $\dfrac{m^2-9}{m^2-1}$ va $\dfrac{2m+6}{m-1}$ ifodalar bir-biriga teng bo'ladi?

A) –5; 6

B) –5; 3

C) –5; –3

D) –3; 5

8. $\dfrac{(x^2-9):(3+x)-2}{(x^2-16):(x-4)+2}=(x-1):(x+1)$ tenglamaning ildizini toping.

A) $\dfrac{4}{5}$

B) 3,5

C) $\dfrac{1}{9}$

D) $x\in\varnothing$

9. $\frac{x^2+9}{4-x^2} = \frac{\sqrt{9+x^2}}{\sqrt{4-x^2}}$ tenglama nechta haqiqiy ildizga ega?

A) haqiqiy ildizga ega emas
B) 4
C) 2
D) 1

10. $\left(\sqrt{x}-\frac{1}{2}\right)(3x^2-8x-3)=0$ tenglamaning haqiqiy ildizlari yig'indisini toping.

A) $2\frac{11}{12}$ B) $\frac{5}{6}$
C) $3\frac{1}{2}$ D) $3\frac{1}{4}$

11. $(3x^2-48)(x+3)=(6x+18)(x-4)$ tenglamaning barcha ildizlari yig'indisini toping.

A) –1 B) –5
C) 2 D) 5

12. $\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\ldots\left(1-\frac{1}{8}\right)\left(1-\frac{1}{9}\right)\cdot x = 1\frac{5}{9}$ tenglama ildizining $\frac{1}{14}$ qismini toping.

A) 3,5 B) 2
C) 1 D) 0,5

13. $\sqrt[3]{y^2} = \sqrt[3]{y}+12$ tenglamaning kichik ildizi y_0 bo'lsa, y_0+14 ning qiymatini toping.

A) 15
B) 22
C) 13
D) –13

14. Tenglamani yeching.

$$\frac{\frac{x+2}{2}-3}{2+\frac{1}{2}} - \frac{\frac{x-6}{3}+2}{4-2\frac{1}{3}} = \frac{\frac{x}{6}+4\frac{1}{3}}{(1,2)^{-1}}$$

A) –30
B) $\frac{1}{15}$
C) $-\frac{1}{15}$
D) 30

15. $x^2+ax=1$ tenglamaning x_1 va x_2 ildizlari $\frac{x_1}{x_2}+\frac{x_2}{x_1}=-18$ tenglikni qanoatlantirsa, a^2-2 ning qiymatini toping.

A) 7
B) 2
C) 14
D) 34

16. Agar $a(x-2)^2+b(x-2c)=2(x^2-x+16)$ tenglik ayniyat bo'lsa, $a+b+c$ ning qiymatini toping.

A) 2
B) 6
C) 8
D) –2

17. a va b ning qanday qiymatlarida $\frac{8x-12}{16x^2-9} = \frac{a}{4x+3}+\frac{b}{4x-3}$ tenglik ayniyat bo'ladi?

A) $a=-1;\ b=-3$
B) $a=-3;\ b=1$
C) $a=1;\ b=3$
D) $a=3;\ b=-1$

18. $(x+1)\cdot(|x|-1)=3$ tenglama nechta haqiqiy ildizga ega?

A) 4 B) 1
C) 2 D) 0

19. $|2x-3|=3x+1$ tenglama nechta haqiqiy yechimga ega?

A) 0
B) cheksiz ko'p
C) 2
D) 1

20. $(x^2-12x+10)^2=(3x+10)^2$ tenglamaning barcha yechimlari yig'indisini toping.

A) 20 B) 3
C) 19 D) 24

21. $(x^3+35x)^2=144x^4$ tenglamaning natural yechimlari yig'indisini toping.

A) 7 B) 12
C) 5 D) 35

22. $\dfrac{|3x-16|}{x}=-5$ tenglamaning ildizlar yig'indisini (agar yagona bo'lsa, ildizini) toping.

A) –8 B) 6
C) 0 D) 2

23. $|x^2+9x|=x^2+9x-20$ tenglamaning haqiqiy ildizlari yig'indisini toping.

A) –9
B) –10
C) yechimga ega emas
D) 9

24. $\dfrac{1}{|x|}=\dfrac{6}{x^2+2x}$ tenglamaning ildizlari ko'paytmasini toping.

A) –32
B) 0
C) –8
D) 4

25. $\dfrac{x^2-3|x|-7}{|x|}=3$ tenglamaning ildizlari ko'paytmasini toping.

A) –7
B) 7
C) 49
D) –49

26. $(x^2+8x+15)\sqrt{4x-9}=0$ tenglamaning haqiqiy ildizlar yig'indisini (agar yagona bo'lsa, ildizini) toping.

A) –5,75
B) 2,25
C) –0,75
D) –2,75

27. x_1 va x_2 sonlari $2x^2-3x=6$ tenglamaning ildizlari bo'lsa, $\dfrac{x_1^2}{x_2}+\dfrac{x_2^2}{x_1}$ ifodaning qiymatini hisoblang.

A) $11\dfrac{1}{4}$
B) $-11\dfrac{1}{4}$
C) $5\dfrac{5}{8}$
D) $-5\dfrac{5}{8}$

28. b ning qanday qiymatlarida $2b(3-x)+x(2-b)=2b-5x$ tenglamaning ildizi 1 dan katta bo'ladi?

A) $\left(-7;\ 2\frac{1}{3}\right)$

B) $\left(-\infty;\ \frac{2}{3}\right)\cup(4;\ \infty)$

C) $\left(\frac{2}{3};\ 4\right)$

D) $(-\infty;\ -7)\cup\left(2\frac{1}{3};\ \infty\right)$

29. $2x^2+(6-\sqrt{3})x=3\sqrt{3}$ tenglamaning eng katta ildizini toping.

A) 3

B) $\sqrt{3}$

C) $2\sqrt{3}$

D) $0{,}5\sqrt{3}$

30. Agar $a\in(-0{,}4;\ 0{,}4)$ bo'lsa, $x^4+0{,}32=2a^2$ tenglamalar nechtadan haqiqiy ildizlarga ega?

A) 0

B) 4

C) 2

D) 0 yoki 2

31. b ning qanday qiymatlarida $\frac{x^2-2(b+3)x+12b}{x-6}=0$ tenglama yechimga ega bo'lmaydi?

A) $b\neq\pm3$

B) $b=6$

C) $b\neq6$

D) $b=3$

32. $\sqrt{4\sqrt{x+2}+x+6}=4$ tenglamaning ildizi x_0 bo'lsa, $\frac{2x_0^2-1}{3}$ ning qiymatini toping.

A) $-\frac{1}{3}$

B) $\frac{1}{3}$

C) 1

D) $2\frac{1}{3}$

33. $\frac{\sqrt{9-x^2}}{2x+5}=\frac{\sqrt{9-x^2}}{x-5}$ tenglama nechta haqiqiy ildizga ega?

A) 4

B) 3

C) 2

D) 0

34. Tenglamani yeching (x ga nisbatan): $6x^2+(2ab-3b)x=ab^2$.

A) $\frac{ab}{2};\ -\frac{b}{3}$

B) $\frac{ab}{3};\ \frac{b}{2}$

C) $-\frac{ab}{2};\ \frac{b}{3}$

D) $-\frac{ab}{3};\ \frac{b}{2}$

35. Tenglamani yeching: $\frac{x-2}{3\cdot5}+\frac{x-2}{5\cdot7}+\frac{x-2}{7\cdot9}+\frac{x-2}{9\cdot11}=1\frac{1}{11}$.

A) 8

B) 11

C) 14

D) 4

36. m ning qanday qiymatida $4x^2 - 5x + m = 0$ tenglamaning x_1 va x_2 ildizlari $4x_1 + 3x_2 = 3\frac{1}{2}$ tenglikni qanoatlantiradi?

A) 1,5
B) –6
C) –1,5
D) 6

37. $x^3 + mx^2 - 4x + n = 0$ tenglamaning ildizlari $x_1 = 3$ va $x_2 = -2$ bo'lsa, $3m + n$ ning qiymatini toping.

A) 3
B) –12
C) 6
D) 8

38. $(x - 0{,}2)(3 + x)^2 + (0{,}2 - x)(4 - x)^2 = 5x - 1$ tenglamaning eng kichik ildizi x_0 bo'lsa, $10x_0 + 3$ ni toping.

A) 9 B) 5
C) 11 D) 7

39. $\dfrac{3}{1+\sqrt{x}+x} = 3 - \sqrt{x} - x$ tenglama nechta haqiqiy ildizga ega?

A) 1 B) 3
C) 2 D) 4

40. $x^2 - (p - 5)x + 4 = 0$ tenglama haqiqiy yechimga ega bo'lmaydigan p ning barcha butun qiymatlari yig'indisini toping.

A) 45
B) 27
C) 25
D) 35

41. k ning qanday qiymatlarida $\dfrac{3x+2}{4x-3} = k + 2$ tenglamaning ildizi 1 dan kichik bo'ladi?

A) (–1,25; 3)
B) $(-\infty; -1{,}25) \cup (3; \infty)$
C) $(-\infty; -3) \cup (1{,}25; \infty)$
D) (–3; 1,25)

42. $\sqrt{x - \sqrt{x^2+8}} - \sqrt{x + \sqrt{x^2+8}} = 4$ tenglama nechta haqiqiy ildizga ega?

A) 0 B) 4
C) 1 D) 2

43. Tenglamani yeching:
$1{,}4 \cdot (2 + 0{,}6) \cdot (4 + 0{,}6^2) \cdot (16 + 0{,}6^4) \cdot x = 0{,}6^8 - 256$.

A) $0{,}6^4 - 16$ B) 1
C) –1 D) $16 - 0{,}6^4$

44. Tenglamani yeching:

$$\frac{x+3}{4^2-1} + \frac{x+3}{6^2-1} + \frac{x+3}{8^2-1} + \ldots + \frac{x+3}{100^2-1} = \frac{49}{101}.$$

A) –3 B) 2
C) $-\frac{1}{3}$ D) 0

45. a, b, c sonlar $\begin{cases} \dfrac{ab}{a+b} = 1\dfrac{1}{3} \\ \dfrac{ac}{a+c} = -1\dfrac{1}{3} \\ \dfrac{bc}{b+c} = -2 \end{cases}$ sistemani qanoatlantiradi. $a - b + c$ ning qiymatini toping.

A) –3 B) 5 C) –2 D) 1

46. $(x; y)$ sonlar juftligi $\begin{cases} \frac{3}{x+2}+\frac{7}{6+y}=1\frac{1}{4} \\ \frac{10}{x+2}-\frac{14}{y+6}=-\frac{1}{2} \end{cases}$ tenglamalar sistemasini qanoatlantiradi.

$(x-y)^y$ ning qiymatini toping.

A) 125
B) 36
C) 16
D) 1

47. $6x-9=x^2(|x-3|+1)$ tenglama nechta haqiqiy ildizga ega?

A) 2 B) 1 C) 3 D) 4

48. $(x^2+5x+1)^2+2x^2+10x=1$ tenglama nechta haqiqiy ildizga ega?

A) 3 B) 1
C) 4 D) 2

49. $|4x-25|=x^2+3x+7$ tenglama nechta haqiqiy ildizga ega?

A) 1 B) 2
C) 4 D) 3

50. $(3x-8)\sqrt{-4x^2+3x+10}=0$ tenglama nechta haqiqiy ildizga ega.

A) 2 B) 0
C) 1 D) 3

51. $\sqrt[3]{x-2}-\sqrt[3]{x-9}=1$ tenglamaning ildizlari yig'indisini toping.

A) 10 B) 9
C) 1 D) 11

52. $\begin{cases} |x-3|=3\sqrt{y+2} \\ |y+2|=3\sqrt{x-3} \end{cases}$ tenglamalar sistemasi nechta haqiqiy yechimga ega?

A) 1 B) 4
C) 2 D) 3

53. $\begin{cases} x^2+4y=21 \\ y^2-4x=21 \end{cases}$ tenglamalar sistemasi nechta haqiqiy yechimga ega?

A) 4
B) 1
C) 3
D) 2

54. $|x^2-5x+4|=x^2-5|x|+4$ tenglamaning barcha yechimlari to'plamini toping.

A) $[0; +\infty)$
B) $[0; 1]$
C) $[0; 1]\cup[4; +\infty)$
D) $[4; +\infty)$

55. $\sqrt[3]{(x+4)^2}+4\sqrt[3]{(x-3)^2}+$ $+5\sqrt[3]{x^2+x-12}=0$ tenglama nechta haqiqiy ildizga ega?

A) 3 B) 1 C) 0 D) 2

56. $\left(x^2+\frac{1}{x^2}\right)-4\left(x+\frac{1}{x}\right)+5=0$ tenglamaning barcha haqiqiy ildizlari yig'indisini toping.

A) 2
B) 1
C) 3
D) 4

57. $\left(\frac{|x|+x}{x-2}\right)^2 - \frac{6x}{x-2} + 2 = 0$ tenglama nechta haqiqiy ildizga ega?

A) 2 B) 1
C) 3 D) 0

58. $(x^2-4)^2 - 5(x-1)\cdot(x^2-4) - 6(x-1)^2 = 0$ tenglamaning barcha haqiqiy ildizlari yig'indisini toping.

A) 5 B) 4
C) 6 D) 3

59. $x^2 - x\frac{|x-1|}{x-1} - 6 = 0$ tenglamaning haqiqiy ildizlari ko'paytmasini toping.

A) –4 B) –6
C) –9 D) 36

60. $(x^2-2x)^2 - 4(x-1)^2 + 7 = 0$ tenglamaning barcha haqiqiy ildizlari ko'paytmasini toping.

A) 1 B) –3
C) –1 D) 3

61. Agar $x^2 - (\sqrt{3}-2)x - \sqrt{4+2\sqrt{3}} = 0$ tenglamaning ildizlari x_1 va x_2 bo'lsa, u holda $|x_1 - x_2|$ ni toping.

A) $\sqrt{2}$ B) $\sqrt{3}$
C) $\sqrt{7}$ D) $\sqrt{11}$

62. $2\sqrt[4]{x\cdot(7+4\sqrt{3})}\cdot\sqrt{2\sqrt{x}-\sqrt{3x}} = x$ tenglama ildizlarining o'rta arifmetik qiymatini toping.

A) 2 B) 0
C) 1 D) 4

63. $(x^2+1)^2 + 5(x^4-1) - 6(x^2-1)^2 = 0$ tenglama nechta haqiqiy ildizga ega?

A) 0 B) 3
C) 1 D) 2

64. $(x^2-5x-4)\cdot(x^2-5x+3) - 8 = 0$ tenglamaning haqiqiy ildizlari yig'indisini toping.

A) 10 B) 5
C) 4 D) 1

65. $(x^2-7x+13)^2 - (x-3)\cdot(x-4) - 3 = 0$ tenglamaning haqiqiy ildizlari ko'paytmasini toping.

A) 49 B) 14
C) 154 D) 11

66. $\left|2^{4x^2-1} - 5\right| = 3$ tenglama nechta haqiqiy ildizga ega?

A) 2 B) 3
C) 4 D) 1

67. $\frac{x^2-7|x|+12}{(x-3)^2} = 0$ tenglama nechta haqiqiy ildizga ega?

A) 1 B) 3
C) 4 D) 2

68. x va y sonlar $\begin{cases} \frac{x}{y} - \frac{y}{x} = 2\frac{2}{3} \\ x - y = 1\frac{1}{3} \end{cases}$ tenglamalar sistemasini qanoatlantirsa, $3x+1$ ning eng katta qiymatini toping.

A) 2 B) 3
C) 7 D) 10

69. $\begin{cases} x^3y^2 + x^2y^3 = 128 \\ x^2y + xy^2 = -16 \end{cases}$ tenglamalar sistemasining ildizlari soni n bo'lsa, $\frac{x^2+y^2}{n}$ ning qiymatini toping.

A) 10 B) 5
C) 17 D) 20

70. $\sqrt[4]{1-x^{-1}} + 3 = 10\sqrt[4]{x(x-1)^{-1}}$ tenglama nechta haqiqiy ildizga ega?

A) 2 B) 4
C) 1 D) 0

71. $\sqrt{(x^2-121)^2 \cdot (32-14x-x^2)} = (121-x^2)\cdot\sqrt{32-14x-x^2}$ tenglikni nechta butun son qanoatlantiradi?

A) 16 B) 14
C) 18 D) 15

72. $\frac{\sqrt{x}+1}{\sqrt{x}+2} + \frac{\sqrt{x}+2}{\sqrt{x}+3} = \frac{7}{6}$ tenglama nechta haqiqiy ildizga ega?

A) 1 B) 4 C) 0 D) 2

73. $\frac{3}{\sqrt[3]{9x^2-1}+3} + \frac{2}{\sqrt[3]{9x^2-1}+2} = 2$ tenglama nechta haqiqiy ildizga ega?

A) 1 B) 0 C) 4 D) 2

74. $\frac{1}{\sqrt{x^3+2}+3} + \frac{2}{\sqrt{x^3+2}+7} = \frac{1}{2}$ tenglama nechta haqiqiy ildizga ega?

A) 0 B) 2 C) 1 D) 4

75. $\frac{\sqrt[3]{x^4}-9}{\sqrt[3]{x^2}-3} - \frac{\sqrt[3]{x^2}-4}{\sqrt[3]{x}+2} = 7$ tenglamaning ildizlari yig'indisini toping.

A) 19 B) 7 C) –1 D) 8

Tengsizliklar

1. Tengsizliklar sistemasini yeching:

$\begin{cases} \frac{x-4}{x+4} \geq \frac{x+4}{x-4} \\ (2-x)(x+6) > 0 \end{cases}$

A) [0; 2)
B) (–6; 0]
C) (–6; –4) ∪ [0; 2)
D) (–6; –4) ∪ [0; 2) ∪ (2; 4)

2. $\frac{64-x^2}{x^{-1}-8x^{-2}} \leq 0$ tengsizlikning [5; 11) oraliqqa tegishli barcha natural yechimlarining o'rta arifmetigini toping.

A) $7\frac{1}{2}$ B) $7\frac{2}{5}$ C) $6\frac{1}{6}$ D) $6\frac{3}{5}$

3. $\frac{\left(\sqrt{3x-7}\right)^2-2}{x-3} \leq \frac{3-\left(\sqrt{x}\right)^2}{x-3}$ tengsizlikni yeching.

A) $\left[2\frac{1}{3}; 3\right) \cup (3; \infty)$
B) $\left[0; 2\frac{1}{3}\right]$
C) $x \in R$
D) yechimga ega emas

4. Agar $x^2y > 0$ bo'lsa, quyidagilarning qaysi biri x va y ning barcha haqiqiy qiymatlarida to'g'ri bo'ladi?

A) $(x+y)^2 > 0$ B) $x^3 + y^3 > 0$
C) $\frac{x+y}{xy} > 0$ D) $x^2 + y > 0$

5. Quyidagi tengsizliklardan qaysi biri a ning har qanday haqiqiy qiymatida o'rinli bo'ladi?

A) $4a^2 + 7a > (a+3)(a+4) - 12$
B) $(a-6)(a+2) + a^2 \le (a-5)(a+1) - 21$
C) $a^2 + (a-2)(a-4) < (a+2)(a+4)$
D) $(a-1)(a+3) + 3a^2 > (a+4)(a-2) - 4$

6. Tengsizlikni yeching:

$$\frac{(x^2+2x+1)(x-3)(x+4)}{x^2-4x+4} < 0.$$

A) $(-4; -1) \cup (2; 3)$
B) $(-4; -1) \cup (-1; 2) \cup (2; 3)$
C) $(-\infty; -4) \cup (3; \infty)$
D) $(-\infty; -4) \cup (-1; 2) \cup (3; \infty)$

7. $\frac{(2x-x^2-4)(x+3)}{x^2-9} > 0$ tengsizlikni yeching.

A) $(-\infty; 2) \cup (2; 3)$
B) $(-\infty; 3)$
C) $(-\infty; -3) \cup (-3; 3)$
D) $(2; 3)$

8. Nechta butun son $\sqrt[4]{2x^2+7} - \sqrt{x-2} < 0$ tengsizlikning yechimi bo'ladi?

A) 0 B) 2
C) 1 D) 3

9. $(4x - x^2) \cdot \sqrt{x^2+2x-15} > 0$ tengsizlikni yeching.

A) $[3; 4)$
B) $(0; 3) \cup (3; 4)$
C) $(-\infty; -5] \cup [3; 4)$
D) $(3; 4)$

10. $\frac{x-3}{\sqrt{9x+18-2x^2}} \le 0$ tengsizlikning barcha butun yechimlari yig'indisini toping.

A) 5
B) 6
C) 9
D) 11

11. $\left|\frac{9}{x-3}\right| > 2\frac{4}{7}$ tengsizlikning barcha butun yechimlari yig'indisini toping.

A) 12
B) 21
C) 15
D) 18

12. $(x+1) \cdot (|x| - 1) \ge 2$ tengsizlikni yeching.

A) $(-\infty; 0] \cup [\sqrt{3}; +\infty)$
B) $(-\infty; -\sqrt{3}]$
C) $[\sqrt{3}; +\infty)$
D) $(-\infty; -\sqrt{3}] \cup [\sqrt{3}; +\infty)$

13. $x^2 \cdot |x+2| + x^2 + 4x + 4 \le 0$ tengsizlik nechta butun yechimga ega?

A) 0
B) 1
C) 3
D) cheksiz ko'p

14. Agar a, b va c haqiqiy sonlar uchun $a < 0 < b < c$ tengsizlik o'rinli bo'lsa, u holda doimo musbat bo'ladigan sonni aniqlang.

A) $a + b - c$
B) $a - b - c$
C) $a - b + c$
D) $-a + b + c$

15. Tengsizlikni yeching: $\frac{x}{x-2}-\frac{1}{x}\le 0$.

A) $(-\infty; 0)$
B) $(2; +\infty)$
C) $(0; 3)$
D) $(0; 2)$

16. $\frac{(x^2-x+2)\cdot(2-x)^3}{(x-3)^2\cdot(x+1)}\ge 0$ tengsizlik nechta butun yechimga ega?

A) 4
B) 3
C) 5
D) 2

17. $\frac{x^3}{x-2}\le\frac{9x}{x-2}$ tengsizlikning butun yechimlari sonini toping.

A) 6
B) 5
C) 7
D) 4

18. $x(x+7)^2\ge 5x^2$ tengsizlikning $(1; 7)$ oraliqdagi butun yechimlari yig'indisini toping.

A) 20
B) 28
C) 14
D) 21

19. $\begin{cases}6x > x^2\\ 4x^2\le 25\end{cases}$ tengsizliklar sistemasining butun yechimlari yig'indisini toping.

A) 3
B) 7
C) 4
D) 12

20. $\sqrt{5-11x-3x^2}\ge 1$ tengsizlikning butun yechimlari sonini toping.

A) 2
B) 3
C) 5
D) 4

21. Tengsizlikni yeching:
$x(x-1)^2\ge 12\cdot(x-1)$.

A) $(-\infty; -3]\cup[4; +\infty)$
B) $[-3; 1]\cup[4; +\infty)$
C) $(-\infty; -3]\cup[1; 4]$
D) $[-3; 4]$

22. $\sqrt{5x+4}\le\sqrt{4x+5}$ tengsizlikning eng katta va eng kichik yechimlari yig'indisini toping.

A) $\frac{1}{5}$
B) $-\frac{3}{5}$
C) $\frac{2}{5}$
D) $-\frac{4}{5}$

23. $\frac{x^2-3x+4}{(x^2-10)\cdot(x-1)}\le 0$ tengsizlikning natural yechimlari yig'indisini toping.

A) 5 B) 3 C) 4 D) 6

24. Tengsizlikni yeching:
$(3x-12)^2\cdot(4x-12)\ge(3x-12)\cdot(4x-12)^2$.

A) $(-\infty; 0]$
B) $[4; +\infty)$
C) $[0; 3]\cup[4; +\infty)$
D) $(-\infty; 0]\cup[3; 4]$

25. Tengsizlikni yeching:
$\sqrt[3]{(x-2)^3} + \sqrt[4]{(x-2)^4} \le 2 - x$.

A) $\{2\}$
B) $(-\infty; 2]$
C) $\varnothing$
D) $[2; \infty)$

26. $(a-3)(a-4) - 3(a-2)$ ifodaga qanday eng kichik butun son qo'shilganda, ifodaning qiymati ixtiyoriy $a \in R$ uchun musbat bo'ladi?

A) 8 B) 7
C) 6 D) 9

27. $\sqrt{(3x-2)^2} + \sqrt[3]{(3x-2)^3} + \sqrt[4]{(3x-2)^4} \ge 4$ tengsizlikning eng katta manfiy butun yechimi bilan eng kichik musbat butun yechimi yig'indisini toping.

A) 4
B) tengsizlik yechimga ega emas
C) 1
D) 3

28. $4x^2 \le x^2 - 12x + 36 \le 25$ qo'sh tengsizlikni qanoatlantiruvchi butun sonlar nechta?

A) 3
B) 1
C) 4
D) 2

29. $12 - 4x < x^2 \le 9x$ tengsizlikni qanoatlantiruvchi barcha tub sonlar yig'indisini toping.

A) 12
B) 15
C) 24
D) 17

30. $(4x-1)^2 - (3+4x)(x-2) - x(10x-1) \le$ $\le 25 - 2x$ tengsizlikning eng katta va eng kichik butun yechimlari yig'indisini toping.

A) 0 B) 3
C) 1 D) 4

31. $\left(\sqrt{2x-1}+3\right)\left(\sqrt{2x-1}-3\right) \le 7$ tengsizlikni nechta butun son qanoatlantiradi?

A) 6
B) cheksiz ko'p
C) 8
D) 12

32. $(x^2 - 2x - 24)\sqrt{10x - x^2} < 0$ tengsizlikning eng katta butun yechimini toping.

A) 7 B) 5
C) 6 D) 9

33. $|25 - x^2| \cdot (x^2 - 10x + 21) < 0$ tengsizlikning butun yechimlari soni a bo'lsa, $\frac{a^2+2}{4}$ ni hisoblang.

A) 0,5
B) 0,75
C) 1,5
D) 2,75

34. $\sqrt{4x - x^2} \le x - 5$ tengsizlik nechta butun yechimga ega?

A) 6
B) 2
C) 4
D) yechimga ega emas

Funksiyalar

1. $f(x) = \frac{4x}{x+2}$ funksiyaning aniqlanish sohasini toping.

A) $(-\infty; -2) \cup [0; \infty)$
B) $(-\infty; -2) \cup (-2; \infty)$
C) $(-\infty; -2]$
D) $(-\infty; 0]$

2. $f(x) = \frac{4}{x} - 2$ funksiyaning qiymatlar sohasini toping.

A) $(-\infty; 0) \cup (0; \infty)$
B) $[-2; \infty)$
C) $(-\infty; 0]$
D) $(-\infty; -2) \cup (-2; \infty)$

3. Agar $f(x) = \frac{-2}{x}$ bo'lsa, u holda $y = f(x+2) + 1$ funksiyani toping.

A) $y = \frac{-2x}{x+2}$
B) $y = \frac{-x}{x+2}$
C) $y = \frac{2x}{2+x}$
D) $y = \frac{x}{x+2}$

4. Agar $k < 0$, $b = 0$ bo'lsa, $y = kx + b$ chiziqli funksiyaning grafigi qaysi choraklarda yotadi?

A) I va II
B) I va III
C) II va IV
D) III va IV

5. Agar $k < 0$, $b > 0$ bo'lsa, $y = kx + b$ chiziqli funksiyaning grafigi qaysi choraklarda yotadi?

A) I, II va III
B) I, II va IV
C) II, III va IV
D) I, III va IV

6. Agar $f(x)$ o'zgarmas funksiya uchun $f(2) = 3$ bo'lsa, $f(1)$ ni toping.

A) 1
B) 3
C) 2
D) aniqlab bo'lmaydi

7. Agar $f(x)$ chiziqli funksiya grafigi koordinatalar boshidan o'tsa va $f(2) = 5$ tenglik o'rinli bo'lsa, $f(1)$ ni toping.

A) 2 B) 4
C) 2,5 D) 3,5

8. $f(x) = kx + 3$ funksiya k ning qanday qiymatlarida toq funksiya bo'ladi?

A) k ning hech bir qiymatida
B) $k < 0$
C) $k > 0$
D) $k \in R$

9. $f(x) = 3x + b$ funksiya b ning qanday qiymat(lar)ida toq funksiya bo'ladi?

A) $b = 2n - 1$, $n \in N$
B) $b = 0$
C) $b > 0$
D) $b < 0$

10. $f(x) = 3x + b$ funksiya b ning qanday qiymat(lar)ida juft funksiya bo'ladi?

A) $b = 2n$, $n \in N$
B) $b > 0$
C) b ning hech qanday qiymatida
D) $b < 0$

11. $f(x) = kx + 2$ funksiya k ning qanday qiymat(lar)ida juft funksiya bo'ladi?

A) $k = 0$
B) $k = 2n$, $n \in N$
C) $k > 0$
D) $k < 0$

12. $f(x) = kx + 2$ funksiya k ning qanday qiymatlarida kamayuvchi bo'ladi?

A) $k > 0$
B) $k = 2n - 1$, $n \in N$
C) $k \in R$
D) $k < 0$

13. $f(x) = (k + 2)x + 2$ funksiya k ning qanday qiymatlarida o'suvchi bo'ladi?

A) $k < -2$ B) $k < 0$
C) $k > -2$ D) $k \in R$

14. $f(x) = -x + b$ funksiya b ning qanday qiymatlarida o'suvchi bo'ladi?

A) b ning hech qanday qiymatida
B) $b > 0$
C) $b < 0$
D) $b = 2n - 1$, $n \in N$

15. Agar $f(x) = kx + 3$ funksiya uchun $f(2) = -3$ munosabat o'rinli bo'lsa, $f(-2)$ ni toping.

A) 0 B) 9 C) 3 D) 6

16. Koordinata o'qlarining (3; 0) va (0; 4) nuqtalaridan o'tadigan chiziqli fuksiyani toping.

A) $y = -\frac{4}{3}x + 4$
B) $y = \frac{4}{3}x + 4$
C) $y = -\frac{4}{3}x - 4$
D) $y = \frac{4}{3}x - 4$

17. $f(x) = \sqrt{\frac{3}{6 - x}}$ funksiyaning aniqlanish sohasiga tegishli natural sonlar nechta?

A) 6 B) 3
C) 5 D) 4

18. x ning qanday qiymatida $f(x) = \sqrt{\frac{3}{6 - x}}$ funksiyaning qiymati 1 ga teng bo'ladi?

A) 2 B) 1
C) 3 D) 4

19. $f(x) = |2 - x| - 4$ funksiya berilgan. $f(1) - f(3)$ ni hisoblang.

A) 1
B) 2
C) –1
D) 0

20. $f(x) = |3 - 2x| - 4$ funksiyaning eng kichik qiymatini toping.

A) –3,5
B) 1,5
C) –4
D) 0

21. Agar $f(x) = x^2 - 2$ funksiyaning eng kichik qiymati a bo'lsa, $f(a)$ ni toping.

A) 2 B) 0
C) 1 D) –2

22. $f(x) = x^2 - 5x - 6$ funksiyaning nollari yig'indisini toping.

A) –5 B) 5
C) –6 D) 0

23. $f(x) = x^2 - 5x - 6$ funksiyaning nollari ko'paytmasini toping.

A) 6 B) 5
C) –6 D) 0

24. $f(x) = x^2 + bx + c$ funksiyaning nollari 2 va 3 bo'lsa, b ni toping.

A) –6 B) 6
C) 5 D) –5

25. $f(x) = x^2 + bx + c$ funksiyaning nollari 2 va 3 bo'lsa, c ni toping.

A) –6 B) 5
C) 6 D) –5

26. $f(x) = x^2 + bx + c$ funksiyaning nollari 4 va 2 bo'lsa, parabola uchining abssissasini toping.

A) 3 B) –3
C) 6 D) –6

27. $f(x) = x^2 - 2x + c$ funksiyaning nollaridan biri 3 bo'lsa, ikkinchisini toping.

A) 1 B) 0
C) –5 D) –1

28. $f(x) = x^2 - 2x + c$ funksiyaning nollaridan biri 3 bo'lsa, c ni toping.

A) 1 B) 0
C) –3 D) –5

29. $f(x) = x^2 + bx + 3$ funksiyaning nollaridan biri 1 bo'lsa, ikkinchisini toping.

A) 3
B) –4
C) 4
D) –3

30. $f(x) = x^2 + bx + 3$ funksiyaning nollaridan biri 1 bo'lsa, b ni toping.

A) 4 B) –4
C) –3 D) 3

31. $f(x) = (x-3)^2 + 5$ parabola uchining koordinatalari yig'indisini toping.

A) 2
B) –8
C) –2
D) 8

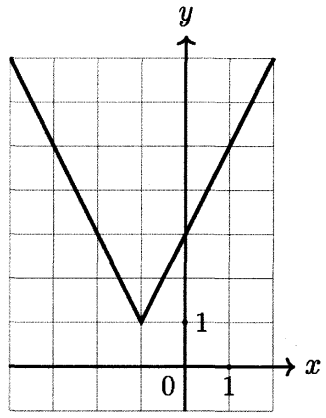
32. $f(x) = (x-3)^2 + 1$ parabola uchining koordinatalari ko'paytmasini toping.

A) 3
B) –3
C) 4
D) –2

33. $f(x) = (x+1)^2 + 4$ parabola uchining koordinatalarini toping.

A) (1; 4)
B) (–1; 4)
C) (–1; –4)
D) (1; –4)

34. Rasmda qaysi funksiyaning grafigi tasvirlangan?



A) $f(x) = 2|x| - 1$
B) $f(x) = |x + 1| + 1$
C) $f(x) = 3|x + 2|$
D) $f(x) = 2|x + 1| + 1$

35. k ning qanday qiymatida $y = kx^2 - 3$ funksiyaning grafigi $A(-2; 9)$ nuqtadan o'tadi?

A) 3 B) –6 C) –3 D) 6

36. $f(x) = \frac{1}{3}x - 2$ funksiya uchun quyidagi tengliklardan qaysi biri to'g'ri?

A) $f(6) = 4$
B) $f(9) = -5$
C) $f(-9) = 1$
D) $f(-6) = -4$

37. Grafigi $A(-2; 11)$ nuqtadan o'tuvchi $y = kx + 5$ funksiya abssissalar o'qini qaysi nuqtada kesib o'tadi?

A) $\left(0; 1\frac{1}{2}\right)$ B) $\left(1\frac{1}{2}; 0\right)$
C) $\left(1\frac{2}{3}; 0\right)$ D) $\left(-1\frac{2}{3}; 0\right)$

38. x ning qanday qiymatida $y = \frac{2}{3}x - 3$ funksiyaning qiymati $\frac{5}{9}$ga teng bo'ladi?

A) $4\frac{2}{3}$
B) $5\frac{1}{3}$
C) $2\frac{1}{3}$
D) $-1\frac{1}{3}$

39. $y = \frac{\sqrt{2x + 24 - x^2}}{7^{(x+2)^2-4} - 1}$ funksiyaning aniqlanish sohasiga nechta butun son tegishli?

A) 8
B) 11
C) 10
D) 9

40. Agar $f(x)$ funksiya $(-\infty; +\infty)$ da qat'iy o'suvchi funksiya bo'lsa, $y = 3f(x) - 8$ funksiya uchun quyidagi mulohazalardan qaysi biri doim to'g'ri bo'ladi?

A) qat'iy kamayuvchi
B) qat'iy o'suvchi
C) dastlab o'sadi, keyin kamayadi
D) dastlab kamayadi, keyin o'sadi

41. $(x_0; y_0)$ nuqta $y = 3x^2 - bx + 12$ parabola uchining koordinatalari bo'lsa, $y_0 + 3x_0^2$ ning qiymatini toping.

A) 9
B) 12
C) 15
D) 18

42. $f(x) = 13x^5 + 6x^3 - 27$ funksiya berilgan bo'lsa, $f(f(x))$ funksiyaning darajasi toping.

A) 10
B) 15
C) 9
D) 25

43. $y = kx + b$ chiziqli funksiyaning grafigi I, II va IV choraklarda yotsa, k va b larni nol bilan taqqoslang.

A) $k > 0,\ b < 0$
B) $k > 0,\ b > 0$
C) $k < 0,\ b > 0$
D) $k < 0,\ b < 0$

44. $y = kx + b$ chiziqli funksiyaning grafigi I, II choraklarda yotsa, k va b larni nol bilan taqqoslang.

A) $k = 0,\ b < 0$
B) $k < 0,\ b = 0$
C) $k > 0,\ b = 0$
D) $k = 0,\ b > 0$

45. $y = -3x + 7$ chiziqli funksiyaning ordinatalar o'qiga nisbatan simmetrigini toping.

A) $y = -3x + 7$
B) $y = -3x - 7$
C) $y = 3x + 7$
D) $y = 3x - 7$

46. $y = -3x + 7$ chiziqli funksiyaning abssissalar o'qiga nisbatan simmetrigini toping.

A) $y = 3x - 7$
B) $y = -3x - 7$
C) $y = 3x + 7$
D) $y = -3x + 7$

47. $y = -3x + 7$ chiziqli funksiyaning $(0;\ 0)$ nuqtaga nisbatan simmetrigini toping.

A) $y = 3x - 7$
B) $y = -3x + 7$
C) $y = 3x + 7$
D) $y = -3x - 7$

48. $y = -3x + 7$ chiziqli funksiyaning $x = 1$ to'g'ri chiziqqa nisbatan simmetrigini toping.

A) $y = -3x + 9$
B) $y = 3x - 9$
C) $y = 3x + 1$
D) $y = -3x - 1$

49. $y = -3x + 7$ chiziqli funksiyaning $y = 1$ to'g'ri chiziqqa nisbatan simmetrigini toping.

A) $y = -3x + 9$
B) $y = -3x - 7$
C) $y = 3x + 1$
D) $y = 3x - 5$

50. $y = -3x + 7$ chiziqli funksiyaning $y = x$ to'g'ri chiziqqa nisbatan simmetrigini toping.

A) $y = \dfrac{-7 - x}{3}$
B) $y = \dfrac{7 + x}{3}$
C) $y = \dfrac{-7 + x}{3}$
D) $y = \dfrac{7 - x}{3}$

51. $y = 6x^2 - 24x - 21$ kvadrat funksiyaning simmetriya o'qi bo'lgan chiziqni aniqlang.

A) $x = 4$ B) $x = 2$
C) $x = 0$ D) $x = 1$

52. $y = 2x^2 - 8x + 11$ parabola uchining koordinatalari yig'indisini toping.

A) 8 B) 5 C) 6 D) 7

53. $y = 3x^2 - 12x + 15$ kvadrat funksiyaning qiymatlari to'plamini aniqlang.

A) $[7; +\infty)$ B) $[-1; +\infty)$
C) $[3; +\infty)$ D) $[2; +\infty)$

54. $y = 3x^2 - 6x + 7$ kvadrat funksiyaning eng kichik qiymatini aniqlang.

A) 4 B) 7
C) 5 D) 1

55. $y = ax^2 + bx + c$ kvadratik funksiyaning grafigi I, II va IV choraklarda yotsa, a, b va c larning har birini nol bilan taqqoslang.

A) $a > 0,\ b < 0,\ c \le 0$
B) $a > 0,\ b < 0,\ c \ge 0$
C) $a < 0,\ b > 0,\ c \ge 0$
D) $a < 0,\ b < 0,\ c \ge 0$

56. Agar $a \cdot c < 0$ bo'lsa, $y = ax^2 + bx + c$ kvadrat funksiyaning grafigi qaysi choraklarda yotadi?

A) I, III va IV
B) I, II, III va IV
C) I, II va III
D) II, III va IV

57. $y = 3x^2 - 6x + 7$ kvadrat funksiyaning ordinatalar o'qiga nisbatan simmetrik funksiyasini aniqlang.

A) $y = -3x^2 - 6x - 7$
B) $y = -3x^2 + 6x - 7$
C) $y = 3x^2 + 6x + 7$
D) $y = 3x^2 - 6x + 7$

58. $y = 3x^2 - 6x + 7$ kvadrat funksiyaning abssissa o'qiga nisbatan simmetrik funksiyasini aniqlang.

A) $y = 3x^2 + 6x + 7$
B) $y = 3x^2 - 6x + 7$
C) $y = -3x^2 - 6x - 7$
D) $y = -3x^2 + 6x - 7$

59. $y = 3x^2 - 6x + 7$ kvadrat funksiyaning $(0; 0)$ nuqtaga nisbatan simmetrik funksiyasini aniqlang.

A) $y = -3x^2 + 6x - 7$
B) $y = -3x^2 - 6x - 7$
C) $y = 3x^2 + 6x + 7$
D) $y = 3x^2 - 6x + 7$

60. $y = x^2 - 8x + 17$ kvadrat funksiyaning $x = 2$ chiziqqa nisbatan simmetrik funksiyasini aniqlang.

A) $y = x^2 - 4x + 5$
B) $y = x^2 + 6x + 10$
C) $y = x^2 + 1$
D) $y = x^2 - 2x + 2$

61. $y = x^2 - 2x + 2$ kvadrat funksiyaning $y = 2$ chiziqqa nisbatan simmetrik funksiyasini aniqlang.

A) $y = -x^2 + 2x$
B) $y = -x^2 + 2x + 1$
C) $y = -x^2 + 2x + 2$
D) $y = -x^2 + 2x - 2$

62. $f(x) = x^2 - 2x - 1$, $g(x) = \dfrac{x-3}{x+2}$ funksiyalar uchun $f(g(-1))$ ni hisoblang.

A) 22 B) 23
C) 24 D) 25

63. b^2 ning qanday qiymatlarida $f(x) = x^2 + bx + 3$ funksiya abssissalar o'qini ikkita nuqtada kesib o'tadi?

A) $b^2 > 0$ B) $b^2 = 12$
C) $b^2 > 12$ D) $b^2 < 12$

64. $f(x) = x^2 + bx - 1$ funksiya abssissalar o'qini ikkita nuqtada kesib o'tadigan b ning barcha qiymatlarini toping.

A) $b < -2$ B) $b \in R$
C) $b < 2$ D) $b > 2$

65. b^2 ning qanday qiymatlarida $f(x) = x^2 + bx + 3$ funksiyaning grafigi abssissalar o'qidan yuqorida joylashadi?

A) $b^2 < 12$ B) $b^2 > 12$
C) $b^2 = 12$ D) $b^2 > 0$

66. $f(x) = \dfrac{x^2 - x}{2}$ va $g(x) = \dfrac{6}{x-5} + 5$ berilgan. Agar $a = f(5)$, $b = g(6)$ bo'lsa, quyidagi tengsizlikalardan qaysi biri to'g'ri?

A) $12a < 11b$ B) $10a < 9b$
C) $9a < 8b$ D) $13a > 12b$

67. Agar $f\left(\dfrac{2x-1}{3}\right) = \dfrac{6x+5}{3}$ bo'lsa, $f(1) - f(-2)$ ni hisoblang.

A) 3 B) –12
C) –3 D) 9

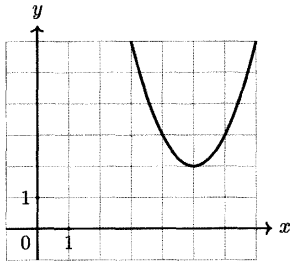
68. Agar $f(x)$ chiziqli funksiya uchun $f(1) + f(x-3) = 7x - 2$ bo'lsa, $f(x)$ ni toping.

A) $f(x) = 7x + 4$
B) $f(x) = 7x - 2$
C) $f(x) = 7x + 6$
D) $f(x) = 7x + 2$

69. $A(6; 7)$ nuqtadan $y = 2(x^2 - 4x + 6)$ parabola uchigacha bo'lgan masofani toping.

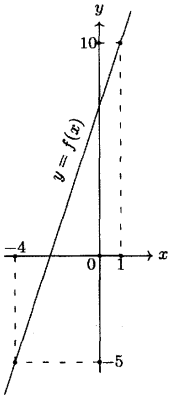
A) $3\sqrt{2}$ B) 4 C) $4\sqrt{2}$ D) 5

70. Rasmda qaysi kvadrat funksiyaning grafigi tasvirlangan?



A) $y = x^2 - 10x + 21$
B) $y = x^2 + 10x + 23$
C) $y = x^2 - 10x + 27$
D) $y = x^2 - 10x + 23$

71. Rasmda $f(x) = kx + b$ funksiyaning grafigi tasvirlangan. $f(2) + f(0)$ ning qiymatini toping.



A) 18 B) 24 C) 16 D) 20

72. $y = -x^2 + bx + c$ kvadrat funksiyaning eng katta qiymati –2 ga teng va unga $x = 2$ nuqtada erishadi. bc ni toping.

A) 18 B) –24
C) –18 D) 24

Hosila va uning tatbiqlari

1. $f(x)=\frac{x\sin x}{\pi}$ funksiya grafigiga abssissasi $x_0=\pi$ bo'lgan nuqtada o'tkazilgan urinma tenglamasini tuzing.

A) $y=-x-\pi$
B) $y=x+\pi$
C) $y=-x+\pi$
D) $y=x-\pi$

2. $f(x)=\frac{x^3+8}{x^2-2x+4}+2x$ funksiyaning $x_0=0$ nuqtadagi hosilasini toping.

A) 4 B) 3 C) 0 D) 2

3. $f(x)=x\cos x^2$ funksiyaning $x_0=0$ nuqtadagi hosilasini toping.

A) –1 B) 2
C) 0 D) 1

4. $f(x)=\frac{1}{\sin^2(2x-\pi)}$ funksiyaning $x_0=\frac{\pi}{4}$ nuqtadagi hosilasini toping.

A) –1 B) 1
C) –2 D) 0

5. $f(x)=\ln\sqrt{x^2-4x+5}+3x$ funksiyaning $x_0=0$ nuqtadagi hosilasini toping.

A) $2\frac{3}{5}$
B) $4\frac{2}{5}$
C) $3\frac{2}{5}$
D) $2\frac{2}{5}$

6. $f(x)=(2x+1)^5\cdot\sqrt{x^6+16}$ funksiyaning $x_0=0$ nuqtadagi hosilasini toping.

A) 20
B) 10
C) 40
D) 5

7. $f(x)=(x^2+x)\cdot\sqrt{x^2+1}$ funksiyaning $x_0=0$ nuqtadagi hosilasini toping.

A) 2
B) 0
C) 1
D) –1

8. $f(x)=(x-1)^{20}\cdot(\cos x+\sin x)$ funksiyaning $x_0=0$ nuqtadagi hosilasini toping.

A) –19 B) 19
C) 20 D) –20

9. $f(x)=\frac{x\cdot 2^x}{\ln 2}-\frac{2^x}{\ln^2 2}+2x$ funksiyaning $x_0=1$ nuqtadagi hosilasini toping.

A) –2 B) 2 C) 4 D) –4

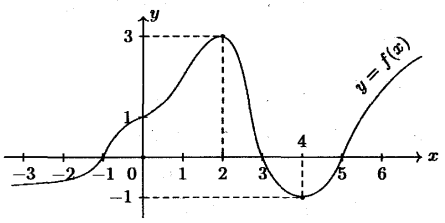
10. $f(x)=\frac{x^8\cdot\ln 7x}{8}-\frac{x^8}{64}+1$ funksiyaning $x_0=1$ nuqtadagi hosilasini toping.

A) $\frac{1}{4}\ln 7$
B) $2\ln 7$
C) $\frac{1}{2}\ln 7$
D) $\ln 7$

11. $f(x) = \frac{(x-5)^7}{7} + \frac{5(x-5)^6}{6} + 3x$ funksiyaning $x_0 = 4$ nuqtadagi hosilasini toping.

A) 1 B) –1 C) 3 D) 7

12. $y = f(x)$ funksiya grafigidan foydalanib, (–2; 6) oraliqda $f(x)\cdot f'(x) = 0$ tenglamaning barcha yechimlari to'plamini toping.

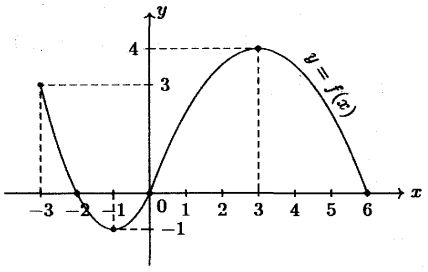


A) {–1; 2; 3; 4; 5}
B) {–1; 3; 5}
C) {–1; 0; 2; 3; 5}
D) {–1; 1; 3; 4; 5}

13. $f(x) = \frac{17}{3x^2} + \frac{75x^2}{17}$ funksiyaning eng kichik qiymatini toping.

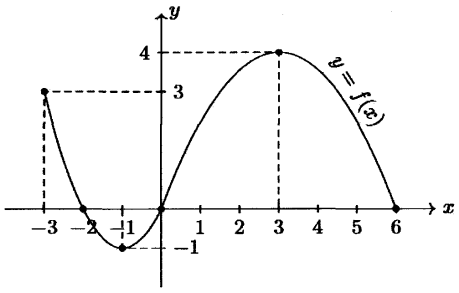
A) 10 B) 8 C) 12 D) 6

14. Rasmda grafigi keltirilgan $f(x)$ funksiya uchun quyidagi tengliklardan qaysi biri to'g'ri?



A) $f'(-1) + f(-1) = 0$
B) $f'(-2) + f(-1) = 0$
C) $f'(-1) + f(-2) = 0$
D) $f'(-2) + f(-2) = 0$

15. Rasmda $y = f(x)$ funksiyaning grafigi tasvirlangan. Quyidagi tengsizliklardan qaysi biri to'g'ri?



A) $f'(4)\cdot f(3) > 0$
B) $f'(1)\cdot f(3) > 0$
C) $f'(4)\cdot f(5) > 0$
D) $f'(5)\cdot f(2) > 0$

16. $f(x) = \ln(2x + 5)$ funksiyaning $x_0 = 2$ nuqtadagi hosilasini toping.

A) 0 B) $\frac{4}{9}$
C) $\frac{2}{9}$ D) $-\frac{2}{9}$

17. $f(x) = (x^2 - x + 2)\cdot(x - 1)$ funksiyaning $x_0 = 1$ nuqtadagi hosilasini toping.

A) –2
B) 2
C) 0
D) 1

18. $f(x) = \ln x^{x-1}$ funksiyaning hosilasini toping.

A) $f'(x) = \ln x - \frac{2}{x} + 1$
B) $f'(x) = \ln x + 1$
C) $f'(x) = \ln x - \frac{1}{x} + 1$
D) $f'(x) = \ln x + \frac{1}{x} + 1$

19. $g(x) = x^3 \cdot f(x)$ funksiya berilgan. Agar $f'(2) = f(2) \neq 0$ bo'lsa, $\frac{g'(2)}{f'(2)}$ ning qiymatini toping.

A) 20
B) 24
C) 22
D) 18

20. Agar $f(x)$ 13-darajali ko'phad bo'lsa, $y = x^{14} \cdot f(x)$ funksiyaning hosilasi nechanchi darajali ko'phad bo'ladi?

A) 52 B) 26
C) 25 D) 27

21. Agar $f(x)$ 9-darajali ko'phad bo'lsa, $y = (x-1)^2 \cdot f(x) + x$ funksiyaning $x_0 = 1$ nuqtadagi hosilasini toping.

A) –1 B) 0
C) 1 D) 2

22. $g(x) = (f(x))^{96}$ funksiya berilgan. Agar $f'(1) \neq 0$ va $f(1) = -1$ bo'lsa, $\frac{g'(1)}{f'(1)}$ ning qiymatini toping.

A) 95
B) –96
C) 1
D) 97

23. $f(x) = x^2$ funksiyaning (0; 0) va (1; 1) nuqtalaridan o'tuvchi to'g'ri chiziqqa parallel bo'lgan urinma tenglamasini tuzing.

A) $y = x - 0{,}225$
B) $y = x - 0{,}125$
C) $y = x - 0{,}25$
D) $y = x - 0{,}2$

24. $f(x) = \log_2 x$ funksiyaning (1; 0) va (2; 1) nuqtalaridan o'tuvchi to'g'ri chiziqqa parallel bo'lgan urinma tenglamasining burchak koeffitsiyentini toping.

A) $\frac{2}{3}$ B) 1
C) $\frac{1}{2}$ D) $\frac{1}{3}$

25. $f(x) = e^{-3x+2} \cdot \sin 3x$ funksiyaning hosilasini toping.

A) $-3e^{-3x+2} \cdot (\cos 3x + \sin 3x)$
B) $-3e^{-3x+2} \cdot (\cos 3x - \sin 3x)$
C) $3e^{-3x+2} \cdot (\cos 3x + \sin 3x)$
D) $3e^{-3x+2} \cdot (\cos 3x - \sin 3x)$

26. $f(x) = \cos(\sin 2x - 1)$ funksiyaning $x_0 = 0$ nuqtadagi hosilasini toping.

A) 2cos1 B) 2sin1
C) 0 D) –2sin1

27. $f(x) = x5^x$ funksiyaning hosilasini toping.

A) $f'(x) = 5^x \ln 5^x - 5^x$
B) $f'(x) = 2 \cdot 5^x \ln 5^x$
C) $f'(x) = 5^x \ln 5^{x+1}$
D) $f'(x) = 5^x \ln 5^x + 5^x$

28. x argumentning qanday qiymatida $f(x) = (x-1) \cdot 5^x$ funksiyaning hosilasi 0 ga teng bo'ladi?

A) $\log_5 \frac{5}{e}$
B) $\ln \frac{e}{5}$
C) $\log_5 \frac{e}{5}$
D) $\ln \frac{5}{e}$

29. $f(x) = e^{2x}\cdot(\sin x + \cos x)$ funksiya berilgan.

$f'(x) - f(x)$ni toping.

A) $2e^{2x}\sin x$
B) $-2e^{2x}\cos x$
C) $2e^{2x}\cos x$
D) $-2e^{2x}\sin x$

30. $f(2x + 1) = x^4 + 4x^2$ funksiya berilgan. $f'(3)$ ni toping.

A) 6
B) 8
C) 0
D) 12

31. To'g'ri to'rtburchak shaklidagi yer maydonning to'rtta tomoni 360 m uzunlikdagi devor bilan o'ralgan. Bu yer maydonining eng katta yuzasi necha m^2 bo'ladi?

A) 3240
B) 8100
C) 32400
D) 81000

32. Birinchi moddiy nuqta $S_1(t) = t^3 - 3t^2 + 6t + 2$ $[m]$, ikkinchisi $S_2(t) = \frac{1}{3}t^3 + t^2 - 3t + 1$ $[m]$ qonuniyat bo'yicha harakatlanmoqda. Ularning tezlanishlari teng bo'lgan vaqtdagi birinchisining tezligini (m/s) toping. (t – vaqt, s)

A) 9,5
B) 4
C) 6
D) 8

33. $f(x) = 3x^2 - 7x + 2$ funksiyaga $(3; f(3))$ nuqtadan o'tkazilgan urinma tenglamasini toping.

A) $y = 11x + 3$
B) $y = 11x - 25$
C) $y = -11x - 3$
D) $y = 11x - 21$

34. Agar $f(x) = \frac{x^3 - 4x^2 + x - 4}{x - 4}$ bo'lsa, $f'(-2) + f(1)$ ning qiymatini toping.

A) 4 B) –6
C) –2 D) 2

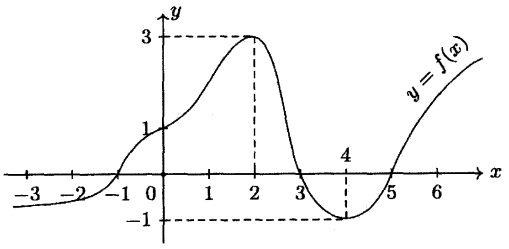
35. Agar $f(x) = (3x - 2)^{18}$ bo'lsa, $f'(1)$ ni hisoblang.

A) 54 B) 27
C) 18 D) 36

36. $y = -x^4 + 8x^2 - 9$ funksiyaning eng katta qiymati a bo'lsa, $a + 5$ quyidagi sonlardan qaysi biriga qoldiqsiz bo'linadi?

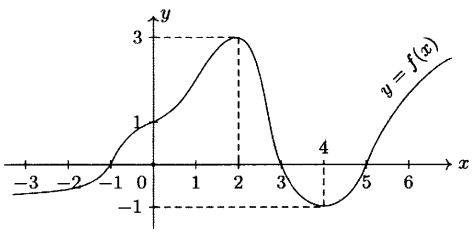
A) 9 B) 6
C) 5 D) 8

37. Funksiya grafigidan foydalanib, (–2; 6) oraliqda $f(x)\cdot f'(x) \geq 0$ tengsizlikning eng kichik natural yechimini toping.



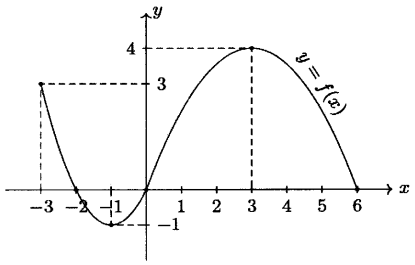
A) 2 B) 3
C) 4 D) 1

38. Funksiya grafigidan foydalanib, (–3; 6) oraliqda $f(x)\cdot f'(x) \le 0$ tengsizlikning eng katta manfiy butun yechimini toping.



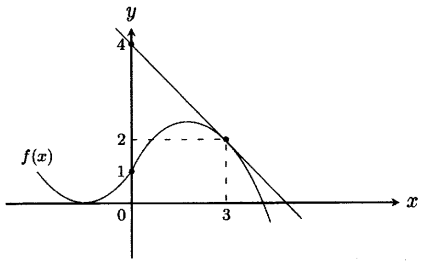
A) –1
B) –2
C) manfiy yechimga ega emas
D) –3

39. Rasmda $y = f(x)$ funksiyaning grafigi tasvirlangan. $f'(x)\cdot f(x) \ge 0$ tengsizlikning (0; 6) oraliqdagi yechimlarini toping.



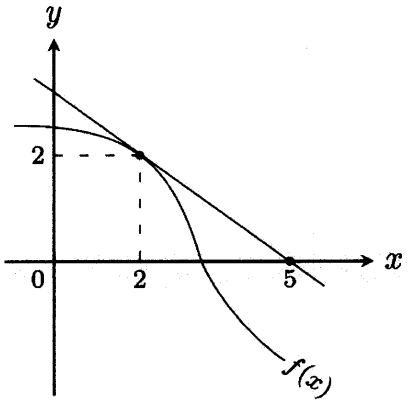
A) (0; 6) B) (0; 3]
C) Ø D) [3; 6)

40. Rasmda $y = f(x)$ funksiya grafigi va unga (3; 2) nuqtadan o'tkazilgan urinmasi tasvirlangan. Agar $g(x) = (x-2)\cdot f(x)$ bo'lsa, $g'(3)$ ni toping.



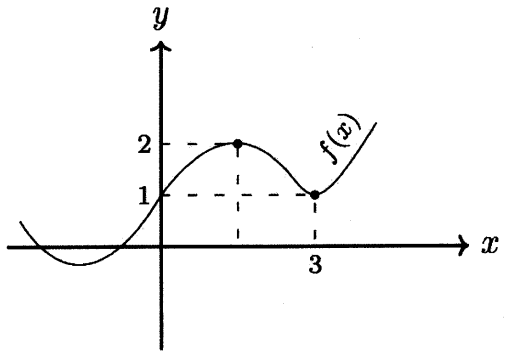
A) $2\frac{2}{3}$ B) $1\frac{1}{3}$ C) $1\frac{2}{3}$ D) $2\frac{1}{3}$

41. Rasmda $y = f(x)$ funksiya grafigi va unga (2; 2) nuqtadan o'tkazilgan urinmasi tasvirlangan. Agar $g(x) = (x^2-2)\cdot f(x)$ bo'lsa, $g'(2)$ ni toping.



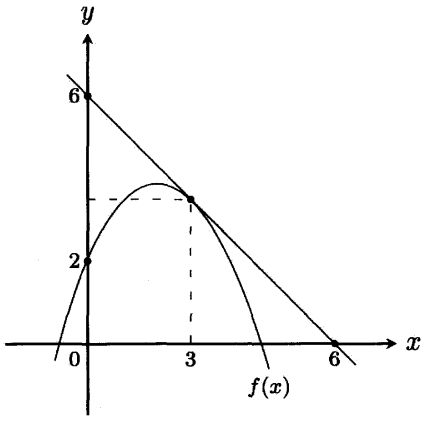
A) $9\frac{1}{3}$
B) $6\frac{1}{3}$
C) $9\frac{2}{3}$
D) $6\frac{2}{3}$

42. Rasmda $f(x)$ funksiyaning grafigi tasvirlangan. Agar $g(x) = (2x-7)^7\cdot f(x)$ bo'lsa, $g'(3)$ ni toping.



A) 14
B) –14
C) –7
D) 7

43. Rasmda $f(x) = ax^2 + bx + c$ funksiyaning grafigi va unga o'tkazilgan urinma tasvirlangan bo'lsa, a ni toping.



A) $-\frac{2}{3}$

B) $-\frac{1}{3}$

C) $-\frac{4}{9}$

D) $-\frac{5}{9}$

44. Agar $f(x)$ funksiya uchun $c + xf(x) = (x-1)\cdot(2x-1)^{11}$ munosabat o'rinli bo'lsa, $f'(1)$ ni toping (c – o'zgarmas son).

A) 1
B) 2
C) –1
D) 0

45. Agar $(x-1)^3\cdot(2x-1)^7 = a + a_1x^1 + a_2x^2 + \ldots + a_9x^9 + a_{10}x^{10}$ bo'lsa, $a + a_1$ ni toping.

A) –10
B) –17
C) –14
D) –16

46. Agar $a = 13 - x^2$, $b = x^2 - 3$ va $a, b \in N$ bo'lsa, ab eng katta qiymatini toping.

A) 9 B) 16
C) 24 D) 25

47. Agar a, b, c musbat haqiqiy sonlar uchun $ab = 14$ va $bc = 6$ bo'lsa, $a + 2b + 3c$ eng kichik qiymatini toping.

A) 34 B) 20
C) 18 D) 16

48. $y = \sqrt{1{,}44 - x^2}$ funksiya grafigiga o'tkazilgan urinma abssissa o'qini (–2; 0) nuqtada kesib o'tsa, uning tenglamasini toping.

A) $y = \frac{3}{4}x + \frac{3}{2}$

B) $y = \frac{3}{5}x + \frac{6}{5}$

C) $y = \frac{2}{3}x + \frac{4}{3}$

D) $y = \frac{4}{5}x + \frac{8}{5}$

49. $f(x) = \sqrt{2x+7}$ funksiya grafigiga o'tkazilgan urinma abssissa o'qini $\left(-\frac{21}{2}; 0\right)$ nuqtada kesib o'tsa, uning burchak koeffitsiyentini toping.

A) $\frac{2}{\sqrt{14}}$

B) $\frac{1}{\sqrt{7}}$

C) $\frac{2}{\sqrt{7}}$

D) $\frac{1}{\sqrt{14}}$

50. $y = -x + 1$ va $y = x^2 - 5x + 6$ funksiyalarning grafiklari orasidagi eng qisqa masofani toping.

A) $\frac{1}{2}$ B) $\frac{\sqrt{2}}{2}$

C) $\frac{\sqrt{3}}{2}$ D) 0

51. Quyidagi to'g'ri chiziq tenglamalaridan qaysi biri $y = 4x$ to'g'ri chiziqqa parallel va $y = x^3 - 3x^2 - 5x$ funksiya grafigiga urinma bo'ladi?

A) $y = 4x - 28$
B) $y = 4x - 26$
C) $y = 4x - 25$
D) $y = 4x - 27$

52. Oy o'qiga perpendikulyar va $y = (x-4)^2 \cdot e^x + 2$ funksiya grafigiga urinma bo'lgan to'g'ri chiziq tenglamalarini aniqlang.

A) $y = 2 \cdot e^2 + 4;\ y = 4$
B) $y = 2 \cdot e^2 + 4;\ y = 2$
C) $y = 4 \cdot e^2 + 2;\ y = 2$
D) $y = 4 \cdot e^2 + 2;\ y = 4$

53. $y = 17x$ to'g'ri chiziqqa parallel bo'lgan $f(x) = \left(\frac{11 \cdot 36^x}{2} + 6^{x+1}\right) \cdot \frac{1}{\ln 6}$ funksiyaning urinma tenglamasini tuzing.

A) $y = 17x + \frac{27}{\ln 36}$
B) $y = 17x + \frac{23}{\ln 36}$
C) $y = 17x + \frac{13}{\ln 36}$
D) $y = 17x + \frac{17}{\ln 36}$

54. $y = 2x$ to'g'ri chiziqqa parallel va $f(x) = \left(4^{x-\frac{1}{2}} - 2^{x+1}\right) \cdot \frac{1}{\ln 2} - 6x + 5$ funksiya grafigiga urinma bo'lgan to'g'ri chiziq tenglamasini aniqlang.

A) $y = 2x - 10$
B) $y = 2x - 12$
C) $y = 2x - 11$
D) $y = 2x - 16$

55. (8; 0) nuqtadan $y = \sqrt{25 - (x-5)^2}$ funksiyaning grafigigacha bo'lgan eng qisqa masofani toping.

A) $\sqrt{5}$
B) 2
C) $\sqrt{6}$
D) 3

56. $y = x^3 - x^2 - x - 2$ funksiya Ox o'qi bilan kesishgan burchak tangensini toping.

A) 4 B) 6
C) 7 D) 5

57. $y = \ln\left(\frac{5x+6}{2x+15}\right)$ funksiyaning grafigiga abssissasi $x_0 = 3$ bo'lgan nuqtadan urinma o'tkazilgan. Bu urinma va koordinata o'qlari hosil qilgan uchburchakning yuzini toping.

A) $\frac{9}{7}$
B) $\frac{3}{14}$
C) $\frac{3}{7}$
D) $\frac{9}{14}$

58. Agar $y = \ln(5x+1)^2 - \ln(2x+1)^5 + 4$ funksiyaning grafigiga $(x_0; y_0)$ nuqtada o'tkazilgan urinma Ox o'qiga parallel bo'lsa, $\sqrt{x_0^2 + y_0^2}$ ni toping.

A) 6
B) 4
C) 5
D) 3

59. $f(x) = \dfrac{(x+8)^4 + (x-6)^4}{2}$ funksiyaning eng kichik qiymatini toping.

A) 6^4
B) 7^4
C) $\dfrac{8^4 + 6^4}{2}$
D) 8^4

60. $f(x) = -\dfrac{x^4}{5} + 4x + 5$ funksiya berilgan. Uning monotonligidan foydalanib, $f\left(\sqrt[3]{6}\right)$ va $f\left(\sqrt[3]{7}\right)$ni taqqoslang.

A) $f\left(\sqrt[3]{7}\right) < f\left(\sqrt[3]{6}\right)$
B) $f\left(\sqrt[3]{7}\right) - 1 = f\left(\sqrt[3]{6}\right) + 1$
C) $f\left(\sqrt[3]{7}\right) > f\left(\sqrt[3]{6}\right)$
D) $f\left(\sqrt[3]{7}\right) = f\left(\sqrt[3]{6}\right)$

61. $f(x) = \dfrac{2}{(x-2)^3} + \dfrac{3}{x^3} + 14$ funksiyaning kamayish oraliqlarini aniqlang.

A) $(-\infty; 0) \cup (0; 2) \cup (2; \infty)$
B) $(0; 2) \cup (2; \infty)$
C) $(-\infty; 0) \cup (2; \infty)$
D) $(-\infty; 0) \cup (0; 2)$

62. Agar musbat a va b sonlar uchun $a + b = 14$ bo'lsa, $\dfrac{25}{a} + \dfrac{36}{b}$ ning eng kichik qiymatini toping.

A) $\dfrac{61}{7}$ B) $\dfrac{121}{14}$
C) $\dfrac{123}{14}$ D) $\dfrac{62}{7}$

63. $y = (x-4)\cdot(x-1)^2$ funksiyaning ekstremum nuqtalaridan o'tuvchi to'g'ri chiziq tenglamasini tuzing.

A) $y = 2x - 2$
B) $y = 2 - 2x$
C) $y = 2x + 2$
D) $y = -2x - 2$

64. $f(x) = ax^2 + bx + c$ funksiyaning grafigi $A(-2; 5)$, $B(3; 10)$ va $C(-1; -2)$ nuqtalardan o'tadi. $f'(3) - 2f(2)$ ning qiymatini toping.

A) –3 B) 4
C) 9 D) 6

65. $f(x) = 24\operatorname{tg}x - 24x + 6\pi + 11$ funksiyaning $\left[-\dfrac{\pi}{4}; \dfrac{\pi}{4}\right]$ kesmadagi eng katta qiymatini toping.

A) $14\sqrt{3} + 11$ B) $12\sqrt{3} + 13$
C) 35 D) 24

66. Agar $y = f(x)$ funksiya uchun $xf(3x-2) = x^4 + 2x - 5$ shart bajarilsa, $f'(1)$ ni toping.

A) $\dfrac{8}{3}$ B) $-\dfrac{2}{3}$
C) 8 D) –2

Integral va uning tatbiqlari

1. $\int_0^1 x \cdot \cos x^2 dx$ integralni hisoblang.

A) 0 B) $\frac{\sin 1}{2}$

C) $\frac{\cos 1}{2}$ D) $-\frac{\sin 1}{2}$

2. $\int x^2 \cdot \cos x^3 dx$ integralni hisoblang.

A) $-\frac{\cos x^3}{3} + C$ B) $-\frac{\sin x^3}{3} + C$

C) $\frac{\sin x^3}{3} + C$ D) $\frac{\cos x^3}{3} + C$

3. $\int \frac{1}{\sin^2(2x-3)} dx$ integralni hisoblang.

A) $-\frac{\operatorname{ctg}(3-2x)}{3} + C$

B) $\frac{\operatorname{ctg}(3-2x)}{3} + C$

C) $-\frac{\operatorname{ctg}(3-2x)}{2} + C$

D) $\frac{\operatorname{ctg}(3-2x)}{2} + C$

4. $\int \frac{dx}{\sin^2(x-1) \cdot \cos^2(x-1)}$ integralni hisoblang.

A) $2\operatorname{tg}(2x-2) + C$
B) $-2\operatorname{tg}(2x-2) + C$
C) $-2\operatorname{ctg}(2x-2) + C$
D) $2\operatorname{ctg}(2x-2) + C$

5. $\int \frac{(x-2)dx}{x^2-4x+17}$ integralni hisoblang.

A) $\ln(x^2-4x+17)^{-2} + C$
B) $\ln\sqrt{x^2-4x+17} + C$
C) $\ln(x^2-4x+17)^2 + C$
D) $\ln(x^2-4x+17) + C$

6. $\int \frac{(x-2)dx}{\sqrt{x^2-4x+8}}$ integralni hisoblang.

A) $\sqrt{x^2-4x+8} + C$
B) $-\sqrt{x^2-4x+8} + C$
C) $-\frac{1}{2}\sqrt{x^2-4x+8} + C$
D) $\frac{1}{2}\sqrt{x^2-4x+8} + C$

7. $\int \frac{x^3}{\sqrt{5+x^4}} dx$ integralni hisoblang.

A) $2\sqrt{5+x^4} + C$
B) $\sqrt{5+x^4} + C$
C) $\frac{1}{2}\sqrt{5+x^4} + C$
D) $4\sqrt{5+x^4} + C$

8. $\int (2x+1)\cos(x^2+x)dx$ integralni hisoblang.

A) $-\cos(x^2+x) + C$
B) $\cos(x^2+x) + C$
C) $\sin(x^2+x) + C$
D) $-\sin(x^2+x) + C$

9. $\int \sin x \cdot \cos^7 x dx$ integralni hisoblang.

A) $\frac{1}{8}\cos^8 x + C$ B) $\frac{1}{8}\sin^8 x + C$

C) $-\frac{1}{8}\sin^8 x + C$ D) $-\frac{1}{8}\cos^8 x + C$

10. $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$ integralni hisoblang.

A) $2\cos\sqrt{x} + C$

B) $-\frac{1}{2}\cos\sqrt{x} + C$

C) $\frac{1}{2}\cos\sqrt{x} + C$

D) $-2\cos\sqrt{x} + C$

11. $\int \frac{x}{\sqrt{(x^2+4)^3}} dx$ integralni hisoblang.

A) $\frac{1}{\sqrt{x^2+4}} + C$

B) $\frac{-1}{\sqrt{x^2+4}} + C$

C) $\frac{-2}{\sqrt{x^2+4}} + C$

D) $\frac{2}{\sqrt{x^2+4}} + C$

12. $\int x \cdot \cos 3x dx$ integralni hisoblang.

A) $-\frac{x}{3} \cdot \sin 3x - \frac{1}{9}\cos 3x + C$

B) $\frac{x}{3} \cdot \sin 3x + \frac{1}{9}\cos 3x + C$

C) $-\frac{x}{3} \cdot \sin 3x + \frac{1}{9}\cos 3x + C$

D) $\frac{x}{3} \cdot \sin 3x - \frac{1}{9}\cos 3x + C$

13. $\int 4x \cdot \ln 3x dx$ integralni hisoblang.

A) $4x^2\ln 3x - 2x^2 + C$
B) $x^2\ln 3x - 2x^2 + C$
C) $2x^2\ln 3x - x^2 + C$
D) $2x^2\ln 3x - 2x^2 + C$

14. $\int 3x \cdot 2^x dx$ integralni hisoblang.

A) $\frac{3 \cdot 2^x}{\ln 2} - \frac{3 \cdot 2^x}{\ln^2 2} + C$

B) $\frac{3x \cdot 2^x}{\ln 2} - \frac{3 \cdot 2^x}{\ln^2 2} + C$

C) $\frac{3x \cdot 2^x}{\ln 2} - \frac{3 \cdot 2^x}{\ln 2} + C$

D) $\frac{3 \cdot 2^x}{\ln 2} - \frac{3x \cdot 2^x}{\ln^2 2} + C$

15. $\int x^7 \cdot \ln 7x dx$ integralni hisoblang.

A) $\frac{x^8}{8} + \frac{x^8 \cdot \ln 7x}{64} + C$

B) $\frac{x^8}{8} - \frac{x^8 \cdot \ln 7x}{64} + C$

C) $\frac{x^8 \cdot \ln 7x}{8} - \frac{x^8}{64} + C$

D) $\frac{x^8 \cdot \ln 7x}{8} + \frac{x^8}{64} + C$

16. $\int_5^6 (x-5)^4 \cdot x dx$ integralni hisoblang.

A) $1\frac{1}{7}$

B) $1\frac{1}{6}$

C) $1\frac{1}{8}$

D) $1\frac{1}{9}$

17. $f(x) = (\sin x + \cos x)^2$ funksiyaning boshlang'ich funksiyasini toping.

A) $F(x) = x + \frac{1}{2}\cos 2x + C$

B) $F(x) = -x + \frac{1}{2}\cos 2x + C$

C) $F(x) = x - \frac{1}{2}\cos 2x + C$

D) $F(x) = -x - \frac{1}{2}\cos 2x + C$

18. $f(x) = x^2 - x + 1$ funksiyaning (0; 2) nuqtadan o'tuvchi boshlang'ich funksiyasini toping.

A) $F(x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 + 1$

B) $F(x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 + 2$

C) $F(x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - 2$

D) $F(x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - 1$

19. $F(x)$ funksiya $f(x) = x^2 - x + 2$ funksiyaning boshlang'ich funksiyasi. $F(x)$ funksiyaning [0; 2] kesmadagi eng kichik qiymati 2 ga teng bo'lsa, uning [0; 2] kesmadagi eng katta qiymatini toping.

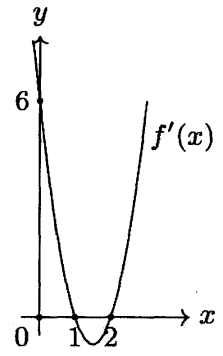
A) $5\frac{2}{3}$

B) $5\frac{1}{3}$

C) $6\frac{2}{3}$

D) $6\frac{1}{3}$

20. Rasmda $f'(x)$ kvadrat funksiyaning grafigi tasvirlangan. Uning boshlang'ich funksiyasi uchun $f(0) = 0$ bo'lsa, u holda $f(2)$ ni toping.



A) 0 B) 3
C) 1 D) 2

21. Integralni hisoblang: $\int_0^1 \frac{(4x-1)dx}{\sqrt{2x^2 - x + 4}}$.

A) $2\sqrt{5} - 4$

B) $2 - \sqrt{5}$

C) $\sqrt{5} - 2$

D) $4 - \sqrt{5}$

22. Integralni hisoblang:

$\int_0^1 (2x+1)\cos(x^2 + x)dx$.

A) sin2 B) 2sin2
C) –2sin2 D) –sin2

23. Integralni hisoblang: $\int_0^{\frac{\pi}{2}} \sin x \cdot \cos^7 x dx$.

A) $\frac{1}{4}$ B) $\frac{1}{8}$

C) $-\frac{1}{8}$ D) 0

24. $f(x) = (10 - x^2)\cdot\ln x$ funksiyaning (4; 7) nuqtadan o'tuvchi boshlang'ich funksiyasi $F(x)$ bo'lsa, $F(2)$ va $F(3)$ larni taqqoslang.

A) $F(2) = F(3) + 1$
B) $F(2) < F(3)$
C) $F(2) > F(3)$
D) $F(2) = F(3)$

25. Agar $f(x) = \begin{cases} x+2, & x \le -1 \\ x^2, & x > -1 \end{cases}$ bo'lsa,

$\int\limits_{-2}^{0} 6x^3 \cdot f(x)dx$ integralni hisoblang.

A) –4,8
B) –8,4
C) –7,8
D) –8,8

26. Integralni hisoblang:

$\int\limits_{1}^{2} \left(x^2 - x + 1\right)^3 \cdot (2x - 1)dx$.

A) 20
B) 6,5
C) 13
D) 10

27. $y = f(x)$ funksiya $(-\infty; +\infty)$ da aniqlangan va hosilaga ega bo'lsin. Agar $f(1) = 0$ va $f(3) = 2$ bo'lsa,

$\int\limits_{1}^{3} \left(f(x)\right)^3 \cdot f'(x)dx$ integralni hisoblang.

A) 8
B) 16
C) 4
D) 20

28. Integralni hisoblang: $\int\limits_{0}^{1} \frac{4x+5}{x^2+3x+2}dx$.

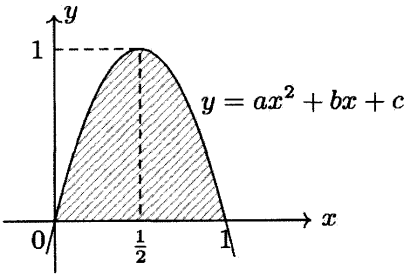
A) $\ln\frac{27}{4}$
B) $\ln\frac{4}{27}$
C) $\ln\frac{2}{27}$
D) $\ln\frac{27}{2}$

29. Agar $f(x) = \begin{cases} x^2+1, & x \le 1 \\ x, & x > 1 \end{cases}$ bo'lsa,

$\int\limits_{-1}^{2} x \cdot f(x)dx$ integralni hisoblang.

A) $\frac{5}{3}$ B) $\frac{4}{3}$
C) $\frac{7}{3}$ D) $\frac{8}{3}$

30. Rasmda bo'yalgan sohaning yuzasini toping.



A) $\frac{5}{6}$
B) $\frac{2}{3}$
C) $\frac{4}{3}$
D) $\frac{1}{2}$

31. Integralni hisoblang: $\int_{-1}^{2}\left(x^2-1\right)^6 \cdot x dx$.

A) $3^7 \cdot 7^{-1}$
B) $3^7 \cdot 14^{-1}$
C) $3^6 \cdot 14^{-1}$
D) $3^6 \cdot 7^{-1}$

32. Hisoblang: $\int_{1}^{2}\frac{dx}{9x^2-1}$.

A) $\frac{1}{6}\ln\left(\frac{20}{7}\right)$ B) $\frac{1}{6}\ln\left(\frac{10}{7}\right)$
C) $\frac{1}{9}\ln\left(\frac{35}{8}\right)$ D) $\frac{1}{2}\ln\left(\frac{10}{7}\right)$

33. Integralni hisoblang: $\int_{-3}^{3}|x-2|dx$.

A) 13 B) 6
C) 16,5 D) 9,5

34. Integralni hisoblang: $\int\frac{x^2+6x+7}{x^2+6x+10}dx$

A) $x + 3\text{arctg}(x+3) + C$
B) $x - 3\arcsin(x+1) + C$
C) $x + 3\arcsin(x+6) + C$
D) $x - 3\text{arctg}(x+3) + C$

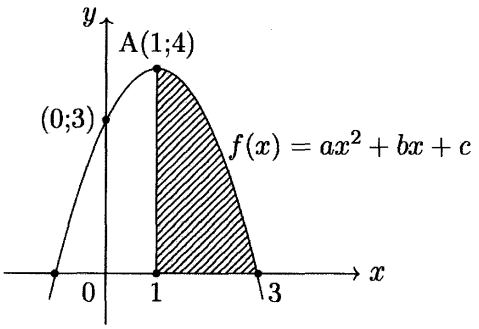
35. Integralni hisoblang: $\int\sin^4 2x dx$.

A) $\frac{3}{8}x+\frac{1}{8}\sin 4x-\frac{1}{64}\sin 8x+C$
B) $\frac{3}{8}x-\frac{1}{8}\sin 4x+\frac{1}{64}\sin 8x+C$
C) $\frac{1}{2}x-2\sin 4x+\sin 8x+C$
D) $\frac{3}{8}x+2\sin 4x-\sin 8x+C$

36. $f(x)=e^{2x+a}+b$ funksiya uchun $f'(2)=2e^5$ va $\int_{0}^{2}f(x)dx=\frac{e^5-e+24}{2}$ bo'lsa, ab ning qiymatini toping.

A) 12
B) –12
C) 6
D) 4

37. Rasmda shtrixlangan soha yuzini toping. (A – nuqta parabolaning uchi)



A) $5\frac{1}{3}$
B) 9
C) $6\frac{2}{3}$
D) $8\frac{1}{3}$

38. Integralni hisoblang:

$\int(7x-3)\cos 4x dx$.

A) $\frac{(7x-3)\sin 4x}{4}-\frac{7}{16}\cos 4x+C$
B) $\frac{(7x-3)\sin 4x}{4}+\frac{7}{16}\cos 4x+C$
C) $\frac{(7x-3)\sin 4x}{8}+\frac{7}{4}\cos 4x+C$
D) $\frac{(7x-3)\cos 4x}{4}+\frac{7}{16}\sin 4x+C$

39. Integralni hisoblang:

$\int(5x^4-1)\ln 2x dx$.

A) $(5x^4-1)\ln 2x - \frac{x^5}{5} + x + C$

B) $(x^5-x)\ln 2x + \frac{x^5}{5} - x + C$

C) $(x^5-x)\ln 2x - \frac{x^5}{5} + x + C$

D) $(x^5-x)\ln 2x - \frac{x^5}{5} + C$

40. Integralni hisoblang: $\int_{\frac{\pi}{16}}^{\frac{\pi}{8}} \sin 6x \cdot \sin 2x dx$.

A) $\frac{3-\sqrt{2}}{16}$

B) $\frac{2\sqrt{2}-1}{8}$

C) $\frac{2-\sqrt{2}}{8}$

D) $\frac{2\sqrt{2}-1}{16}$

Planimetriya

1. Agar ABC uchburchakning burchaklari $\angle A : \angle B : \angle C = 2:3:4$ shartlarni qanoatlantirsa, uchburchakning qaysi tomoni eng katta bo'ladi?

A) AC
B) aniqlab bo'lmaydi
C) AB
D) BC

2. Agar qo'shni burchaklar o'zaro 13:17 nisbatda bo'lsa, shu qo'shni burchaklardan kattasini toping.

A) 78°
B) 68°
C) 112°
D) 102°

3. Agar qo'shni burchaklar ayirmasi 12° bo'lsa, shu burchaklardan kattasinining gradus o'lchovini aniqlang.

A) 72° B) 84°
C) 108° D) 96°

4. Agar ikkita to'g'ri chiziq kesishganidan hosil bo'lgan burchaklarning ikkitasini gradus o'lchovlari 8:7 nisbatda bo'lsa, bu burchaklarning farqini toping.

A) 12°
B) 9°
C) 8°
D) 7°

5. Ikkita to'g'ri chiziq kesishganidan hosil bo'lgan burchaklardan biri ikkinchisidan 36° ga katta bo'lsa, ularning nisbatini toping.

A) 6:5 B) 4:3
C) 5:4 D) 3:2

6. ABC uchburchakning burchaklari 2:3:1 nisbatda. Agar eng kichik tomoni 5 cm bo'lsa, eng katta tomoni uzunligini (cm) toping.

A) 8 B) 10
C) $5\sqrt{3}$ D) $5\sqrt{2}$

7. Ikkita to'g'ri chiziqning kesishishidan hosil bo'lgan burchaklardan uchtasining yig'indisi 215° ga teng bo'lsa, shu burchaklardan kattasining gradus o'lchovini aniqlang.

A) 145° B) 135°
C) 115° D) 125°

8. Ixtiyoriy uchtasi bir to'g'ri chiziqda yotmagan 10 ta nuqtani o'zaro tutashtirib ko'pi bilan nechta har xil kesma hosil qilish mumkin?

A) 10 B) 90
C) 55 D) 45

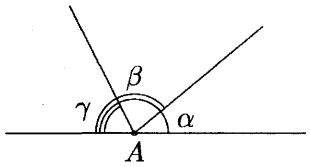
9. To'g'ri chiziqda bir biri bilan ustma-ust tushmaydigan 5 ta nuqta tanlangan. To'g'ri chiziqda jami nechta kesma hosil bo'ladi?

A) 9 B) 4
C) 10 D) 7

10. Agar ABC uchburchakning tomonlari $AB{:}AC{:}BC = 5{:}3{:}4$ nisbatda bo'lsa, uchburchakning qaysi burchagi eng katta bo'ladi?

A) $\angle ABC$ B) aniqlab bo'lmaydi
C) $\angle ACB$ D) $\angle BAC$

11. Yoyiq burchakning A nuqtasidan chiquvchi ikkita nur uni 2:4:3 nisbatdagi burchaklarga ajratadi. Eng katta burchakni toping.



A) 60° B) 80°
C) 90° D) 40°

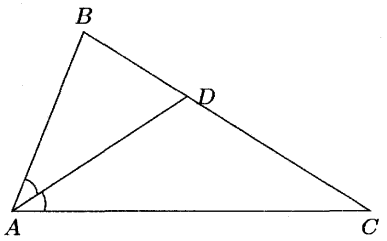
12. Soatning minut mili 15 minutda necha gradusga buriladi?

A) 75° B) 90°
C) 60° D) 105°

13. Agar ABC uchburchak uchun $AC^2 = BC^2 + AB^2 + \sqrt{2}\, AB{\cdot}BC$ bo'lsa, u holda $\angle ABC$ ni toping.

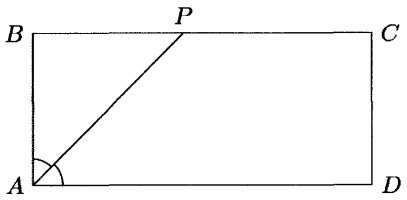
A) 60° B) 30°
C) 45° D) 135°

14. Rasmda berilgan ABC uchburchakda AD bissektrisa. Agar $\angle ADC = 113°$ bo'lsa, B burchak C burchakdan necha gradusga katta?



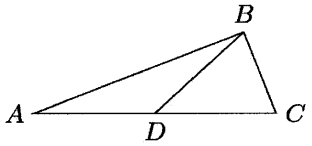
A) 47°
B) 67°
C) 46°
D) 23°

15. Rasmda $ABCD$ to'g'ri to'rtburchak, BAD burchakning AP bissektrisasi tasvirlangan. Agar $BP = 4$ va $PC = 5$ bo'lsa, $APCD$ trapetsiyaning yuzini toping.



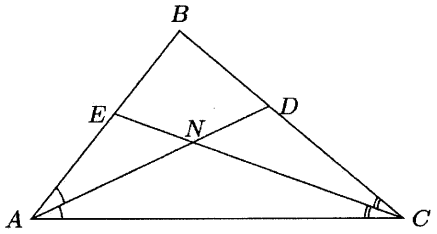
A) 28 B) 24
C) 27 D) 25

16. Rasmda ABC uchburchak va uning BD medianasi tasvirlangan. Agar $AC = 2BD$ va $\angle CAB = 22°$ bo'lsa, ACB burchakni toping.



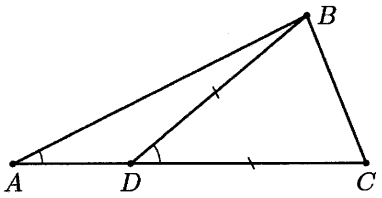
A) 52°
B) 62°
C) 58°
D) 68°

17. Rasmda ABC uchburchak, uning AD va CE bissektrisalari tasvirlangan. Agar $\angle ABC = 108°$ bo'lsa, $\angle ENA$ burchakni toping.



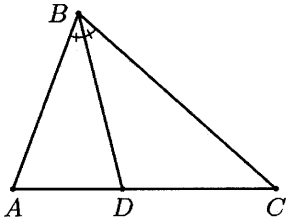
A) 36°
B) 28°
C) 34°
D) 38°

18. ABC uchburchakning AC tomonidan D nuqta shunday olinganki, bunda $BD = DC$ (rasm). Agar $\angle BAC = 33°$ va $\angle BDC = 42°$ bo'lsa, $\angle ABC$ ni toping.



A) 75° B) 79°
C) 78° D) 80°

19. Rasmda ABC uchburchak va uning BD bissektrisasi tasvirlangan. Agar $AB = 5$ va $BC = 7$ bo'lsa, $DC{:}AC$ nisbatni toping.



A) $\frac{7}{12}$
B) $\frac{5}{7}$
C) $\frac{5}{12}$
D) $\frac{7}{5}$

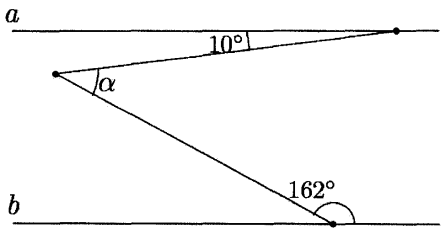
20. $ABCD$ qavariq to'rtburchakka aylana ichki chizilgan. Agar $AB = 8$ va $BC = 12$ bo'lsa, $CD - AD$ ayirmani toping.

A) 4
B) 3
C) aniqlab bo'lmaydi
D) 2

21. Ikki to'g'ri chiziqning kesishishidan hosil bo'lgan o'tmas burchak sinusi $\frac{4}{5}$ga teng bo'lsa, o'tkir burchak tangensini toping.

A) $\frac{3}{4}$
B) $-\frac{3}{5}$
C) $\frac{4}{3}$
D) $\frac{3}{5}$

22. a va b parallel to'g'ri chiziqlar. Rasmdan foydalanib α burchakning qiymatini toping.



A) 24°
B) 28°
C) aniqlab bo'lmaydi
D) 18°

23. Tomonlari $3\sqrt{3}$; 4 va $2\sqrt{6}$ ga teng bo'lgan uchburchakning turini aniqlang.

A) aniqlab bo'lmaydi
B) o'tmas burchakli
C) to'g'ri burchakli
D) o'tkir burchakli

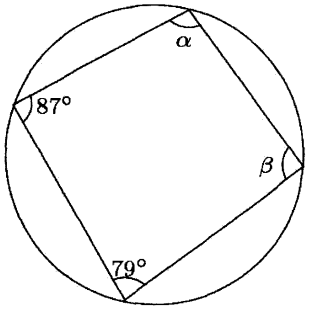
24. $x^2 + y^2 - 2\sqrt{3}\,x + 4y - 1 = 0$ tenglama bilan berilgan aylananing markazi koordinata tekisligining qaysi choragida joylashgan?

A) IV B) II
C) I D) III

25. Yuzasi $18\sqrt{2}$ bo'lgan to'g'ri burchakli trapetsiyaga ichki chizilgan aylananing radiusi 3 bo'lsa, trapetsiyaning o'rta chizig'ini toping.

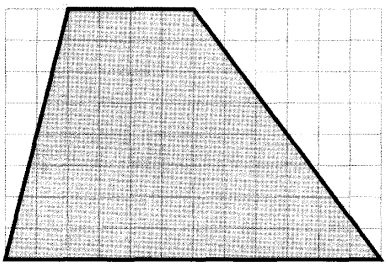
A) $6\sqrt{2}$
B) berilgan ma'lumotlar yetarli emas
C) 6
D) $3\sqrt{2}$

26. Rasmda berilgan ma'lumotlardan foydalanib, $\alpha - \beta$ ni aniqlang.



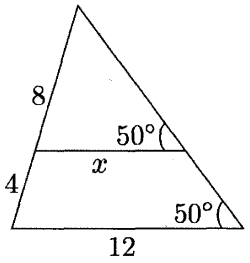
A) 12° B) 6°
C) 8° D) aniqlab bo'lmaydi

27. Rasmda tasvirlangan trapetsiyaning yuzasini (cm^2) hisoblang. Har bir katak tomoni 1 cm li kvadrat.



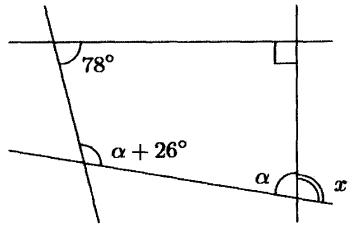
A) 64 B) 68
C) 72 D) 56

28. Rasmdan foydalanib x ning qiymatini toping.



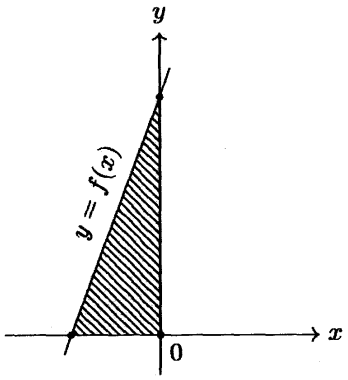
A) 9
B) berilgan ma'lumotlar yetarli emas
C) 6,5
D) 8

29. Rasmda berilgan ma'lumotlarga ko'ra x necha gradus?



A) 102° B) aniqlab bo'lmaydi
C) 97° D) 93°

30. Koordinatalar o'qlari va $f(x) = 2x + 7$ ning grafigi bilan chegaralangan yuzani (rasm) toping.



A) $\frac{7}{2}$
B) $\frac{49}{4}$
C) 7
D) $\frac{49}{2}$

31. Bitta tashqi burchagi 15° ga teng bo'lgan muntazam ko'pburchakning nechta tomoni bor?

A) 32
B) 30
C) 26
D) 24

32. Tomonlari $4\sqrt{2}$; 6 va 8 ga teng bo'lgan uchburchakka tashqi chizilgan aylana markazi uchburchakning qayerida joylashgan bo'ladi?

A) eng katta tomonida
B) eng kichik tomonida
C) ichki sohasida
D) tashqi sohasida

33. AB kesmani A uchidan boshlab hisoblaganda C nuqta 3:4 nisbatda, D nuqta esa AC kesmani 4:3 nisbatda bo'ladi. Agar AB kesmaning uzunligi 49 cm bo'lsa, u holda AD kesmaning uzunligini (cm) toping.

A) 12
B) 21
C) 16
D) 9

34. Tekislikda joylashgan AB kesmaning uzunligi 12 cm va BC kesmaning uzunligi esa 3 cm ga teng. AC kesmaning uzunligi (cm) quyidagilarning qaysi biriga teng bo'la olmaydi?

A) 10
B) 8
C) 11
D) 9

35. Teng yonli uchburchakning perimetri 32 cm ga teng. Agar teng tomonlarining o'rtalarini tutashtiruvchi kesma uzunligi 6 cm bo'lsa, uchburchakning yuzini (cm^2) toping.

A) 42 B) 54
C) 56 D) 48

36. Teng yonli uchburchakning perimetri 32 cm ga teng. Agar teng tomonlarining o'rtalarini tutashtiruvchi kesma uzunligi 6 cm bo'lsa, uchburchakka ichki chizilgan aylana diametrini (cm) toping.

A) 6 B) 3
C) 5 D) 4

37. $ABCD$ parallelogrammda, AD katta tomonidagi A va D burchaklarining bissektrisalari parallelogrammning ichki sohasida kesishgan bo'lsa, tomonlari orasida qaysi munosabat to'g'ri bo'ladi?

A) $2AB < AD$
B) $2DC < AD$
C) $2AB > AD$
D) $2AB = AD$

38. $ABCD$ parallelogrammda, AD katta tomonidagi A va D burchaklarining bissektrisalari parallelogrammning BC tomonida kesishgan bo'lsa, parallelogrammning tomonlari orasida qaysi munosabat to'g'ri bo'ladi?

A) $2AB > AD$
B) $2AB < AD$
C) $2AB = AD$
D) $2DC > AD$

39. $ABCD$ parallelogrammda $AB = 12$ cm va $BC = 23$ cm. Parallelogrammning A va D burchaklarining bissektrisalari qayerida kesishadi?

A) parallelogrammning tashqi sohasida
B) parallelogrammning ichki sohasida
C) parallelogrammning AB tomonida
D) parallelogrammning BC tomonida

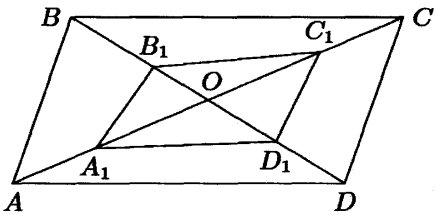
40. To'g'ri burchakli uchburchak o'tkir burchaklarining bissektrisalari kesishishidan hosil bo'lgan o'tkir burchakni toping.

A) 60°
B) 30°
C) 15°
D) 45°

41. ABC uchburchakning BD medianasidagi E va F nuqtalar (E nuqta B uchiga yaqin joylashgan) medianani teng uchta qismga bo'ladi. Agar ABC uchburchakning yuzi 36 ga teng bo'lsa, AEB uchburchakning yuzini toping.

A) 6
B) 12
C) 9
D) 4

42. Rasmdan foydalanib, agar $AC{:}A_1C_1 = 5{:}3$ va $BD{:}B_1D_1 = 7{:}4$ bo'lsa, u holda $S_{A_1B_1C_1D_1} : S_{ABCD}$ ni toping.



A) $\frac{15}{24}$
B) $\frac{12}{35}$
C) $\frac{20}{21}$
D) $\frac{24}{35}$

43. Radiusi 6 ga teng bo'lgan aylanaga ichki chizilgan muntazam uchburchak yuzini toping.

A) $18\sqrt{3}$
B) $27\sqrt{3}$
C) 27
D) $108\sqrt{3}$

44. Aylanaga ichki chizilgan to'g'ri to'rtburchakning tomonlari 32 va 24 ga teng. Aylananing uzunligini toping.

A) 48π
B) 80π
C) 40π
D) 20π

45. Teng yonli trapetsiyaning katta asosi 25 cm va perimetri 55 cm. Agar trapetsiyaning diagonali uning o'tkir burchagini teng ikkiga bo'lsa, trapetsiyaning o'rta chizig'ini (cm) toping.

A) 16
B) 18
C) 17,5
D) 17

46. Yon tomonining uzunligi 5 dm bo'lgan teng yonli trapetsiyaga doira ichki chizilgan. Agar trapetsiyaning yuzi 20 dm^2 bo'lsa, doiraning yuzini (cm^2) toping.

A) 400π
B) 40π
C) 20π
D) 16π

47. Teng yonli uchburchakning asosi yon tomonidan 6 ga ortiq. Uchburchakning asosiga tushirilgan balandligi 6 ga teng bo'lsa, uning asosini toping.

A) 10
B) 24
C) 16
D) 18

48. Agar $ABCD$ kvadratning $A(1; 0)$ va $C(4; 5)$ uchlari ma'lum bo'lsa, uning yuzini toping.

A) 17
B) 18
C) 16
D) 15

49. Rombning diagonallari 2 va 3 bo'lsa, unga ichki chizilgan doiraning yuzini toping.

A) $\frac{4}{13}\pi$
B) $\frac{3}{13}\pi$
C) $\frac{9}{13}\pi$
D) $\frac{6}{13}\pi$

50. Agar ABC uchburchakning tomonlari $AB{:}AC{:}BC = 5{:}9{:}7$ nisbatda bo'lsa, uchburchakning turini aniqlang.

A) aniqlab bo'lmaydi
B) to'g'ri burchakli uchburchak
C) o'tkir burchakli uchburchak
D) o'tmas burchakli uchburchak

51. To'g'ri burchakli uchburchakning tomonlari ayirmasi 1,5 ga teng bo'lgan arifmetik progressiyani tashkil etadi. Uchburchakning perimetrini toping.

A) 18 B) 17
C) 15 D) 16

52. A va B aylanadagi nuqtalar bo'lib, AB yoyning markaziy burchagi 140° ga teng. Katta yoyda olingan C nuqta uchun AC yoyni BC yoyga nisbati 5:6 bo'lsa, $\angle ABC$ ni toping.

A) 60° B) 50°
C) 70° D) 90°

53. Markazi (0; 0) nuqtada bo'lgan aylanadagi $A(0; 2)$ nuqtani soat mili harakati yo'nalishida aylana bo'ylab 60° ga burish natijasida hosil bo'lgan nuqtaning koordinatalari yig'indisini toping.

A) 1 B) $1-\sqrt{3}$
C) $1+\sqrt{3}$ D) 2

54. Markazi (0; 0) nuqtada bo'lgan aylanadagi $A\left(\frac{\sqrt{3}}{2}; \frac{1}{2}\right)$ nuqtani soat mili harakatiga qarama-qarshi yo'nalishida aylana bo'ylab 120° ga burish natijasida hosil bo'lgan nuqtaning koordinatalari yig'indisini toping.

A) -1
B) $\frac{-\sqrt{3}+1}{2}$
C) $\frac{\sqrt{3}-1}{2}$
D) 1

55. To'g'ri burchakli uchburchakning o'tkir burchagi 60°. Shu burchakning bissektrisasi uzunligi 1 cm ga teng bo'lsa, gipotenuzasi uzunligini (cm) toping.

A) 2
B) $\sqrt{5}-1$
C) $\sqrt{3}$
D) $\sqrt{2}+1$

56. To'g'ri burchakli uchburchakning o'tkir burchagi 60°. Shu burchakka yopishgan kateti uzunligi $2\sqrt{13}$ cm ga teng bo'lsa, uning eng katta medianasi uzunligini (cm) toping.

A) 13
B) $2\sqrt{13}$
C) $3\sqrt{13}$
D) $\sqrt{91}$

57. Soatning soat mili ikki soatda necha gradusga buriladi?

A) 120° B) 90°
C) 60° D) 75°

58. Soatning minut mili 156° burilganda soat mili necha gradus burchakka buriladi?

A) 5,2° B) 13°
C) 2,6° D) 6,5°

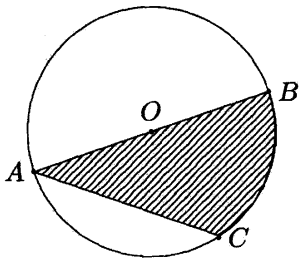
59. Soatning soat mili 14° burilganda minut mili necha gradus burchakka buriladi?

A) 84°
B) 720°
C) 360°
D) 168°

60. a ning qanday qiymatlarida uzunliklari mos ravishda $a+2$; 4 va $2a-1$ bo'lgan kesmalardan uchburchak yasash mumkin?

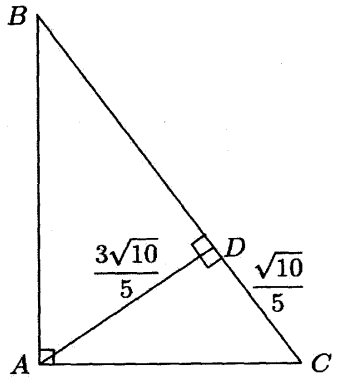
A) (1; 7) B) (0; 5)
C) (1; 8) D) (0; 7)

61. Rasmda tasvirlangan markazi O nuqtada bo'lgan doiraning yuzasi 24 ga teng. Agar $\angle BAC = 45°$ bo'lsa, uning bo'yalgan (shtrixlangan) qismining yuzasini toping.



A) $\frac{6(\pi+1)}{\pi}$ B) $\frac{6(\pi+2)}{\pi}$
C) $\frac{12(\pi+2)}{\pi}$ D) $\frac{6(\pi-2)}{\pi}$

62.



ABC to'g'ri burchakli uchburchakning perimetrini toping. ($AD \perp BC$)

A) $4\left(2+\sqrt{10}\right)$ B) $2\left(3+2\sqrt{10}\right)$
C) $2\left(4+\sqrt{10}\right)$ D) $3\left(4+\sqrt{10}\right)$

63. Uchburchakning asosiga tushirilgan balandligi 20 cm bo'lib, asosidan 2 cm ga katta. Agar shu balandlik 10%ga kamaytirilib, asosi esa 4 cm ga uzaytirilsa, uchburchakning yuzi qanday o'zgaradi?

A) 18 cm^2 ga kamayadi
B) 18 cm^2 ga ortadi
C) 12 cm^2 ga ortadi
D) o'zgarmaydi

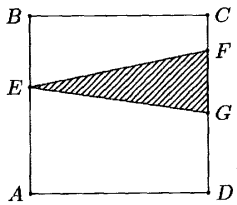
64. Perimetri p ga, diagonali d ga teng bo'lgan to'g'ri to'rtburchakning yuzasini toping.

A) $\frac{p^2-4d^2}{8}$ B) $\frac{p^2-4d^2}{4}$
C) $\frac{p^2-2d^2}{8}$ D) $\frac{p^2-2d^2}{4}$

65. O'tmas burchagi α ga teng rombga ichki chizilgan aylananing uzunligi L ga teng bo'lsa, rombning yuzasini toping.

A) $\frac{L^2}{\pi^2 \sin\alpha}$ B) $\frac{2L^2}{\pi^2}\cdot\cos\alpha$
C) $\frac{L^2}{\pi^2}\cdot\sin\alpha$ D) $\frac{L^2}{2\pi\sin^2\alpha}$

66. Rasmda tasvirlangan $ABCD$ kvadratning perimetri p ga teng. Agar $CF{:}FG{:}GD = 1{:}2{:}3$ bo'lsa, EFG uchburchakning yuzasini toping.



A) $\frac{p^2}{48}$ B) $\frac{p^2}{96}$
C) $\frac{p^2}{192}$ D) $\frac{p^2}{72}$

67. To'g'ri burchakli uchburchakning katta kateti $4\sqrt{2}$ ga teng, kichik kateti gepotenuzasidan 3 marta kichik. Uchburchakka ichki chizilgan aylananing uzunligini toping.

A) $2\left(2\sqrt{2}+1\right)\pi$

B) $4\left(\sqrt{2}+1\right)\pi$

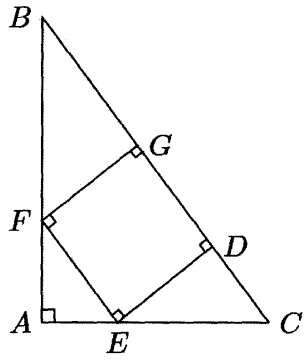
C) $2\left(\sqrt{2}-1\right)\pi$

D) $4\left(\sqrt{2}-1\right)\pi$

68. Uchlari $A(1;-1)$, $B(1;3)$, $C(5;3)$ va $D(6;-1)$ nuqtalarda bo'lgan $ABCD$ to'rtburchakning yuzasini toping.

A) 12
B) 20
C) 18
D) 14

69. Rasmdan tasvirlangan $DEFG$ kvadratning yuzasi 12 ga, DEC burchak 30° ga teng bo'lsa, ABC to'g'ri burchakli uchburchakning perimetrini toping.



A) $15+7\sqrt{3}$

B) $5\left(3+\sqrt{3}\right)$

C) $15+8\sqrt{3}$

D) $12+7\sqrt{3}$

70. Asosi $4\sqrt{2}$ ga teng va unga yopishgan burchaklari 30° va 45° bo'lgan uchburchakning yuzasini toping.

A) $16\left(\sqrt{3}-1\right)$ B) $8\sqrt{\sqrt{3}+1}$

C) $8\left(\sqrt{3}-1\right)$ D) $4\sqrt{\sqrt{3}+2}$

71. Teng yonli uchburchakning ikki tomoni 2 va 5 ga teng. Uchburchakning eng kichik medianasi uzunligini toping.

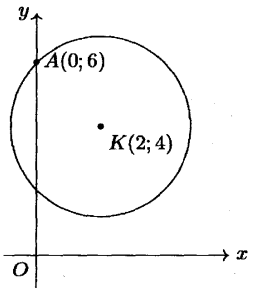
A) 6,5 B) 13

C) $\frac{\sqrt{33}}{2}$ D) $\sqrt{33}$

72. ABC uchburchakning AB, BC va AC tomonlarining o'rta nuqtalari mos ravishda E, F va D. Agar ABC uchburchakning yuzasi $3\frac{1}{5}$ ga teng bo'lsa, EFD uchburchakning yuzasini toping.

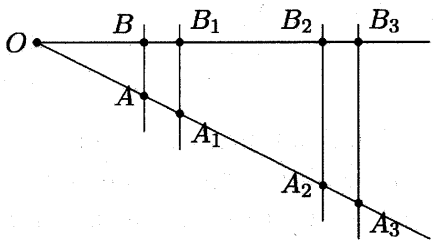
A) $1\frac{1}{5}$ B) $\frac{1}{5}$ C) $1\frac{3}{5}$ D) $\frac{4}{5}$

73. Rasmda markazi K nuqtada bo'lgan aylana tasvirlangan. Quyidagilardan qaysi biri berilgan aylananing tenglamasi bo'ladi?



A) $x^2+y^2-4x-8y+16=0$
B) $x^2+y^2-4x-8y+24=0$
C) $x^2+y^2+4x+8y+12=0$
D) $x^2+y^2-4x-8y+12=0$

74. Agar $OA{:}AA_1{:}A_1A_2{:}A_2A_3 = 3{:}1{:}4{:}1$ bo'lsa, $AB{:}A_1B_1{:}A_2B_2{:}A_3B_3$ $(AB||A_1B_1||A_2B_2||A_3B_3)$ nisbatni aniqlang. (rasm)

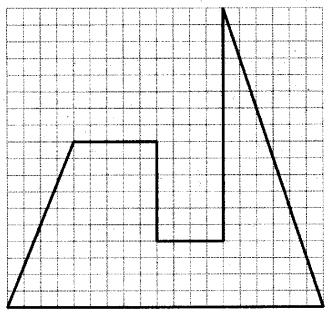


A) 3:4:8:9
B) 3:1:4:1
C) 3:2:4:9
D) 6:1:8:1

75. Agar rombning bir diagonalini 50%ga kamaytirib, ikkinchi diagonalini 2 marta uzaytirilsa, rombning yuzi qanday o'zgaradi?

A) o'zgarmaydi
B) 50%ga ortadi
C) aniqlab bo'lmaydi
D) 50%ga kamayadi

76. Rasmda tasvirlangan yopiq siniq chiziq bilan chegaralangan soha yuzasini (cm^2) toping. (har bir katakning tomonlari 1 cm dan)

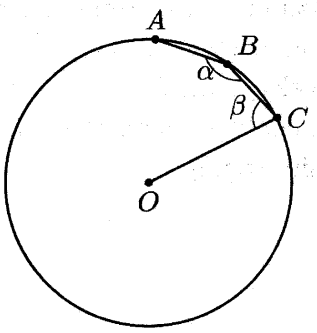


A) 132 B) 135
C) 140 D) 194

77. $x^2 + y^2 - 12x + 6y + 9 = 0$ tenglama bilan berilgan aylananing markazini toping.

A) (6; –3) B) (–6; 3)
C) (–3; 6) D) (3; –6)

78. Rasmda markazi O nuqtada bo'lgan aylana tasvirlangan. Agar $AB = BC$ va $\alpha = 152°$ bo'lsa, β necha gradus?

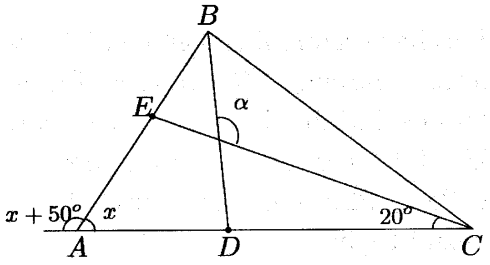


A) 82° B) 74°
C) 76° D) 68°

79. Kvadratga ichki chizilgan aylananing uzunligi 12π ga teng bo'lsa, kvadratning perimetrini toping.

A) 36 B) 48
C) 64 D) 24

80. Rasmda ABC uchburchak va uning BD, CE bissektrisalari tasvirlangan. Berilgan ma'lumotlarga ko'ra α necha gradus?



A) 105,5° B) 112,5°
C) 135,5° D) 122,5°

81. Agar to'g'ri burchakli uchburchakning katetlaridan biri $2\sqrt{2}$ ga, gipotenuzasi $4\sqrt{5}$ ga teng bo'lsa, gipotenuzaga tushurilgan bissektrisa uzunligini toping.

A) 3 B) 4
C) $2\sqrt{3}$ D) 6

82. O'tkir burchakli uchburchakning ikki tomonining uzunliklari ayirmasi 2 cm ga teng, bu tomonlarining uchinchi tomonga proyeksiyalari 9 cm va 5 cm bo'lsa, uchburchakka tashqi chizilgan aylana radiusini toping.

A) $8\frac{1}{8}$
B) $7\frac{2}{7}$
C) $6\frac{3}{10}$
D) $5\frac{5}{12}$

83. $ABCD$ trapetsiyaning asoslari $BC = 18$ va $AD = 50$. AC dioganal o'tkazilgan. Agar $\angle BAC = \angle ADC$ bo'lsa, AC dioganalning uzunligini toping.

A) 28 B) 34
C) 30 D) 32

84. Parallelogrammning tomonlari 10 va 14, o'tmas burchagi 150° ga teng. Barcha burchaklarining bissektrisalari o'zaro kesishib, to'g'ri to'rtburchak hosil bo'lgan. Shu to'g'ri to'rtburchakning yuzini toping.

A) 6 B) 4
C) 12 D) 8

85. ABC uchburchakning AE va BF medianalari P nuqtada kesishadi. Agar ABC uchburchakning yuzi 48 teng bo'lsa, PEF uchburchakning yuzini toping.

A) 8 B) 6
C) 4 D) 9

86. To'g'ri burchakli uchburchakning eng kichik tomoni uzunligi 5 ga teng va qolgan tomonlari uzunliklari natural son bo'lsa, uchburchakning yuzini toping.

A) 35
B) 6
C) aniqlab bo'lmaydi
D) 30

87. $ABCD$ parallelogrammda C o'tkir burchak. E nuqta AB tomonda yotadi. $AECD$ to'rtburchak yuzining BCE uchburchak yuziga nisbati 5:2 kabi bo'lsa, $AE{:}EB$ nisbatni toping.

A) $\frac{2}{3}$
B) $\frac{4}{3}$
C) $\frac{3}{4}$
D) $\frac{3}{2}$

88. $ABCD$ parallelogrammda D o'tmas burchak. E nuqta AB tomonda yotadi. $BCDE$ to'rtburchak yuzining DAE uchburchak yuziga nisbati 5:3 kabi bo'lsa, $AE{:}EB$ nisbatni toping.

A) $\frac{2}{3}$ B) $\frac{3}{2}$
C) $\frac{3}{4}$ D) 3

89. $ABCD$ parallelogramda C o'tkir burchak. E nuqta AB tomonda yotadi. Agar $AE{:}EB$ nisbat 2:3 kabi bo'lsa, $AECD$ to'rtburchak yuzining BCE uchburchak yuziga nisbatini toping.

A) $\frac{5}{3}$
B) $\frac{7}{3}$
C) $\frac{3}{2}$
D) $\frac{4}{3}$

90. $ABCD$ parallelogramda D o'tmas burchak. E nuqta AB tomonda yotadi. Agar $AE{:}EB$ nisbat 2:3 kabi bo'lsa, $BCDE$ to'rtburchak yuzini DAE uchburchak yuziga nisbatni toping.

A) 4
B) $\frac{11}{3}$
C) 3
D) $\frac{11}{4}$

91. $ABCD$ trapetsiyaning AB katta asosida E nuqta olingan. CE kesma AD yon tomoniga parallel. Agar $AE{:}EB = 3{:}5$ bo'lsa, $AECD$ to'rtburchak yuzini BCE uchburchak yuziga nisbatini toping.

A) $\frac{3}{2}$
B) $\frac{5}{6}$
C) $\frac{3}{5}$
D) $\frac{6}{5}$

92. $ABCD$ trapetsiyaning AB katta asosida E nuqta olingan. DE kesma BC yon tomoniga parallel. Agar $BCDE$ to'rtburchak yuzining AED uchburchak yuziga nisbati 6:5 kabi bo'lsa, $AE{:}EB$ nisbatni toping.

A) $\frac{5}{6}$
B) $\frac{3}{5}$
C) $\frac{5}{3}$
D) $\frac{3}{2}$

93. $ABCD$ teng yonli trapetsiyaga radiusi 2 ga teng bo'lgan aylana ichki chizilgan. Agar trapetsiya asoslarining nisbati 4:9 kabi bo'lsa, kichik asos uzunligini toping.

A) $\frac{5}{8}$
B) $\frac{8}{5}$
C) $\frac{3}{8}$
D) $\frac{8}{3}$

94. Uchburchakning 3 va 4 teng bo'lgan tomonlariga o'tkazilgan medianalar o'zaro perpendikulyar bo'lsa, bu uchburchakning uchinchi tomonini toping.

A) 2,4
B) $\sqrt{6}$
C) 2,5
D) $\sqrt{5}$

95. $ABCD$ parallelogrammning BC va CD tomonlaridan mos ravishda M va N nuqtalar shunday tanlab olinganki C uchidan boshlab hisoblaganda (BC va CD tomonlarini) 2:1 nisbatda bo'ladi. Agar parallelogrammning yuzi 54 ga teng bo'lsa, AMN uchburchakning yuzini toping.

A) 12
B) 24
C) 18
D) 36

96. ABC uchburchakning AB va BC tomonlaridan mos ravishda E va F nuqtalar shunday tanlab olinganki B uchidan boshlab hisoblaganda (AB va BC tomonlarini) 2:3 nisbatda bo'ladi. Agar ABC uchburchakning yuzi 75 ga teng bo'lsa, AEF uchburchakning yuzini toping.

A) 16
B) 20
C) 15
D) 18

97. $ABCD$ parallelogrammning BC va CD tomonlaridan mos ravishda M va N nuqtalar shunday tanlab olinganki C uchidan boshlab hisoblaganda (BC va CD tomonlarini) 1:3 nisbatda bo'ladi. Agar parallelogrammning yuzi 64 ga teng bo'lsa, $AMND$ to'rtburchakning yuzini toping.

A) 38
B) 36
C) 40
D) 32

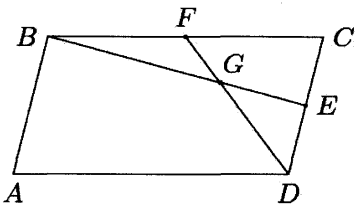
98. $ABCD$ parallelogrammning BC, CD tomonlarida mos ravishda yotuvchi M, N nuqtalar $BC{:}MC = 5{:}3$ va $DC{:}NC = 3{:}1$ shartlarni qanoatlantiradi. Agar parallelogrammning yuzi 35 ga teng bo'lsa, $BMND$ to'rtburchakning yuzini toping.

A) 16
B) 12
C) 15
D) 14

99. Uchburchakning ikki tomoni va ular orasidagi mediana uzunliklari mos ravishda 15; 13; 7 bo'lsa, shu uchburchakning yuzini toping.

A) 70
B) 78
C) 84
D) 72

100. Rasmda $ABCD$ parallelogramm tasvirlangan. G nuqta BE va DF kesmalarning kesishish nuqtasi. Agar $BF = FC$ va $CE = ED$ bo'lsa, $\frac{S_{ABCD}}{S_{ABGD}}$ ni toping.

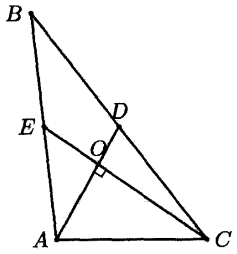


A) $\frac{5}{3}$
B) $\frac{3}{2}$
C) 1
D) 2

101. To'g'ri burchakli uchburchakka ichki va tashqi aylanalar chizilgan. Agar uchburchakning katetlari 6 va 8 ga teng bo'lsa, aylanalar markazlari orasidagi masofani toping.

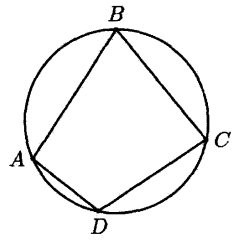
A) $\sqrt{6}$ B) $\sqrt{5}$
C) 2 D) $\sqrt{3}$

102. Rasmda ABC uchburchak va uning o'zaro perpendikulyar AD va CE medianalari tasvirlangan. Agar $AB = 8$ va $BC = 10$ bo'lsa, AC ni toping.



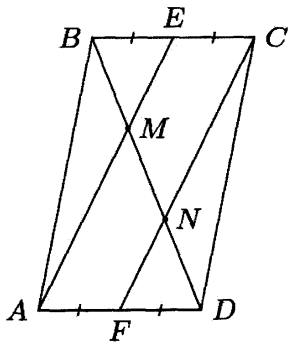
A) $2\sqrt{\frac{42}{5}}$ B) $2\sqrt{\frac{43}{5}}$
C) $4\sqrt{2}$ D) $2\sqrt{\frac{41}{5}}$

103. Rasmda $ABCD$ to'rtburchak va unga tashqi chizilgan aylana tasvirlangan. Agar $AB = 5$, $BC = 4$, $CD = 3$ va $AD = 2$ bo'lsa, $\angle ABC$ ning kosinusini toping.



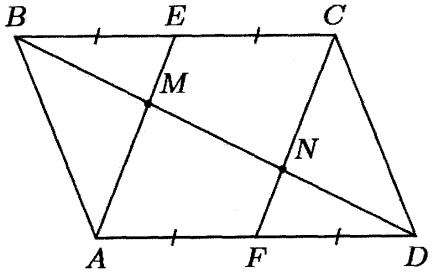
A) $\frac{6}{13}$ B) $\frac{8}{13}$
C) $\frac{7}{13}$ D) $\frac{5}{13}$

104. Rasmda $ABCD$ parallelogrammga BD diagonal hamda BC va AD tomonlarini mos ravishda teng ikkiga bo'luvchi AE va CF kesmalar o'tkazilgan. Agar $ABCD$ parallelogrammning yuzi 72 ga teng bo'lsa, BEM uchburchakning yuzini toping.



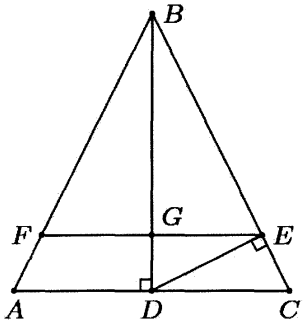
A) 6
B) 7,2
C) 8
D) 9

105. Rasmda $ABCD$ parallelogrammda BD diagonal hamda BC va AD tomonlarini mos ravishda teng ikkiga bo'luvchi AE va CF kesmalar o'tkazilgan. Agar FDN uchburchakning yuzi 6 ga teng bo'lsa, BCD uchburchakning yuzini toping.



A) 42
B) 30
C) 36
D) 54

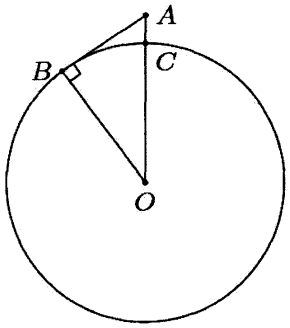
106. Rasmda ABC teng yonli ($AB = BC$) uchburchak tasvirlangan. Bunda $BD \perp AC$, $DE \perp BC$ va $EF \| AC$. Agar $AB = 11$ va $CD = 5$ bo'lsa, EF ni toping.



A) $\frac{810}{121}$ B) $\frac{960}{121}$

C) $\frac{1000}{121}$ D) $\frac{840}{121}$

107. Rasmda markazi O nuqtada bo'lgan aylanaga A nuqtadan AB urinma o'tkazilgan. AO kesma aylanani C nuqtada kesib o'tadi. Agar aylananing kichik BC yoyi uzunligi 3 ga va radiusi 4 ga teng bo'lsa, AC ni toping.



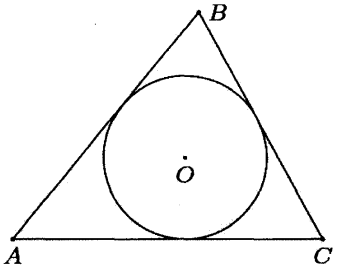
A) $4(1 - \cos 0{,}75)$

B) $4\cos 0{,}75$

C) $\frac{5}{\cos 0{,}75} - 4$

D) $\frac{4}{\cos 0{,}75} - 4$

108. Rasmda ABC uchburchakka aylana ichki chizilgan. Agar $AB = 14$, $BC = 13$ va $AC = 15$ bo'lsa, aylana markazi O nuqtadan A nuqtagacha bo'lgan masofani toping.



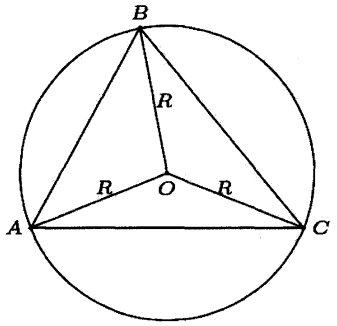
A) $\sqrt{84}$

B) $\sqrt{52}$

C) $\sqrt{65}$

D) $\sqrt{80}$

109. Rasmda ABC uchburchakka aylana tashqi chizilgan. Agar $AB = 13$, $BC = 14$ va $AC = 15$ bo'lsa, aylana markazidan AB tomongacha eng qisqa masofani toping.



A) $\frac{33}{8}$

B) $\frac{25}{8}$

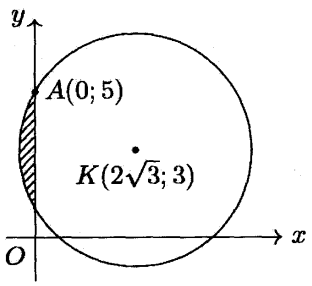
C) $\frac{39}{8}$

D) $\frac{65}{8}$

110. Uchburchakning asosiga parallel to'g'ri chiziqlar yon tomonini (uchidan boshlab hisoblaganda) 1:2:3 nisbatda bo'ladi. Bu to'g'ri chiziqlar uchburchakning yuzasini qanday nisbatda bo'ladi?

A) 1:4:18
B) 1:6:27
C) 1:8:18
D) 1:8:27

111. Rasmda markazi K nuqtada bo'lgan doira tasvirlangan. Uning bo'yalgan (shtrixlangan) qismi yuzasini toping.



A) $\frac{2(\pi-3)}{3}$
B) $\frac{4(\pi-3)}{3}$
C) $2\left(2\pi-3\sqrt{3}\right)$
D) $\frac{4\left(2\pi-3\sqrt{3}\right)}{3}$

112. To'g'ri to'rtburchak shaklidagi qog'ozning A, B, C va D uchlaridan tomonlari bo'ylab, tomoni 10 cm bo'lgan to'rtta kvadrat kesib olingan. Qolgan shakldan hajmi 4,5 dm^3 ga teng bo'lgan usti ochiq parallelepiped yasalgan. Parallelepiped asosining bir tomoni ikkinchisidan 15 cm ortiq bo'lsa, $ABCD$ to'g'ri to'rtburchak shaklidagi qog'ozning yuzasi necha cm^2 bo'lgan?

A) 1750
B) 2700
C) 1350
D) 2200

113. Uzunligi 12π bo'lgan aylanaga muntazam oltiburchak va ABC uchburchak ichki chizilgan. ABC uchburchakning o'tkir burchagi 60° bo'lib, uning AB tomoni aylananing markazidan o'tadi. Muntazam oltiburchakning yuzi ABC uchburchakning yuzidan qanchaga katta?

A) $32\sqrt{3}$
B) $18\sqrt{3}$
C) $36\sqrt{3}$
D) $48\sqrt{3}$

Stereometriya

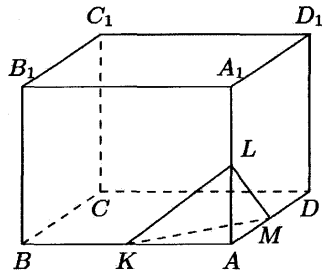
1. Beshburchakli prizmada nechta turli diagonal kesim mavjud?

A) 10
B) 3
C) 2
D) 5

2. Oltiburchakli prizmada nechta turli diagonal o'tkazish mumkin?

A) 24
B) 18
C) 9
D) 12

3. To‘g‘ri burchakli parallelepipedning A uchidan chiquvchi 8; 9 va 12 dm qirralaridan mos ravishda A nuqtadan boshlab hisoblaganda qirralari 3; 5 va 6 dm bo‘lgan piramida qirqib olingan. (rasm) Qolgan qismining hajmini (dm^3) hisoblang.



A) 774
B) 834
C) 819
D) 849

4. Agar prizmaning qirralari soni bilan yoqlari soni yig‘indisi 38 bo‘lsa, uning uchlari sonini toping.

A) 20 B) 18
C) 10 D) 9

5. Agar prizmaning uchlari soni bilan yoqlari soni yig‘indisi 47 bo‘lsa, uning diagonallari sonini toping.

A) 208
B) 154
C) 108
D) 180

6. Agar prizmaning diagonallari soni 54 bo‘lsa, bu prizmaning qirralar soni yoqlari sonidan nechtaga ko‘p?

A) 14 B) 16
C) 20 D) 18

7. Agar prizmaning qirralar soni yoqlari sonidan 24 taga ko‘p bo‘lsa, prizmaning diagonallari soni uchlari sonidan nechtaga ko‘p?

A) 91
B) 130
C) 104
D) 117

8. Agar piramidaning qirralari soni bilan uchlari soni yig‘indisi 34 bo‘lsa, uning yoqlari sonini toping.

A) 11 B) 12
C) 10 D) 13

9. Agar piramidaning uchlari soni bilan yoqlari soni yig‘indisi 42 bo‘lsa, piramida asosining diagonallari sonini toping.

A) 209
B) 152
C) 170
D) 189

10. Agar piramida asosining diagonallari soni 44 ta bo‘lsa, bu piramidaning qirralar soni yoqlari sonidan qanchaga ko‘p?

A) 10 B) 12
C) 9 D) 11

11. Agar piramida asosining diagonallari soni bilan uning yoqlari soni yig‘indisi 22 ga teng bo‘lsa, bu piramidaning qirralar soni uchlari sonidan qanchaga ko‘p?

A) 5 B) 8
C) 6 D) 7

12. Piramida asosining diagonallari soni piramidaning qirralar soniga teng. Piramidaning yoqlari soni bilan uchlari soni yig'indisini toping.

A) 8
B) 16
C) 12
D) 14

13. Bitta nuqtadan tekislikka og'ma va perpendikulyar o'tkazilgan bo'lib, ular orasidagi burchak 15° ga teng. Agar perpendikulyarning uzunligi $12 + 6\sqrt{3}$ cm bo'lsa, og'maning tekislikdagi proyeksiyasi uzunligini (cm) toping.

A) $6 \cdot \left(7 - 4\sqrt{3}\right)$
B) 12
C) $6 \cdot \left(7 + 4\sqrt{3}\right)$
D) 6

14. α tekislik va uni kesib o'tmaydigan $AB = 13$ cm kesma berilgan. AB kesmaning uchlaridan α tekislikkacha bo'lgan masofalar $AA_1 = 4$ cm, $BB_1 = 9$ cm. AB kesma yotuvchi to'g'ri chiziq bilan α tekislik hosil qilgan burchakning kosinusini toping.

A) $\frac{9}{13}$
B) $\frac{5}{13}$
C) $\frac{4}{13}$
D) $\frac{12}{13}$

15. α tekislik va uni kesib o'tmaydigan AB kesma berilgan. Kesmaning uchlaridan α tekislikkacha bo'lgan masofalar $AA_1 = 18$ cm, $BB_1 = 13$ cm bo'lsa, AB kesmani A uchidan boshlab hisoblaganda 3:2 nisbatda bo'luvchi C nuqtadan α tekislikkacha bo'lgan masofani (cm) toping.

A) 15,5 B) 16
C) 14 D) 15

16. α tekislik va uni kesib o'tadigan AB kesma berilgan. Kesmaning uchlaridan α tekislikkacha bo'lgan masofalar $AA_1 = 12$ cm, $BB_1 = 13$ cm bo'lsa, AB kesmani A uchidan boshlab hisoblaganda 3:2 nisbatda bo'luvchi C nuqtadan tekislikkacha bo'lgan masofani (cm) toping.

A) 4 B) 3,2
C) 3,6 D) 3

17. To'g'ri burchakli parallelepipedning uchta turli yoqlarining yuzalari 56; 63 va 72 cm^2 bo'lsa, parallelepipedning hajmini (cm^3) toping.

A) 648 B) 576
C) 504 D) 432

18. To'rtburchakli muntazam prizma asosining diagonalini uning yon yoqi diagonaliga nisbati 2:3 kabidir. Agar bu prizma asosining yuzi 14 dm^2 bo'lsa, uning hajmini (dm^3) hisoblang.

A) $7\sqrt{147}$
B) $7\sqrt{161}$
C) 196
D) 98

19. To'g'ri prizmaning asosi rombdan iborat bo'lib, uning diagonal kesimlarining yuzlari 12 dm^2 va 16 dm^2 ga teng. Shu prizmaning yon sirtining yuzini (dm^2) toping.

A) 30
B) 20
C) 42
D) 40

20. To'g'ri burchakli parallelepipedning qirralari nisbati 2:1:3 kabi. Agar parallelepipedning to'la sirti 198 dm^2 ga teng bo'lsa, uning hajmini (dm^3) toping.

A) 154
B) 162
C) 148
D) 192

21. Uchburchakli piramidaning yon qirralari o'zaro perpendikulyar hamda uzunliklari 6; 7 va 8 dm ga teng. Piramidaning hajmini (dm^3) toping.

A) 63
B) 54
C) 64
D) 56

22. $SABC$ uchburchakli piramidaning yon qirralari $SA = 8$ dm, $SB = 10$ dm va $SC = 12$ dm. Agar $\angle ASB = 30°$, $\angle BSC = 45°$ va $\angle ASC = 60°$ bo'lsa, piramidaning yon sirti yuzini (dm^2) toping.

A) $20\sqrt{2} + 30 + 24\sqrt{3}$
B) $20\sqrt{2} + 30\sqrt{3} + 24$
C) $20\sqrt{3} + 30\sqrt{2} + 24$
D) $20 + 30\sqrt{2} + 24\sqrt{3}$

23. Piramida balandligining o'rtasidan asosga parallel tekislik o'tkazilgan va hosil bo'lgan kesim yuzi 27 ga teng. Agar berilgan piramidaning balandligi 10 ga teng bo'lsa, uning hajmini toping.

A) 320
B) 340
C) 400
D) 360

24. Qirrasining uzunligi 6 cm ga teng bo'lgan muntazam tetraedrning hajmini (cm^3) toping.

A) $32\sqrt{2}$
B) $24\sqrt{2}$
C) $36\sqrt{2}$
D) $18\sqrt{2}$

25. Muntazam tetraedrning qirrasi 9 ga teng. Uning asosiga tashqi chizilgan aylananing markazidan uning yon yoqigacha bo'lgan eng qisqa masofani toping.

A) $2\sqrt{6}$ B) $2\sqrt{3}$
C) $\sqrt{6}$ D) $3\sqrt{2}$

26. Muntazam tetraedrning qirrasi 2 ga teng. Uning asosiga ichki chizilgan aylananing markazidan uning yon qirrasigacha bo'lgan masofani toping.

A) $\frac{2\sqrt{2}}{3}$
B) $\frac{\sqrt{2}}{2}$
C) $\frac{3\sqrt{2}}{2}$
D) $\frac{\sqrt{2}}{3}$

27. Agar to'g'ri silindr o'q kesimining yuzi 8 ga teng bo'lsa, silindrning yon sirti yuzini toping.

A) 16π B) 4π
C) 2π D) 8π

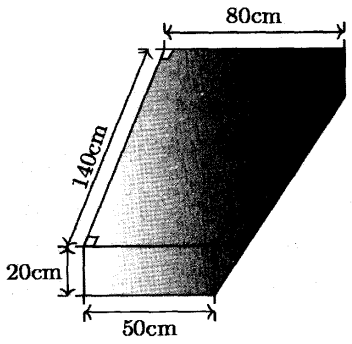
28. Silindrning balandligi 5 ga, o'q kesimining diagonali 13 ga teng. Silindr asosining radiusini toping.

A) $4\sqrt{3}$
B) 12
C) $6\sqrt{2}$
D) 6

29. Konusning to'la sirti 24 ga teng. Agar konus o'q kesimi muntazam uchburchakdan iborat bo'lsa, konus asosining yuzini toping.

A) 8
B) 9,6
C) 12
D) 6

30. Rasmda tasvirlangan to'g'ri prizmaning hajmini (dm^3) toping.



A) 169
B) 196
C) 182
D) 156

31. Radiusi 3 va 4 ga teng bo'lgan ikki shar markazlari orasidagi masofa 5 ga teng. Shar sirtlari kesishishidan hosil bo'lgan aylananing uzunligini toping.

A) $2{,}4\pi$
B) $4{,}8\pi$
C) 5π
D) 4π

32. Kesik konusga shar ichki chizilgan. Agar kesik konus asoslarining radiuslari 2 va 4 bo'lsa, shu konus yon sirtining yuzini toping.

A) 72π
B) 36π
C) 24π
D) 48π

33. 3 dm × 4 dm × 8 dm o'lchamli to'g'ri burchakli parallelepipedlardan nechtasini terib eng kichik hajmli kub hosil qilish mumkin?

A) 72
B) 216
C) 180
D) 144

34. Qirralari 2 dm, 3 dm va 4 dm bo'lgan to'g'ri burchakli parallelepiped shaklidagi quti ichiga eng ko'pi bilan qirrasi 7 cm bo'lgan kublardan nechtasini joylashtirish mumkin?

A) 69
B) 45
C) 40
D) 42

35. Qirralari 4 dm, 5 dm va 8 dm bo'lgan to'g'ri burchakli parallelepipedni tashqi tomonidan qirrasi 1 dm bo'lgan kublarning nechtasini terib, qirralari 6 dm, 7 dm va 10 dm bo'lgan to'g'ri burchakli parallelepiped yasash mumkin?

A) 252 B) 184
C) 260 D) 192

36. To'g'ri burchakli parallelepipedning barcha qirralari uzunliklari yig'indisi 48 dm. Agar parallelepipedning diagonali uzunligi $5\sqrt{2}$ dm bo'lsa, uning to'la sirti yuzini (dm^2) toping.

A) 104 B) 82
C) 108 D) 94

37. To'g'ri burchakli parallelepipedning barcha qirralari uzunliklari yig'indisi 44 dm. Agar parallelepipedning to'la sirtining yuzi 72 dm^2 bo'lsa, uning diagonali uzunligini (dm) toping.

A) 7 B) $\sqrt{61}$
C) 8 D) $5\sqrt{2}$

38. To'g'ri burchakli parallelepipedning bir uchidan chiquvchi qirralari a; b va c bo'lib, $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{1}{2}$ tenglikni qanoatlantiradi. Agar parallelepiped to'la sirtining yuzi 288 bo'lsa, uning hajmini toping.

A) 576
B) 288
C) 432
D) 144

39. Bir nuqtadan tekkislikka ikkita og'ma o'tkazilgan. Og'malarning uzunliklari 17:10 kabi nisbatda va ularning mos ravishda proyeksiyalari esa 5:2 nisbatda. Agar og'malar va ularning proyeksiyalari uzunliklari natural sonlar bo'lsa, quyidagi sonlardan qaysi biri berilgan nuqtadan tekislikkacha bo'lgan masofaning uzunligi bo'la oladi?

A) 8 B) 7 C) 9 D) 6

40. Asosining tomonlari 13 dm; 14 dm va 15 dm bo'lgan uchburchakli to'g'ri prizmaning yon qirrasi asosining kichik balandligiga teng. Prizmaning to'la sirtini (dm^2) toping.

A) 470,4 B) $710\frac{10}{13}$
C) 638,4 D) 672

41. Uchta tengdosh prizma balandliklari $h_1:h_2:h_3 = 1:9:4$ nisbatda bo'lsa, prizmalar asoslarining yuzlari qanday nisbatda bo'ladi?

A) $S_1:S_2:S_3 = 2:3:1$
B) $S_1:S_2:S_3 = 16:81:1$
C) $S_1:S_2:S_3 = 4:9:1$
D) $S_1:S_2:S_3 = 36:4:9$

42. To'g'ri burchakli parallelepipedning uchta turli yoqlarining diagonallari 7; 8 va 9 dm bo'lsa, parallelepipedning diagonali uzunligini (dm) hisoblang.

A) $6\sqrt{3}$
B) $4\sqrt{6}$
C) $\sqrt{94}$
D) $\sqrt{97}$

43. Muntazam to'rtburchakli kesik piramida asoslarining tomonlari 9 cm va 15 cm. Kesik piramidaning diagonali 18 cm bo'lsa, uning balandligini (cm) toping.

A) 8
B) 7
C) 9
D) 6

44. Uchburchakli piramida asosining ikki tomoni 6 va 7 dm bo'lib, ular orasidagi burchak 45 ga teng. Agar piramidaning 8 dm bo'lgan yon qirrasi asos tekisligi bilan 30° li burchak tashkil etsa, uning hajmini (dm^3) toping.

A) $7\sqrt{2}$ B) $28\sqrt{2}$
C) $14\sqrt{2}$ D) $56\sqrt{2}$

45. Piramidaning asosi to'g'ri burchakli uchburchakdan iborat bo'lib, uning gipotenuzasi 2 dm. Piramidaning har bir yon qirrasi $\sqrt{5}$ dm bo'lib, ular asos tekisligi bilan α burchak tashkil qiladi. $tg\alpha$ ni toping.

A) 1 B) $\frac{1}{2}$
C) $\frac{\sqrt{5}}{2}$ D) 2

46. Muntazam piramida asosining tomoni 10 dm ga va ichki burchaklarining yig'indisi 720° ga teng bo'lgan ko'pburchakdan iborat. Agar piramidaning yon qirrasi 13 dm ga teng bo'lsa, piramidaning yon sirti yuzini (dm^2) toping.

A) 340 B) 320
C) 300 D) 360

47. Uchburchakli piramida asosining tomonlari 9 dm, 10 dm va 17 dm ga teng. Piramidaning barcha yon yoqlari asos tekisligi bilan 45° li burchak tashkil etsa, uning hajmini (dm^3) toping.

A) 28
B) 24
C) 26
D) 22

48. Uchburchakli prizmaning yon qirralari orasidagi masofalar 37 cm, 15 cm va 26 cm ga teng. Agar prizmaning yon qirrasi uzunligi 5 cm bo'lsa, uning hajmini (cm^3) toping.

A) 760
B) 770
C) 790
D) 780

49. Silindrning asosida 2 dm uzunlikdagi vatar 60° kattalikdagi yoyga tiralgan. Silindrning o'q kesimi kvadratdan iborat bo'lsa, uning hajmini (dm^3) toping.

A) $4\sqrt{3}\pi$
B) 32π
C) $8\sqrt{3}\pi$
D) 16π

50. Uchburchakli piramida asosining tomonlari 9; 10 va 12 cm ga teng. Piramidaning barcha yon qirralari asos tekisligi bilan 45° li burchak tashkil etsa, uning hajmini (cm^3) toping.

A) 91
B) 72
C) 81
D) 90

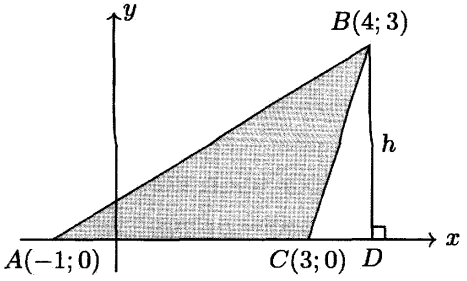
51. Uchlari $S(1;\ 1;\ 1)$, $A(13;\ 1;\ 1)$, $B(1;\ 13;\ 1)$ va $C(1;\ 1;\ 13)$ nuqtalarda bo'lgan muntazam uchburchakli piramidaning hajmini toping.

A) 144
B) 366
C) 288
D) 256

52. Katetlari uzunliklari 6 cm va 7 cm ga teng bo'lgan to'g'ri burchakli uchburchakning gipotenuzasi atrofida to'liq aylantirishdan hosil bo'lgan jismning hajmini (cm^3) toping.

A) $\frac{441\sqrt{85}}{85}$
B) $\frac{588\pi\sqrt{85}}{85}$
C) $\frac{441\pi\sqrt{85}}{85}$
D) $\frac{882\pi\sqrt{85}}{85}$

53. Rasmda uchlari A, B va C nuqtalarda bo'lgan uchburchakni Ox o'qi atrofida to'liq aylantirishdan hosil bo'lgan jismning hajmini toping.



A) 12π
B) 9π
C) 15π
D) 6π

54. To'g'ri silindrning balandligi 5 cm va asosining radiusi 4 cm. Uning yon sirtidagi A va B nuqtalar asos tekisligidan mos ravishda 2 va 3 cm balandlikda joylashgan. Agar AB kesmaning uzunligi 5 cm bo'lsa, silindr o'qidan AB kesmagacha bo'lgan eng yaqin masofani (cm) toping.

A) $\frac{\sqrt{39}}{2}$ B) $\frac{\sqrt{41}}{2}$
C) $\sqrt{11}$ D) $\sqrt{10}$

55. Uchlari Oxy tekisligining $(0;\ 0)$, $(3;\ 0)$, $(2;\ 3)$ va $(0;\ 3)$ nuqtalarida bo'lgan trapetsiyani Oy o'qi atrofida aylantirishdan hosil bo'lgan jismning hajmini toping.

A) 7π B) 12π
C) 19π D) 18π

56. Uchlari Oxy tekisligining $(0;\ 0)$, $(0;\ 2)$, $(4;\ 2)$ va $(1;\ 0)$ nuqtalarida bo'lgan to'rtburchakni Ox o'qi atrofida aylantirishdan hosil bo'lgan jismning hajmini toping.

A) 6π B) 9π
C) 8π D) 12π

57. Sharga tashqi chizilgan kesik konus asosining radiuslari 3 va 6 ga teng. Kesik konus to'la sirtining shar sirtiga nisbatini toping.

A) $\frac{14}{9}$
B) $\frac{7}{6}$
C) $\frac{7}{4}$
D) $\frac{14}{3}$

58. Asoslarining radiuslari 2 va 6 ga, o'q kesimining diagonali 10 ga teng bo'lgan kesik konus yon sirtining yuzini toping.

A) $24\sqrt{13}\pi$
B) $16\sqrt{13}\pi$
C) $12\sqrt{13}\pi$
D) $15\sqrt{13}\pi$

59. To'la sirtining yuzi 54π ga teng silindrning hajmi eng ko'pi bilan qanchaga teng bo'lishi mumkin?

A) 52π B) 56π
C) 58π D) 54π

60. Kovak shar devorining hajmi 156π ga, devorning qalinligi 3 ga teng. Tashqi sharning radiusini toping.

A) 5 B) 4 C) 7 D) 6

61. Radiusi $\frac{25}{4}$ bo'lgan sferaga balandligi 8 ga teng bo'lgan konus ichki chizilgan. Konusning hajmini toping.

A) 72π
B) 144π
C) 192π
D) 96π

62. Uzunligi $\sqrt{128}$ ga teng bo'lgan AB kesmaning uchlari radiusi 5 ga, balandligi 8 ga teng silindrning pastki va yuqori asoslaridagi aylanalarda yotadi. Silindr markaziy o'qidan AB kesmagacha bo'lgan eng qisqa masofani toping.

A) $\sqrt{19}$
B) $\sqrt{17}$
C) 3
D) 4

Koordinatalar va vektorlar

1. $\bar{a}\,(1;\,2)$, $\bar{b}\,(2;\,1)$ va $\bar{c}\,(3;\,2)$ vektorlar berilgan. k ning qanday qiymatida $\bar{a}+k\bar{b}$ vektor $\bar{c}$ vektorga kollinear bo'ladi?

A) 4 B) –4
C) –2 D) 2

2. $\bar{a}\,(-1;\,2)$, $\bar{b}\,(-2;\,1)$ va $\bar{c}\,(-3;\,2)$ vektorlar berilgan. k ning qanday qiymatida $2\bar{a}-k\bar{b}$ vektor $\bar{c}$ vektorga perpendikulyar bo'ladi?

A) $\frac{4}{7}$ B) $-\frac{7}{4}$
C) $\frac{7}{4}$ D) $-\frac{4}{7}$

3. Agar $\bar{a}\,(x;\,2)$ va $\bar{b}\,(5;\,y)$ o'zaro kollinear vektorlar bo'lsa, $2xy-3$ ning qiymatini toping.

A) 13
B) 17
C) 7
D) 3

4. $\bar{a}\,(12;\,-5)$ vektor bilan Ox o'qi orasidagi burchak kosinusini toping.

A) $-\frac{12}{5}$ B) $\frac{12}{13}$
C) $-\frac{5}{12}$ D) $-\frac{5}{13}$

5. $\vec{a}(-1; 2)$, $\vec{b}(-2; 1)$ vektorlar berilgan. Agar $2\vec{a} - x\vec{b} = y\vec{a} + 3\vec{b}$ o'rinli bo'lsa, x va y ning qiymatini toping.

A) $x = 3$, $y = -2$
B) $x = -3$, $y = 2$
C) $x = 3$, $y = 2$
D) $x = -3$, $y = -2$

6. $\bar{a}(3; 2)$, $\bar{b}(1; 2)$ va $\bar{c}(x + 1; y - 1)$ vektorlar berilgan. Agar $2\bar{a} - 3\bar{b} = \bar{c}$ bo'lsa, xy ning qiymatini toping.

A) -4
B) -2
C) -6
D) -3

7. Agar $\vec{a}$, $\vec{b}$ vektorlar uchun $2\vec{a} + \vec{b} = 6\vec{i} + 9\vec{j}$ va $\vec{a} + 2\vec{b} = -3\vec{i} + 6\vec{j}$ o'rinli bo'lsa, $\vec{a}$ vektorni toping.

A) $\vec{a}(5; 4)$
B) $\vec{a}(-5; -4)$
C) $\vec{a}(-5; 4)$
D) $\vec{a}(5; -4)$

8. Agar $|\vec{a} - \vec{b}| = 8$ va $\vec{a} \cdot \vec{b} = 9$ bo'lsa, $|\vec{a} + \vec{b}|$ ni toping.

A) 9 B) 10
C) $\sqrt{108}$ D) 11

9. $2\bar{a} + \bar{b}$ va $2\bar{a} - \bar{b}$ perpendikulyar vektorlar berilgan. Agar $|\bar{a}| = 5$ bo'lsa, $|\bar{b}|$ ni toping.

A) 10 B) 9
C) 8 D) 12

10. Agar $|\vec{a}| = 3$; $|\vec{b}| = 4$ va $\vec{a} \cdot \vec{b} = 4$ bo'lsa, u holda $|2\vec{a} - \vec{b}|$ ning qiymatini toping.

A) 8 B) 9
C) 6 D) 12

11. $|\vec{a}| = 3$; $|\vec{b}| = 4$ bo'lsa, u holda $|2\vec{a} - \vec{b}|$ ning qiymati quyidagilardan qaysi biri bo'lishi mumkin?

A) 0 B) 6
C) 1 D) 11

12. (3; 4) nuqtani koordinatalar boshiga nisbatan soat mili harakatiga teskari yo'nalishida 90° ga burish natijasida hosil bo'lgan nuqtaning koordinatalarini aniqlang.

A) (–3; 4)
B) (3; –4)
C) (–4; 3)
D) (4; –3)

13. (3; 4) nuqtani koordinatalar boshiga nisbatan soat mili harakati yo'nalishida 90° ga burish natijasida hosil bo'lgan nuqtaning koordinatalarini aniqlang.

A) (–4; 3)
B) (4; –3)
C) (–3; 4)
D) (3; –4)

14. (7; –12) nuqtaning koordinatalar boshiga nisbatan simmetrik bo'lgan nuqtasini toping.

A) (7; 12)
B) (–7; 12)
C) (–7; –12)
D) (12; –7)

15. (7; –12) nuqtaning ordinatalar o'qiga nisbatan simmetrik bo'lgan nuqtasini toping.

A) (12; –7)
B) (–7; 12)
C) (7; 12)
D) (–7; –12)

16. (7; –12) nuqtaning abssissalar o'qiga nisbatan simmetrik bo'lgan nuqtasini aniqlang.

A) (–7; 12)
B) (12; –7)
C) (–7; –12)
D) (7; 12)

17. (5; –8) nuqtaning (–4; 9) nuqtaga nisbatan simmetrik bo'lgan nuqtasini toping.

A) (–13; 23)
B) (–14; 14)
C) (–13; 24)
D) (–13; 26)

18. $A(a; -1)$, $B(1-a; 2a+1)$ va $C(a+1; -3)$ nuqtalar bitta to'g'ri chiziqda yotsa, shu to'g'ri chiziq tenglamasini tuzing.

A) $y = -2x + 3$
B) $y = 2x + 3$
C) $y = -3x + 2$
D) $y = 3x + 2$

19. Uchlari $A(-1; 1)$, $B(3; 1)$ va $C(2; 4)$ nuqtalarda bo'lgan uchburchakning yuzasini toping.

A) 8 B) 12
C) 9 D) 6

20. Uchlari $A(3; 0)$, $B(0; 2)$ va $C(0; 0)$ nuqtalarda bo'lgan uchburchakning CM bissektrisasi bo'lsa, M nuqtaning koordinatalarini toping.

A) $\left(\frac{4}{3}; \frac{4}{3}\right)$ B) $\left(\frac{6}{5}; \frac{6}{5}\right)$
C) $\left(\frac{5}{6}; \frac{5}{6}\right)$ D) $\left(\frac{3}{4}; \frac{3}{4}\right)$

21. Uchlari $A(3; 0)$, $B(0; 2)$ nuqtalarda bo'lgan kesmani A uchidan boshlab hisoblaganda 4:3 nisbatda bo'ladigan M nuqtaning koordinatalarini toping.

A) $\left(\frac{8}{7}; \frac{9}{7}\right)$
B) $\left(\frac{12}{7}; \frac{13}{7}\right)$
C) $\left(\frac{9}{7}; \frac{8}{7}\right)$
D) $\left(\frac{13}{7}; \frac{12}{7}\right)$

22. Uchlari $A(0; 0)$, $B(3; -1)$, $C(6; 2)$ va $D(1; 2)$ nuqtalarda bo'lgan to'rtburchakning qaysi tomoni eng katta?

A) BC
B) AB
C) AD
D) CD

23. $A(2; 3)$, $B(3; -4)$, $C(-6; 5)$ va $D(-5; 4)$ nuqtalardan qaysi biri koordinatalar boshidan eng uzoqda joylashgan?

A) B nuqta
B) C nuqta
C) A nuqta
D) D nuqta

24. $\vec{a}(1; 2)$; $\vec{b}(2; 1)$ va $\vec{c}(x; 2)$ vektorlar uchun $\vec{a}\cdot\vec{c}+\vec{b}\cdot\vec{c}=\vec{a}\cdot\vec{b}=13$ bo'lsa, x ni toping.

A) 2
B) –1
C) –2
D) 1

25. Ixtiyoriy uchtasi bitta to'g'ri chiziqda yotmaydigan A, B, C va D nuqtalar berilgan. Agar $\overrightarrow{AB}=0{,}8\overrightarrow{DC}$ bo'lsa, $ABCD$ to'rtburchak turini aniqlang.

A) to'g'ri to'rtburchak
B) kvadrat
C) parallelogramm
D) trapetsiya

26. A, B, C, D, E va F nuqtalar tartib bo'yicha muntazam oltiburchakning uchlari bo'lsa, quyidagi vektorlardan qaysi biri $\overrightarrow{AD}$ vektorga teng?

A) $2\left(\overrightarrow{DC}-\overrightarrow{DE}\right)$
B) $2\left(\overrightarrow{DC}+\overrightarrow{DE}\right)$
C) $-2\left(\overrightarrow{DC}+\overrightarrow{DE}\right)$
D) $-2\left(\overrightarrow{DC}-\overrightarrow{DE}\right)$

27. A, B, C va D nuqtalar tartib bo'yicha kvadratning uchlari bo'lsa, quyidagilardan qaysi biri $\overrightarrow{AB}$ vektorga teng?

A) $\overrightarrow{DA}+\overrightarrow{BC}+\overrightarrow{CD}$
B) $\overrightarrow{AD}+\overrightarrow{BC}+\overrightarrow{DC}$
C) $\overrightarrow{DA}+\overrightarrow{CB}+\overrightarrow{DC}$
D) $\overrightarrow{DA}+\overrightarrow{BC}+\overrightarrow{DC}$

28. A, B, C nuqtalar uchun $\overrightarrow{CB}(-3; 5; -4)$ va $\overrightarrow{CA}(4; 3; -5)$. ABC uchburchakning C uchidan AB tomoniga tushirilgan balandlik uzunligini toping.

A) $\sqrt{37}$
B) 6
C) $\sqrt{36{,}5}$
D) 6,04

29. A, B, C nuqtalar uchun $\overrightarrow{AB}(-4; 3; -4)$ va $\overrightarrow{AC}(4; 3; -3)$. ABC uchburchakning BC tomonining uzunligini toping.

A) 8,06
B) $\sqrt{63}$
C) 8
D) $\sqrt{65}$

30. y ning qanday qiymatlarida $\bar{a}(-2; y; -9)$ vektorning uzunligi 11 ga teng bo'ladi?

A) $y=\pm2$
B) $y=\pm9$
C) $y=\pm6$
D) $y=\pm7$

31. $A(-9; 12; -16)$ nuqtadan Oxy tekislikkacha bo'lgan masofani toping.

A) 16 B) 20
C) 12 D) 9

32. $\bar{a}(-12; 13; -15)$ vektorning Oxy tekisligidagi proyeksiyasi bo'lgan vektorni toping.

A) $\bar{p}(0; 0; -15)$
B) $\bar{p}(-12; 13; 0)$
C) $\bar{p}(-12; 0; -15)$
D) $\bar{p}(0; 13; -15)$

33. $\bar{a}$ (–2; 6; 3) vektor bilan yo'nalishi bir xil bo'lgan birlik vektorning koordinatalarini toping.

A) $\left(\frac{2}{7};\frac{6}{7};\frac{3}{7}\right)$

B) $\left(-\frac{2}{7};\frac{6}{7};\frac{3}{7}\right)$

C) $\left(\frac{2}{7};\frac{-6}{7};\frac{-3}{7}\right)$

D) $\left(-\frac{2}{7};\frac{6}{7};-\frac{3}{7}\right)$

34. Agar $A(-2; 6; -9)$, $B(-12; 6; -9)$, $C(4; 6; 5)$ va $D(14; -8; 15)$ nuqtalar berilgan bo'lsa, $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{CD}$ vektorning koordinatalarini toping.

A) (–16; 0; –14)
B) (16; –14; 24)
C) (16; 14; –24)
D) (10; –11; 8)

35. k ning qanday qiymatlarida $\bar{a}$ $(-2; k+4; k+1)$ vektorning uzunligi 7 ga teng bo'ladi?

A) 2 va 7
B) –2 va 7
C) –2 va –7
D) 2 va –7

36. $ABCD$ parallelogrammning uchlari $A(-2; 6; -9)$, $B(-12; 6; 5)$ va $C(4; 6; 5)$ nuqtalar bo'lsa, $\overrightarrow{BD}$ vektorning koordinatalari yig'indisini toping.

A) –12
B) –16
C) 16
D) 12

37. $ABCD$ parallelogramm uchun $\overrightarrow{AB}(3; 5; -7)$ va $\overrightarrow{AD}(-11; 7; 3)$. Parallelogramm diagonallarining keshishgan nuqtasi O bo'lsa, $\overrightarrow{OA}$ vektorning koordinatalari yig'indisini toping.

A) 1 B) 2 C) –1 D) 0

38. Tekislikda $A(1; 1)$, $B(3; 4)$, $C(x; y)$ nuqtalar berilgan. Agar $\overrightarrow{AB}=\overrightarrow{AC}$ bo'lsa, $\frac{x}{y}+\frac{y}{x}$ ni toping.

A) $2\frac{1}{4}$ B) $2\frac{1}{3}$ C) $2\frac{1}{6}$ D) $2\frac{1}{12}$

39. Uchlari $A(2; 2)$ va $B(6; 6)$ nuqtalarda bo'lgan AB kesmaning C o'rtasidagi nuqta. AB kesmaga perpendikulyar va C nuqtadan o'tuvchi to'g'ri chiziq tenglamasini toping.

A) $-x-y+8=0$
B) $2x-y+12=0$
C) $x+y-8=0$
D) $-x+y+8=0$

40. Uchlari $A(3; 6)$, $B(5; 12)$ va $C(9; 4)$ nuqtalarda bo'lgan uchburchakning BD medianasi bo'yicha yo'nalgan birlik vektorni toping.

A) $\left(\frac{1}{5\sqrt{2}};-\frac{7}{5\sqrt{2}}\right)$

B) $\left(\frac{1}{5\sqrt{2}};\frac{7}{5\sqrt{2}}\right)$

C) $\left(\frac{3}{5};-\frac{4}{5}\right)$

D) $\left(-\frac{3}{5};\frac{4}{5}\right)$

41. $|\vec{a}| = 3$ va $|\vec{b}| = \sqrt{2}$, $\vec{a}$ va $\vec{b}$ vektorlar orasidagi burchak $\frac{\pi}{4}$ ga teng. $2\vec{a} - \vec{b}$ va $3\vec{a} + 4\vec{b}$ vektorlarning skalyar ko'paytmasini toping.

A) 61 B) 42
C) $46 + 15\sqrt{2}$ D) $46 + 5\sqrt{2}$

42. $\vec{a}$ va $\vec{b}$ vektorlar uchun $|\vec{a}| = \sqrt{3}$, $|\vec{b}| = 4$, $(\vec{a}\,\hat{}\,\vec{b}) = 30°$ ga teng. λ ning qanday qiymatida $(2\vec{a} - \lambda\vec{b})$ va $(\vec{a} - \vec{b})$ vektorlar perpendikulyar bo'ladi?

A) 1,2 B) 0,3 C) 0,6 D) –0,3

43. Uchlari $A(10; 11)$, $B(10; 3)$ va $C(2; 3)$ nuqtalarda bo'lgan uchburchakning B uchidan AC tomonga BD balandlik tushirilgan. D nuqtaning koordinatalari yig'indisini toping.

A) $8\sqrt{2}$
B) $10\sqrt{2}$
C) 9
D) 13

To'plam, mantiqiy amallar

1. $A = \{a; b; c; d; e; f\}$ to'plamning nechta qism to'plamiga, a element tegishli bo'ladi?

A) 16 B) 8
C) 32 D) 64

2. $A = \{a; b; c; d; e; f\}$ to'plamning nechta qism to'plamlarida, b elementi bo'lib, c elementi qatnashmaydi?

A) 16
B) 32
C) 8
D) 28

3. $A = \{a; b; c; d; e; f\}$ to'plamning elementlari soni 2 ta bo'lgan nechta qism to'plami bor?

A) 15 B) 4
C) 8 D) 16

4. $A = \{x | x \in N; 36 = nx, n \in N\}$, $B = \{x | x \in N; 24 = nx, n \in N\}$ to'plamlar berilgan. $A \cap B$ to'plamning elementlari sonini toping.

A) 9 B) 12
C) 6 D) 4

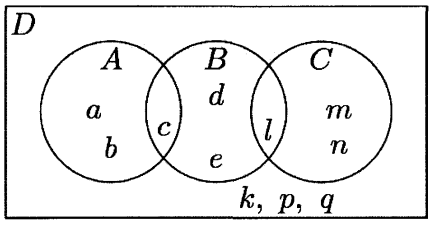
5. A to'plam 48 sonining butun bo'luvchilaridan tashkil topgan bo'lsa, A to'plamning elementlari sonini aniqlang.

A) 20 B) 18
C) 10 D) 16

6. A va B to'plamlarning elementlari mos ravishda 24 va 36 sonlarining natural bo'luvchilaridan iborat bo'lsa, $A \cap B$ to'plamning elementlari sonini aniqlang.

A) 6 B) 4
C) 8 D) 12

7. Rasmdan foydalanib, $((A \cap B) \cup C) \cap D$ to'plamning elementlari sonini toping.

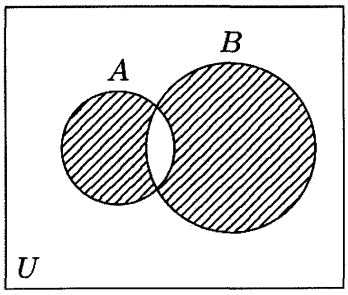


A) 4
B) 1
C) 3
D) 0

8. [1; 200] sonlar to'plamida nechta natural son 6 ga (qoldiqsiz) bo'linib, 9 ga (qoldiqsiz) bo'linmaydi?

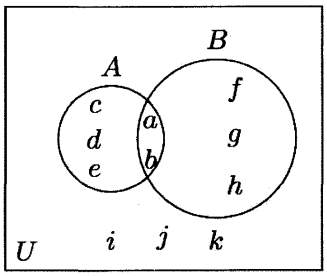
A) 22
B) 33
C) 44
D) 11

9. Rasmda A va B to'plamlar va U universial to'plam tasvirlangan. Quyidagi to'plamlardan qaysi biri bo'yalgan sohaga mos to'plamni tasvirlaydi? ($A' = U \setminus A$; $B' = U \setminus B$)



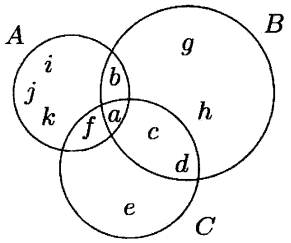
A) $(A \cap B') \cup (A' \cap B)$
B) $(A' \cap B') \cup (A \cap B)$
C) $(A \cap B') \cup (A \cap B)$
D) $(A' \cap B) \cup (A \cap B)$

10. Rasmda A va B to'plamlar va U universial to'plam tasvirlangan. $(A \cap B') \cup (A' \cap B)$ to'plamning elementlarini aniqlang ($A' = U \setminus A$, $B' = U \setminus B$).



A) $\{c, d, e\}$
B) $\{a, b, i, j, k\}$
C) $\{c, d, e, f, g, h\}$
D) $\{f, g, h\}$

11. Rasmda A, B va C to'plamlar tasvirlangan. $(A \cup B) \cap C$ to'plamning elementlarini aniqlang.



A) $\{a, b, c, d, g, h, f\}$
B) $\{a, b, c, d, e, f\}$
C) $\{a, b, c, d\}$
D) $\{a, c, d, f\}$

12. $A = \{x | x \geq 2,\ x \in Z\}$, $B = \{x | x < 8,\ x \in Q\}$ bo'lsa, $A \cap B$ to'plamning elementlari sonini aniqlang.

A) 6
B) 8
C) 7
D) ∞

13. $A = \{x|x \geq 2,\ x \in Z\}$ to'plamning Z to'plamgacha to'ldiruvchi A' to'plamini toping.

$(A' = Z \setminus A)$

A) $A' = \{x|x \leq 2,\ x \in Z\}$
B) $A' = \{x|\ x \in Z\}$
C) $A' = \{x|x \leq 1,\ x \in Z\}$
D) $A' = \{x|x < 1,\ x \in Z\}$

14. $A = \{x|\sin x = 0,\ x \in Z\}$ to'plamga teng bo'lgan to'plamni aniqlang.

A) $\{x|xn = 0,\ n \in N\}$
B) $\{x|x = \pi k,\ k \in N\}$
C) $\{x|x = \pi k,\ k \in R\}$
D) $\{x|x = \pi n,\ n \in Z\}$

15. a) $\{1; 2\} \subset \{1; 2; 3; 4\}$;
b) $\{1; 3\} \subset \{1; 2; 3; 5\}$;
c) $\{2; 3\} \subset \{1; 2; 4; 5\}$; munosabatlardan to'g'rilarini aniqlang.

A) b va c B) a va c
C) a, b va c D) a va b

16. $A = \{x|x = 4n + 3,\ n \in N\}$, $B = \{x|x = 6n + 5,\ n \in N\}$ bo'lsa, $A \cap B$ to'plamni aniqlang.

A) $\{x|x = 12n + 11,\ n \in N\}$
B) $\{x|x = 12n - 1,\ n \in N\}$
C) $\{x|x = 24n - 13,\ n \in N\}$
D) $\{x|x = 24n - 1,\ n \in N\}$

17. A murakkab sonlar to'plami va B juft sonlar to'plami bo'lsa, $A \cap B$ to'plamni aniqlang.

A) $\{x|x = 2n,\ n \in N\}$
B) $\varnothing$
C) $\{x|x = 2n - 2,\ n \in N\}$
D) $\{x|x = 2n + 2,\ n \in N\}$

18. A, B va C sonli to'plamlarning elementlari soni mos ravishda 10; 12 va 15 ta. $A \cup B \cup C$ to'plamning elementlari soni eng kamida necha bo'la oladi?

A) 22
B) 27
C) 12
D) 15

19. Agar $A = \{a, b, c, d, e\}$ bo'lsa, $B \subset A$ $(B \neq A,\ B \neq \varnothing)$ shartlarni qanoatlantiruvchi necha har xil B to'plam mavjud?

A) 32
B) 30
C) 16
D) 14

20. Agar A to'plamga 1 ta element qo'shilgandagi qism to'plamlari soni A to'plamdan 1 ta element chiqarilib tashlangandagi qism to'plamlari sonidan 24 taga ko'p bo'lsa, A to'plamning qism to'plamlari sonini toping.

A) 32
B) 8
C) 4
D) 16

21. Agar $A = \{x|x = 4n,\ n \in N\}$, $B = \{x|x = 4n + 2,\ n \in N\}$ bo'lsa, $A \cup B$ to'plamni aniqlang.

A) $\{x|x = 4n,\ n \in N\}$
B) $\{x|x = 4n - 2,\ n \in N\}$
C) $\{x|x = 2n,\ n \in N\}$
D) $\{x|x = 2n + 2n,\ n \in N\}$

22. $A = \{(x, y)|x^2 + y^2 = 4;\ x, y \in R\}$, $B = \{(x, y)|x - y = 2;\ x, y \in R\}$ bo'lsa, $A \cap B$ to'plamni aniqlang.

A) $\{(-2; 0); (0; 2)\}$
B) $\{(2; 0); (0; 2)\}$
C) $\{(2; 0); (0; -2)\}$
D) $\{(-2; 0); (0; -2)\}$

23. $A = \{1; 2; 3; 4\}$, $B = \{x|x = 2n - 1,\ n \in A\}$ bo'lsa, $A \cap B$ to'plamni aniqlang.

A) $\{1; 3; 4\}$ B) $\{1; 3\}$
C) $\{1; 2; 3\}$ D) $\{1; 2; 4\}$

24. $A = \{x|x^2 \leq 64,\ x \in R\}$, $B = \{x|x^2 > 4,\ x \in R\}$ bo'lsa, $A \cap B$ to'plamni aniqlang.

A) $[2; 8]$
B) $\{3; 4; 5; 6; 7; 8\}$
C) $\{2; 3; 4; 5; 6; 7; 8\}$
D) $(2; 8]$

25. $B \neq \varnothing$ va $B \subset A$. A va B to'plamlarning elementlari soni mos ravishda m va n ga teng. Agar $n + 3m = 18$ bo'lsa, A to'plamning elementlari sonini toping.

A) 3 B) 2
C) 5 D) 4

26. 30 ta o'quvchidan $3x + 1$ tasi rus tilini, $2x - 1$ tasi ingliz tilini, $x - 1$ tasi rus tilini ham ingliz tilini ham biladi. 5 tasi esa rus tilini ham ingliz tilini ham bilmaydi. Nechta o'quvchi rus tilini biladi?

A) 13 B) 19 C) 11 D) 17

27. 100 kishidan iborat sayyohlar guruhidan 60%i ingliz tilini, 50%i fransuz tilini, 17%i esa ikkala tilni ham biladi. Nechta sayyoh ingliz tilini ham, fransuz tilini ham bilmaydi?

A) 11 B) 8
C) 6 D) 7

28. $A = \left[-\sqrt{3}; \sqrt{3}\right]$, $B = \left[-\frac{\pi}{2}; \frac{\pi}{2}\right]$ va $C = \left[-\sqrt{5}; \frac{\sqrt{7}}{2}\right]$ bo'lsa, $(A \cup B) \cap C$ to'plamni aniqlang.

A) $\left[-\sqrt{3}; \sqrt{3}\right]$
B) $\left[-\sqrt{3}; \frac{\sqrt{7}}{2}\right]$
C) $\left[-\frac{\pi}{2}; \frac{\pi}{2}\right]$
D) $\left[-\sqrt{5}; \sqrt{3}\right]$

Kombinatorika va ehtimollar nazariyasi

1. 0; 1; 2; 3; 4; 5 raqamlardan jami nechta raqamlari takrorlanmaydigan 3 xonali sonlar tuzish mumkin?

A) 216
B) 180
C) 100
D) 125

2. 0, 1, 2, 3, 4, 5 raqamlardan jami nechta 3 xonali sonlar tuzish mumkin?

A) 180
B) 216
C) 125
D) 210

3. 6 ta to'g'ri chiziqlar ko'pi bilan nechta nuqtada kesishadi?

A) 12
B) 28
C) 15
D) 21

4. 6 ta to'g'ri chiziqlar ko'pi bilan tekislikni nechta qismga ajratadi?

A) 16
B) 22
C) 21
D) 15

5. Markazlari har xil nuqtalarda bo'lgan 3 ta aylana ko'pi bilan nechta nuqtada kesishadi?

A) 3
B) 6
C) 4
D) 7

6. Tog'ning cho'qqisiga 8 ta yo'l olib boradi. Borgan yo'lidan qaytmaslik sharti bilan tog'ning cho'qqisiga jami necha xil usulda borib kelish mumkin?

A) 42 B) 56
C) 28 D) 21

7. Tekislikda o'zaro kesishmaydigan a va b to'g'ri chiziqlar berilgan. a to'g'ri chiziqda 3 ta, b to'g'ri chiziqda 4 ta nuqta belgilangan. Uchlari bu nuqtalarda bo'lgan jami nechta uchburchak mavjud?

A) 32 B) 30
C) 36 D) 24

8. Tekislikda o'zaro kesishmaydigan a va b to'g'ri chiziqlar berilgan. a to'g'ri chiziqda 2 ta, b to'g'ri chiziqda 4 ta nuqta berilgan. Uchlari bu nuqtalarda bo'lgan jami nechta to'rtburchak mavjud?

A) 8
B) 5
C) 6
D) 12

9. Aylanada 5 ta har xil nuqta berilgan. Uchlari bu nuqtalarda bo'lgan jami nechta turli vatar mavjud?

A) 6
B) 10
C) 15
D) 12

10. Aylanada 6 ta har xil nuqta belgilangan. Uchlari bu nuqtalarda bo'lgan jami nechta har xil uchburchak chizish mumkin?

A) 18
B) 20
C) 15
D) 10

11. Tekislikda ixtiyoriy uchtasi bitta to'g'ri chiziqda yotmaydigan 11 ta nuqta berilgan. Uchlari berilgan nuqtalarda bo'lgan jami nechta turli kesma mavjud?

A) 55
B) 52
C) 54
D) 50

12. Tekislikda ixtiyoriy uchtasi bitta to'g'ri chiziqda yotmaydigan 8 ta nuqta berilgan. Uchlari shu nuqtalarda bo'lgan jami nechta har xil uchburchak mavjud?

A) 50 B) 52
C) 56 D) 54

13. 34974 sonning raqamalari joylarini almashtirib jami nechta har xil 5 xonali son hosil qilish mumkin?

A) 20
B) 60
C) 120
D) 30

14. 2 ta har xil kitobni 12 ta o'quvchidan 2 tasiga bittadan berish sharti bilan necha xil usulda berish mumkin?

A) 66
B) 156
C) 132
D) 78

15. Alida 3 ta fizika va 2 ta matematika kitoblari bor. Ali matematika kitoblari yonma-yon bo'lishi sharti bilan bu 5 kitobni javonga jami necha xil usulda joylashtirishi mumkin?

A) 60 B) 120
C) 24 D) 48

16. 6 kishidan 4 ta kishini va bu 4 kishidan 2 ta kishini necha xil usulda tanlab olish mumkin?

A) 90
B) 60
C) 144
D) 120

17. 5 ta o'quvchidan 3 tasiga 3 ta bir xil kitobni bittadan berish sharti bilan jami necha xil usulda berish mumkin?

A) 18
B) 20
C) 15
D) 10

18. Tekislikda ixtiyoriy uchtasi bitta to'g'ri chiziqda yotmaydigan A, B, C, D, M va N nuqtalarni uchburchaklarning uchlari deb hisoblasak, nechta uchburchakda B nuqta qatnashadi?

A) 12
B) 15
C) 10
D) 9

19. Tashkilot 10 ta xodimidan 3 tasini Buxoroga, qolganlarini Samarqandga xizmat safariga yuboradigan bo'ldi. Tashkilot bu guruhlarni necha xil usulda tuzishi mumkin?

A) 180
B) 120
C) 60
D) 240

20. 52314 sonning raqamalari joylarini almashtirib, 1 bilan tugaydigan nechta har xil son hosil qilish mumkin?

A) 30
B) 25
C) 24
D) 20

21. 3 ta turli lavozimga nomzodlari ko'rsatilgan 5 kishidan 3 kishini necha xil usul bilan saylash mumkin?

A) 64
B) 60
C) 70
D) 56

22. Harbiy xizmatda 5 ta leytenant va 10 ta askar bor. Bitta leytenant va 3 ta askardan iborat guruhni necha xil usulda tuzish mumkin?

A) 480
B) 600
C) 560
D) 640

23. Hasan, Husan va ularning 3 nafar o'rtoqlari orasidan ixtiyoriy tanlangan 3 kishining orasida Hasan va Husan bo'lishi ehtimolligini toping.

A) 0,3
B) 0,2
C) 0,25
D) 0,4

24. Qutida 4 ta qora va 5 ta oq shar bor. Qutidan tavakkaliga olingan ikkita sharning ikkalasi ham oq shar bo'lishi ehtimolligini toping.

A) $\frac{5}{18}$
B) $\frac{2}{9}$
C) $\frac{1}{6}$
D) $\frac{1}{3}$

25. Beshta bir xil qog'ozchaning har biriga quyidagi harflardan biri takrorlanmasdan yozilgan: *A*, *T*, *N*, *S*, *O*. Qog'ozchalar qutiga solingan va yaxshilab aralashtirilgan. Qutiga qaramasdan bittalab olingan va olingan tartibda o'qilganda *SON* so'zi hosil bo'lish ehtimolligini toping.

A) $\frac{1}{60}$ B) $\frac{1}{40}$
C) $\frac{1}{30}$ D) $\frac{1}{120}$

26. Tanga 7 marta tashlanganda 5 marta gerb va 2 marta raqam tomoni tushishining ehtimolligini toping.

A) $\frac{1}{32}$
B) $\frac{10}{49}$
C) $\frac{1}{128}$
D) $\frac{21}{128}$

27. Merganning nishonga tekkizish ehtimoli 0,8 ga teng. U nishonga 3 marta o'q uzganda barcha o'qlari nishonga tegishining ehtimolligini toping.

A) 0,912 B) 0,8
C) 0,72 D) 0,512

28. Merganning nishonga tekkizish ehtimoli 0,8 ga teng. U nishonga 2 marta o'q uzganda o'qlaridan biri nishonga tegishining ehtimolligini toping.

A) 0,16 B) 0,8
C) 0,5 D) 0,32

29. 3 ta mergan bir-biriga bog'liq bo'lmagan holda nishonga bir martadan o'q uzishmoqda. Har birining nishonga tekkizish ehtimolligi mos ravishda 0,8; 0,7 va 0,6 ga teng. Nishonga faqat birinchi va ikkinchi merganlarning o'qlari tegishi hodisasining ehtimolligini toping.

A) 0,7 B) 0,56
C) 0,224 D) 0,336

30. 3 ta mergan bir-biriga bog'liq bo'lmagan holda nishonga bir martadan o'q uzishmoqda. Har birining nishonga tekkizish ehtimolligi mos ravishda 0,7; 0,6 va 0,5 ga teng. Nishonga 3 ta o'qning tegishi ehtimolligini toping.

A) 0,3
B) 0,35
C) 0,21
D) 0,42

MUNDARIJA

amaliy qo'llanma

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J A V O B L A R

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