

*Namangan viloyat xalq ta'limi boshqarmasi
Viloyat metodika markazi
Chust tuman xalq ta'limi bo'limi*

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Математика

OLIMPIADA TESTLARI TO'PLAMI



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Mazkur to'plamdan 2005 yilning 6-10 yanvarida Namangan shahrida o'tkazilgan Respublika fan olimpiadalarining viloyat bosqichi ishtirokchilariga matematika fanidan tavsiya etilgan test topshiriqlari savollari joy olgan.

To'plamdan akademik litsey, kasb-hunar kolleji hamda umumiy o'rta ta'lim maktablari o'qituvchilari va o'quvchilari foydalanishlari mumkin.

To'plovchi-mualliflar:

Tashov Mansurali Jo'rayevich- Chust tumanidagi 52-ixtisoslashgan maktabning oily toifali matematika – informatika o'qituvchisi

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Ushbu to'plam tuman metodika kabineti qoshidagi metodik kengashning 2005 yil 22 avgustdagi №3/5 -sonli qarori bilan foydalanishga tavsiya etilgan.

9-sinf

1-variant

- $\sqrt[3]{2004 \cdot 2002 - 2001 \cdot 2005 + 2 \cdot 12 - 19}$ ni hisoblang.
A) 2 B) 3 C) $\sqrt[3]{17}$ D) 1 E) $\sqrt[3]{11}$
- $\sqrt{x-6} + 2\sqrt{x+10} = 8$ tenglama nechta ildizga ega?
A) 4 B) 3 C) 2 D) 1 E) 0
- ABC uchburchakning A va B burchaklari bissektrisalari 48° burchak ostida kesishadi. C burchakni toping.
A) 84° B) 66° C) 90° D) 132° E) 96°
- $a^2 + b^2 + 2ab - 2a - 2b + 7$ ifodaning eng kichik qiymatini toping.
A) 6 B) 7 C) -7 D) 4 E) 5
- Tengsizlikni yeching: $(2x^2 + 12x + 18)(x - 4) < 0$
A) $(-\infty; -3) \cup (-3; 4)$ B) $(-\infty; 4)$ C) $(-\infty; -4)$ D) $(-3; 4)$ E) $(-\infty; 3)$
- M(8; -5) nuqtadan $x^2 - 4x + y^2 - 6y = 3$ tenglama orqali berilgan aylana gacha bo'lgan masofani toping.
A) 6 B) 5 C) 2 D) 7 E) 1
- Toshbaqa 0,2 km yo'l bosishi kerak. Agar u minutiga 50 sm yursa, yo'lni necha soatda bosib o'tadi?
A) $2\frac{2}{3}$ B) $4\frac{2}{3}$ C) $6\frac{2}{3}$ D) $3\frac{1}{3}$ E) to'g'ri javob berilmagan
- $(3x - 4y)(3x - 4y + 6) - (3x + 4y)(3x + 4y - 6)$ ifodani soddalashtiring.
A) $-12xy$ B) $3x - 4y$ C) $16y$ D) $5x - 3y$ E) $36x - 48xy$
- 7, 12, 17, 22, ... arifmetik progressiyaning nechta hadi 150 dan katta va 250 dan kichik?
A) 20 B) 21 C) 19 D) 17 E) 23
- p ning nechta natural qiymatida $x^2 + px + 49 = 0$ tenglama ildizga ega emas?
A) 6 B) 7 C) 13 D) 14 E) 28
- 1,5 songa teskari sonni toping.
A) $2/3$ B) $-2/3$ C) -0,75 D) 1,5 E) -3
- $|2x - 1| \leq 3$ tengsizlik nechta butun yechimga ega?
A) 1 B) 2 C) 3 D) 4 E) 5
- $x^2 - 6x + 8 < 0$ tengsizlikni yechimini toping.
A) $-4 < x < 2$ B) $2 < x < 4$ C) $-4 < x < -2$ D) $-6 < x < -2$ E) $-2 < x < 4$
- 0, (5) qanday songa teng?
A) $1/2$ B) $1/3$ C) $1/5$ D) $5/8$ E) $10/18$

15. $4x^2-3x-1$ uchhadni ko'paytuvchilarga ajrating.

- A) $(x+1)(4x-1)$ B) $2(2x-1)(x+1)$ C) $(x-1)(4x+1)$
D) $4(x-1)(x+2)$ E) $2(x-1)(2x+1)$

16. $x^3-5x^2-6x=0$ tenglama yechimlarining o'rtta arifmetigini toping.

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

17. Ikki sonnin g yig'indisi 48 ga teng. Agar birining 40 foizi ikkinchisining $\frac{2}{3}$ qismiga teng bo'lsa, katta sonni toping.

- A) 28 B) 30 C) 32 D) 27 E) 26

18. \vec{a} va \vec{b} nokollinear vektorlar bo'lsin. Agar $|\vec{a}|=|\vec{b}|$ bo'lsa, $(\vec{a}+\vec{b})$ va $(\vec{a}-\vec{b})$ vektorlar qanday burchak tashkil etadi?

- A) 30° B) 45° C) 75° D) 90° E) 60°

19. Parallelogramning bir tomoni ikkinchisidan 4 marta katta, perimetri esa $20\sqrt{2}$ ga teng. Agar o'tmas burchagi 135° bo'lsa, uning yuzini toping.

- A) $8\sqrt{2}$ B) $32\sqrt{2}$ C) 16 D) 8 E) $16\sqrt{2}$

20. $\vec{b}(0;-2)$ va $\vec{c}(-3;4)$ vektorlar berilgan. $\vec{a}=3\vec{b}-2\vec{c}$ vektorning kooordinatalarini toping.

- A) (0;8) B) (3;-6) C) (6;-8) D) (6;-14) E) (-6; -8)

21. 4^{12} ni 9 ga bo'lganda qoldiq qanday raqam bo'lishini aniqlang.

- A) 1 B) 2 C) 4 D) 7 E) 8

22. Soddalashtiring va hisoblang: $\frac{x^{-3}+8}{x^{-2}-2x^{-1}+4}$, bunda $x=0,5$

- A) 4,5 B) 3 C) 4 D) 5 E) 6

23. Soddalashtiring: $a \cdot \left(\frac{\sqrt{a}+\sqrt{b}}{2b\sqrt{a}}\right)^{-1} + b \cdot \left(\frac{\sqrt{a}+\sqrt{b}}{2a\sqrt{b}}\right)^{-1}$

- A) $2ab$ B) ab C) $4ab$ D) $\frac{1}{2}ab$ E) $\frac{1}{4}ab$

24. Agar x_1 va x_2 lar $x^2+x-3=0$ tenglamaning ildizlari bo'lsa,

$\frac{1}{x_1^2 \cdot x_2^4} + \frac{1}{x_1^4 \cdot x_2^2}$ ning qiymatini toping

- A) $\frac{5}{81}$ B) $\frac{7}{81}$ C) $\frac{11}{81}$ D) $\frac{4}{27}$ E) $\frac{3}{16}$

25. Agar $x+y=3$ va $x \cdot y=1$ bo'lsa, x^5y+xy^5 ni hisoblang.

- A) 47 B) 29 C) 51 D) 24 E) 18

26. t ning qanday qiymatlarida $tx^2-6x-1 < 0$ tengsizlik x ning barcha qiymatlarida to'g'ri?

- A) $t < -12$ B) $t < -9$ C) $t < -13$ D) $t < -8$ E) $t < -7$

27. $\sqrt{x^2 + 10 + 6\sqrt{1 + x^2}} + \sqrt{2 + x^2 - 2\sqrt{x^2 + 1}} = 4$ tenglama ildizlarining ko'paytmasini toping.

- A) 0 B) 3 C) 4 D) -2 E) -3

28. Uchburchakning balandligi 12 ga teng bo'lib, 21 ga teng tomonini 5:16 nisbatda bo'ladi. Uchburchakning perimetrini toping.

- A) 54 B) 52 C) 56 D) 108 E) 48

29. Muntazam uchburchak shaklidagi va yuzi $9\sqrt{3}$ ga teng bo'lgan plastinkadan yuzi eng katta bo'lgan kvadrat qirqib olingan bo'lsa, uning perimetri nimaga teng?

- A) $18\sqrt{3} - 12$ B) $24 - 12\sqrt{3}$ C) $64\sqrt{3} - 96$ D) $54 - 16\sqrt{3}$
E) $48\sqrt{3} - 72$

30. Qovariq to'rtburchakning diagonallari 16 va 30 ga teng bo'lib, ular orasidagi burchak 30° ga teng. To'rtburchakning yuzini toping.

- A) 120 B) 240 C) $120\sqrt{3}$ D) $160\sqrt{2}$ E) 92

31. Funksiyaning aniqlanish sohasini toping: $y = \sqrt{x+1} - \sqrt{3-x}$

- A) (-1;3) B) [0;3) C) [-1;3] D) (0;3] E) [1;3]

32. $1-x^5=2x$ tenglama nechta ildizga ega?

- A) 1 B) 2 C) 5 D) 3 E) ildizi yo'q

33. Quyidagi tenglamalardan qaysi biri yechimga ega emas?

- A) $\sqrt{x-3} - \sqrt{3} = 0$ B) $\sqrt{x} + 4 = 0$ C) $\sqrt{x+1} - 3 = 0$ D) $\sqrt{-x} = 0$
E) $\sqrt{x^2 + 1} = 7$

34. Sonlarni o'sish tartibida joylashtiring $a = \sqrt[6]{8}$, $b = \sqrt{3}$, $c = \sqrt[3]{4}$

- A) $a < b < c$ B) $a < c < b$ C) $b < c < a$ D) $c < b < a$ E) $b < a < c$

35. Uchburchakning tomonlari 4,5 va 6 sonlariga proporsional. Uchburchakning kichik burchagini toping.

- A) $4\pi/11$ B) $4\pi/15$ C) $5\pi/12$ D) $\pi/4$ E) $\pi/5$

36. $x^3 - 2x^2 - 9x + 18 = 0$ tenglama ildizlari modullarining yig'indisini toping.

- A) 2 B) 6 C) 8 D) 9 E) 18

37. Soddalashtiring: $\sqrt{9 - 4\sqrt{2}} - \sqrt{9 + 4\sqrt{2}}$

- A) $-4\sqrt{2}$ B) -2 C) -4 D) $1 - \sqrt{2}$ E) -3

38. $x+y$ yig'indini $\begin{cases} 3x + 5y = 21 \\ 2x - y = 1 \end{cases}$ sistemadan aniqlang.

- A) 4 B) 5 C) 7 D) 11 E) 9

39. Agar rombning tomoni 10 ga teng va diagonallari 4:3 nisbatda bo'lsa, rombning yuzini toping.

- A) 48 B) 96 C) 64 D) 84 E) 76

40. Agar α - muntazam oltiburchakning burchagi bo'lsa, $\cos\alpha$ ni toping.

- A) 1/2 B) -1/2 C) $-\sqrt{3}/2$ D) $\sqrt{2}/2$ E) $\sqrt{3}/2$

9-sinf
2-variant

1. $a = \frac{169}{19 - \sqrt{192}}$ bo'lsa, $\sqrt{a} - 2$ ni hisoblang.

- A) 4 B) 6 C) 5 D) $2 + \sqrt{3}$ E) $\sqrt{3}$

2. $x^6 + x^4 - 3x^2 + 5 + \sqrt{2}$ ko'phadni $x^2 - \sqrt{2}$ ko'phadga bo'lgandagi qoldiqni toping.

- A) 8 B) 9 C) 10 D) 11 E) $9\sqrt{2}$

3. To'g'ri burchakli uchburchakning bitta o'tkir burchagi 60° ga teng. To'g'ri burchakning bissektrisasi gipotenuzani qanday nisbatda bo'ladi?

- A) $\sqrt{3}:1$ B) 1:1 C) 2:1 D) $2:\sqrt{3}$ E) 4:3

4. $(\vec{a} + \vec{b})(\vec{a} - \vec{b}) = 0$ bo'lsa, $|\vec{a}|/|\vec{b}|$ ni toping.

- A) 1 B) 2 C) 0,5 D) 1,5 E) topib bo'lmaydi

5. $y = \sqrt{\frac{3-5x}{5\sqrt{6}-6\sqrt{5}}}$ funksiyaning aniqlanish sohasini toping.

- A) $[0,6;\infty)$ B) $(-\infty;0,6]$ C) $(-\infty;-0,6]$

- D) $(-\infty;-0,6] \cup [0,6;\infty)$ E) $(-\infty;\infty)$

6. $x^2 + (y-7)^2 = 83$ va $x^2 + (y+5)^2 = 113$ aylanalarning umumiy vatari orqali o'tuvchi to'g'ri chiziq tenglamasini toping.

- A) $y = 9/4$ B) $y = 12x$ C) $y = 14$ D) $x = 12$ E) $y = x + 1$

7. $f(x) = 5 - (x+2)/|x+2|$ funksiyaning qiymatlar sohasini toping.

- A) (4;6) B) 4 C) [4;6) D) 4;6 E) [4;6]

8. $1 \leq \frac{2x+3}{2} \leq 7$ tengsizlikni qanoatlantiruvchi tub sonlar yig'indisini toping.

- A) 14 B) 11 C) 15 D) 10 E) 9

9. $y = -x^2 + bx + c$ funksiya $x = -1$ nuqtada o'zining eng kichik qiymati 2 ga teng. $y(1) = ?$

- A) -2 B) -3 C) -5 D) 0 E) -4
10. Hisoblang: $\sqrt{19+8\sqrt{3}} + \sqrt{19-8\sqrt{3}}$
A) 6 B) 7 C) 8 D) 9 E) $2\sqrt{3}$
11. Hisoblang: $\frac{0,2^2 + 0,4 \cdot 0,3 + 0,3^2}{0,4 \cdot 0,5 - 0,6 \cdot 0,5}$
A) -25 B) -1 C) -2,5 D) 10 E) 0,25
12. Faqat $a=0$ da o'rinli bo'ladigan tenglikni ko'rsating.
A) $\sqrt{a^2} = -a$ B) $\sqrt[4]{a^4} = -a$ C) $\sqrt[3]{a^3} = a$ D) $\sqrt[3]{a^3} = -a$
E) $\sqrt[5]{a^5} = |a|$
13. Quyidagi tengsizlikning eng kichik butun yechimini toping:
 $(1+x)(x^2+x-12) > 0$
A) -4 B) -3 C) -1 D) 2 E) to'g'ri javob yo'q
14. Ifodaning qiymatini toping: $\operatorname{ctg} \frac{\pi}{6} \cos \frac{\pi}{3} \sin \frac{\pi}{4}$
A) $\sqrt{6}/7$ B) $\sqrt{3}/4$ C) $2\sqrt{3}/3$ D) $2\sqrt{2}/3$ E) $3/4$
15. Agar $a=-2$, $b=-1$ bo'lsa, $\frac{4a^2 - b^2}{2a + b}$ nimaga teng?
A) -5 B) $17/5$ C) 5 D) -3 E) $17/3$
16. m ning qanday qiymatlarida $2x+4=2m+3x$ tenglama musbat yechimga ega?
A) $m < -4$ B) $m > -2$ C) $m < 2$ D) $m > 2$ E) $m < -2$
17. $\sqrt{x^2 - 2x + 1} = 1 - x$ tenglama nechta yechimga ega?
A) 1 B) 2 C) 4 D) yechimi yo'q E) cheksiz ko'p
18. A (1;1) va B(-1;1) nuqtalar berilgan. Bu ikki nuqtadan o'tuvchi to'g'ri chiziq tenglamasini toping.
A) $x+3y=2$ B) $x+y=0$ C) $x+y=2$ D) $x+2y=3$ E) $y-1=0$
19. Aylananing uzunligi 30π ga teng. $\pi/3$ ga teng yoyni tortib turuvchi vatarning uzunligini toping.
A) 12 B) 16 C) 15 D) 13 E) 17
20. Trapetsiyaning bir asosi 13, o'rta chizig'i esa 15. Ikkinchi asosini toping.
A) 11 B) 14 C) 16 D) 17 E) 28
21. 840 va 264 sonlari nechta umumiy bo'luvchiga ega?
A) 9 B) 4 C) 6 D) 8 E) 7

22. $\frac{n^3 - 4n^2 - 12}{n}$, ($n \in \mathbb{N}$) kasrning barcha natural qiymatlarini yig'indisini toping

- A) 102 B) 105 C) 104 D) 106 E) 103

23. Soddalashtiring: $\frac{\sqrt{a^3b} \cdot \sqrt[3]{a^4} + \sqrt{a^4b^3} : \sqrt[4]{a}}{(b^2 - ab - 2a^2) \cdot \sqrt{ab}}$

- A) $\frac{a^3 \sqrt{a}}{b-2a}$ B) $a^3 \sqrt{a}$ C) $\frac{b-2a}{\sqrt{a}}$ D) $a\sqrt{a}$ E) $\frac{a\sqrt{a}}{a-2b}$

24. a ning qanday qiymatida $6x-a-6=(a+2)(x+2)$ tenglama yechimga ega emas?

- A) 4 B) 2 C) -2 D) 6 E) -6

25. k ning qanday qiymatida $\begin{cases} 3x + (k-1)y = k+1 \\ (k+1)x + y = 3 \end{cases}$ tenglamalar sistemasi

cheksiz ko'p yechimga ega?

- A) -1 B) -2 C) 0 D) 2 E) 1

26. Agar $p^2+q < 20$ va $pq < 22$ ekanligi ma'lum bo'lsa, $|p+q|$ ifoda nechta butun qiymat qabul qilishi mumkin?

- A) 5 B) 6 C) 7 D) 8 E) 9

27. $\sqrt{x+3+\sqrt{x+14}} + \sqrt{x+3-\sqrt{x+14}} = 4$ bo'lsa, $x \cdot (x+1)^{-1}$ ifodaning qiymatini toping.

- A) $3/2$ B) -1,5 C) 3 D) $2/3$ E) $-2/3$

28. To'g'riburchakli uchburchak o'tkir burchaklarining medianalari 15 va $6\sqrt{5}$ ga teng. Shu uchburchak gipotenuzasini toping.

- A) 18 B) 16 C) 14 D) 10 E) 13

29. ABCD rombning diagonallari 5 va 12 ga teng. AC katta diagonalida olingan N nuqta uni $AN:NC=4:1$ nisbatda bo'lsa, AND uchburchak yuzini toping.

- A) 11 B) 12 C) 12,5 D) 13 E) 13,25

30. Muntazam beshburchakning bir uchidan o'tkazilgan ikki diagonali orasidagi burchagini aniqlang.

- A) 30° B) 40° C) 36° D) 42° E) 48°

31. Agar $(2x-3)(x+2)=0$ bo'lsa, $2x-3$ qanday qiymatlar qabul qilishi mumkin?

- A) 0 B) -7 va 0 C) 1,5 D) -2 E) 1,5 va -2

32. Funksiyaning eng katta qiymatini toping: $y = \frac{2}{x^2 - 2x + 3}$
 A) 2 B) 2/3 C) 1 D) 5 E) topib bo'lmaydi
33. Ifodani soddalashtiring: $\sqrt{(2 - \sqrt{3})^2} - \sqrt{(1 - \sqrt{2})^2} + 3\sqrt{2}$
 A) $4 + \sqrt{2}$ B) $2 - \sqrt{2}$ C) $1 + \sqrt{2}$ D) $4 - \sqrt{2}$ E) $5\sqrt{2} - 4$
34. Ifodaning eng kichik qiymatini toping: $y = 2 - 5|\sin \alpha|$
 A) 2 B) -3 C) -1 D) -2,5 E) -4
35. Agar $M(-2; -7)$ nuqta $y = ax^2 + 8x + p$ parabolaning uchi bo'lsa, p ning qiymatini toping.
 A) 1 B) 2 C) -1 D) -2 E) -4
36. Hisoblang: $(0,4 \cdot 1,25 - 2,25) : 0,5 - 0,5$
 A) 3 B) -4 C) 5 D) -3,9 E) -3
37. Hisoblang: $\sin 75^\circ \cos 15^\circ - \cos 75^\circ \sin 15^\circ$
 A) $\sqrt{3}/2$ B) 0,5 C) 1 D) 0 E) $\sqrt{2}/2$
38. $|2x - 1| \leq 3$ tengsizlikni eng kichik butun yechimini toping.
 A) -3 B) -2 C) -1 D) 0 E) yechimi yo'q
39. Yuzasi tomonlari 9 va 4 bo'lgan to'g'ri burchakli to'rtburchakka teng bo'lgan kvadratning perimetrini toping.
 A) 36 B) 12 C) 18 D) 24 E) 16
40. Uzunligi 10 sm bo'lgan og'ma tekislik bilan 30° burchak tashkil etadi. Og'maning shu tekislikka proyeksiyasining uzunligini toping.
 A) 5 B) $5\sqrt{3}$ C) $5\sqrt{2}$ D) 6 E) to'g'ri javob yo'q

9-sinf 3-variant

1. $a = \sqrt[3]{2}$, $b = \sqrt[4]{3}$ va $c = \sqrt[6]{5}$ sonlarni kamayish tartibida joylashtiring:
 A) $a > b > c$ B) $b > c > a$ C) $c > a > b$ D) $c > b > a$ E) $b > a > c$
2. $\frac{x-9}{3-x} > 1$ tengsizlikning eng kichik butun yechimini toping.
 A) 4 B) 3 C) 5 D) -2 E) 2
3. Birinchi son 0,7, ikkinchi son 0,14. Birinchi son ikkinchi sondan necha foizga ko'p?
 A) 400 B) 200 C) 100 D) 175 E) 500
4. To'g'ri burchakli trapetsiyaga doira ichki chizilgan. Trapetsiyaning asoslari 15 va 10 bo'lsa, doiraning yuzini toping.
 A) 36π B) 25π C) 24π D) 12π E) 30π

5. $y = -2x^2 + 5x + 9$ funksiya grafigining simmetriya o'qi tenglamasini yozing.

A) $x = 1,25$ B) $y = 2x$ C) $x = 5$ D) $y = 2,5$ E) $y = -2,5x$

6. Soddashtiring: $\frac{2a^{-1}}{a^2 - 3a^{-1}} - \frac{a^2}{a^5 - a^2} - \frac{a^6 - 3a^2 + 4}{a^6 - 4a^3 + 3}$

A) 0 B) 1 C) $(a^3 - 1)/(a^3 + 1)$ D) $a/(a^3 - 3)$ E) -1

7. a ning qanday qiymatlarida $\begin{cases} 4x + y = a \\ x + 3y = 5 \\ 5x - 4y = 1 \end{cases}$ tenglamalar sistemasi

yechimga ega?

A) 3 B) 5 C) 0 D) 1 E) 13

8. Ifodanisoddashtiring: $\frac{z}{z-1} + \frac{1}{\sqrt{z}+1} : \left(\frac{1}{\sqrt{2}-\sqrt{z}} + \frac{\sqrt{2}}{z-\sqrt{2z}} \right)$

A) 0 B) 1 C) $\sqrt{z}/(\sqrt{z}+1)$ D) $\sqrt{z}/(z-1)$ E) $\sqrt{z}/(\sqrt{z}-1)$

9. $f(x) = x^2 + 2(t+2)x - (t+1)^2$ uchun t ning qanday qiymatlarida $f(-1) = -2$ tenglik o'rinli bo'ladi?

A) 2; -6 B) ± 4 C) -2 D) ± 3 E) ± 2

10. Quyidagi sonning raqamlari yig'indini toping:

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A) 497 B) 500 C) 480 D) 450 E) 557

11. $2,8 - 3,19x = 2,8x - 3(2x - 1)$ tenglamaning yechimini toping.

A) 2 B) -2 C) -0,2 D) 20 E) 50

12. Agar $k < -1$ bo'lsa, $y = \frac{k+1}{x}$ funksiyaning grafigi qaysi chorakda yotadi?

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

13. p ning qanday qiymatlarida $x^2 - 2x + p^2 = 0$ tenglama ikkita har xil yechimga ega bo'ladi?

A) $p < 1$ B) $p \leq 0$ C) $0 < p < 1$ D) $-1 < p < 1$ E) $p > 1/2$

14. $y = 4\cos^2 x - 3\sin^2 x$ funksiyaning eng katta qiymatini toping.

A) 7 B) 1 C) 5 D) 4 E) Aniqlash mumkin emas

15. Kopaytuvchilarga ajrating: $2x^2 - 3x + 1 - (x-1)^2$

A) $x(x-1)$ B) $(2x-1)(x+1)$ C) $(x-3)(x+1)$ D) $2x(x-5)$
E) $(x-1)(2+x)$

16. Quyidagi tengsizlikning eng kichik butun yechimini toping:

$(x-1)(x+1) > x^2 + 3x - 4$

A) -1 B) 0 C) -3 D) 1 E) mavjud emas

17. Agar $\alpha = 1000^\circ$ bo'lsa, $a = \cos \alpha$ va $b = \sin \alpha$ sonlarning ishorasi qanday?

A) $a > 0, b > 0$ B) $a > 0, b < 0$ C) $a < 0, b > 0$ D) $a < 0, b < 0$

E) aniqlash mumkin emas

18. Tomoni 3 m bo'lgan kvadratning diagonalini ikkinchi kvadratning tomoniga teng. Ikkinchi kvadratning diagonalini toping.

A) $3\sqrt{2}$ B) 7 C) 5 D) 4 E) 6

19. Tomonlari 1, $\sqrt{5}$ va 2 ga teng uchburchakka tashqi chizilgan doiraning yuzini toping.

A) $\pi\sqrt{5}$ B) $2,5\pi$ C) $1,25\pi$ D) 5π E) 4π

20. Bir nuqtadan tekislikka uzunligi 12 sm bo'lgan perpendikulyar va uzunligi tekislikka proyeksiyasidan 8 sm katta bo'lgan og'ma tushirilgan. Og'maning uzunligini toping.

A) 13 B) 15 C) 20 D) 24 E) 25

21. Hisoblang: $\frac{488 \cdot 475 - 462}{244 + 475 \cdot 243}$

A) 3 B) 1 C) $1/2$ D) 2 E) 1,5

22. $x(1+y)-y(xy-1) - x^2y$ ifodani p va q orqali ifodalang,

bunda $x+y=-p, xy=q$

A) $pq+q-p$ B) $p-q+pq$ C) $p+q-pq$ D) $p+q+qp$ E) $-p-q-pq$

23. Tenglamani yeching: $\frac{x}{3} + \frac{x}{15} + \frac{x}{35} + \frac{x}{63} + \frac{x}{99} + \frac{x}{143} = 12$

A) 26 B) 13 C) 18 D) 16 E) 24

24. k ning qanday eng katta butun qiymatida $kx^2+2(k-12)x+2=0$ tenglama xaqiqiy ildizlarga ega emas?

A) 16 B) 18 C) 20 D) 17 E) 21

25. $y = \sqrt{\frac{x(x+1)}{(x-2)(4-x)}}$ funksiyaning aniqlanish sohasini toping

A) $[-1;0] \cup (2;4)$ B) $[-1;0] \cup [2;4]$ C) $(-1;0] \cup [2,4)$

D) $(-\infty;-1) \cup (0;2) \cup (4;+\infty)$ E) $(-\infty;-1] \cup [0;2) \cup (4;+\infty)$

26. Agar $9 \leq x \leq y \leq z \leq 81$ bo'lsa, $x/y+z/t$ ning eng kichik qiymatini toping.

A) $2/3$ B) $3/2$ C) $1/5$ D) $1/3$ E) aniqlash mumkin emas

27. $\sqrt{|x|-2} < 2|x|/x$ tengsizlik nechta butun yechimga ega?

A) 6 B) 5 C) 3 D) 4 E) 7

28. Asosining uzunligi 1 ga va yon tomonlari 2 ga teng bo'lgan tengyonli uchburchakning asosidagi uchidan mediana va bissektrisa o'tkazilgan.

Mediana va bissektrisa tutashgan nuqtadan yon tomonigacha bo'lgan masofani toping.

- A) 1/2 B) 1/3 C) 1/4 D) 1/5 E) 1/6

29. Diagonallarining uzunligi 16 va 12 ga teng bo'lgan parallelogramlardan yuzi eng katta bo'ganini perimetrini toping.

- A) 28 B) 32 C) 64 D) 48 E) 14

30. Ikki doiraning umumiy vatari 60° va 120° li yo'ylar ajratadi. Kichik doira yuzini katta doira yuziga nisbatini toping.

- A) 1:2 B) 1:3 C) 1:4 D) 2:3 E) 2:5

31. Agar $f(x) = \left(\frac{4}{x} + 7\right)\left(1 + \frac{1}{x}\right)$ bo'lsa, $f(-1/2)$ ni toping.

- A) -1 B) 1 C) 1,5 D) -2 E) 4

32. Tenglamani yeching: $|3-x|=x-3$

- A) $x=3$ B) $x=3$ C) $x=3$ D) \emptyset E) x -ixtiyoriy

33. Tenglamani yeching: $\sqrt{x+5} = x-1$

- A) -1 va 4 B) 4 C) -1 D) 3 E) ildizi yo'q

34. Ifodani soddalashtiring: $\sin^4\alpha - \cos^4\alpha + \cos^2\alpha$

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

35. a ning qanday qiymatlarida $\begin{cases} 4x + 3y = 12 \\ 2x + ay = 7 \end{cases}$ sistema yechimga ega emas.

- A) $a=-1,5$ B) $a=1,5$ C) $a=3$ D) $a=-6$ E) $a=-3$

36. Qanday sonning 8% i 144 dan ikki marta kichik?

- A) 3600 B) 1450 C) 800 D) 900 E) 1200

37. a ning nechta butun qiymatida $\frac{a^2 - a + 3}{a + 1}$ kasr butun son bo'ladi?

- A) 3 B) 2 C) 4 D) 5 E) 1

38. Agar $\angle A=60^\circ$, $BD=10,5$ cm bo'lsa, ABCD rombning perimetrini toping. A) 30 B) 36 C) 40 D) 42 E) 44

39. Parallelogramning yuzi 144 sm^2 , balandliklari 8 va 12 sm bo'lsa, perimetrini toping.

- A) 40 B) 30 C) 80 D) 60 E) 120

40. To'g'ri burchakli uchburchakning gipotenuzasi 25 sm, katetlari esa 3:4 nisbatda bo'lsa, kichik katetning gipotenuzaga proyeksiyasini toping.

- A) 10 B) 9 C) 8 D) 12,5 E) to'g'ri javob yo'q

9-sinf
4-variant

1. $y=2\sqrt{x}$ va $y=\sqrt[3]{6x}$ funksiyalar grafiklarining kesishish nuqtalaridan o'tuvchi to'g'ri chiziq tenglamasini toping.

A) $y=4,5x$ B) $y = \frac{8}{3}x$ C) $y=12x$ D) $y=24x$ E) $y=18x$

2. 1, b_2 , b_3 , ..., b_8 , 6561 sonlari geometrik progressiyani tashkil etadi. b_3 ni toping.

A) 9 B) 27 C) 81 D) 64 E) 54

3. $2001^{2004} + 2002^{2005}$ yig'indini oxirgi raqamini toping.

A) 3 B) 5 C) 7 D) 9 E) 1

4. Rombning diagonallari 10 va 24. Rombga ichki chizilgan doiraning yuzini romb yuziga nisbatini toping.

A) $30\pi:169$ B) $35\pi:120$ C) $36\pi:120$ D) $25\pi:120$ E) $49\pi:120$

5. Tengsizliklar sistemasini teching:
$$\begin{cases} |2x - 6| \leq 2 \\ 10 - 0,4x > 0 \end{cases}$$

A) $[2;4]$ B) $(-\infty;4)$ C) $(-\infty;2] \cup [4; \infty)$ D) $(-\infty;4]$ E) $(-\infty;25)$

6. $2, 2^2, 2^3, \dots, 2^9$ sonlarning o'rta geometrigini toping.

A) 16 B) 32 C) 64 D) 128 E) 1

7. $(2a+3b)(2a+3b+2)-(2a-3b)(2a-3b-2)$ ifodani ko'paytuvchilarga ajrating.

A) $2a(3b+1)$ B) $8a(3b+1)$ C) $4a(3b+1)$ D) $8b(2a+1)$
E) $4b(2a+1)$

8. Ifodaning eng kichik qiymatini ko'rsating: $(3a^2+27)/a$, $a>0$

A) 30 B) 27 C) 3 D) 18 E) 12

9. Agar $x=8$, $y=2\sqrt{2}$ bo'lsa,

$$\frac{x+y}{\sqrt[3]{x^2} - \sqrt[3]{xy} + \sqrt[3]{y^2}} \cdot (x^{1/3} - y^{1/3}) \cdot \frac{x-y}{x^{2/3} + \sqrt[3]{xy} + y^{2/3}} \cdot (x^{1/3} + y^{1/3})$$

ifodaning qiymatini toping.

A) 6 B) 8 C) 9 D) 4 E) 5

10. Hisoblang: $(5\frac{2}{3} \cdot 0, (72) + 0, (27) : 3 / 47) \cdot 4\frac{1}{7}$

A) 23 B) 24 C) 16 D) 17 E) 27

11. 21 dan kichik ikki honali natural sonlar yig'indisini toping.

A) 155 B) 165 C) 150 D) 160 E) 161

12. $(x+2)^2 = -3/x$ tenglama nechta yechimga ega?

A) 1 B) 2 C) 3 D) 4 E) yechimi yo'q

13. Ifodani soddalashtiring: $\frac{3-\sqrt{5}}{3+\sqrt{5}} + \frac{3+\sqrt{5}}{3-\sqrt{5}}$
 A) 14 B) 6 C) 7 D) $2\sqrt{5}$ E) 5,5
14. Ifodani soddalashtiring: $\frac{\cos \alpha}{1-\sin \alpha} - \frac{\cos \alpha}{1+\sin \alpha}$
 A) $1/\cos^2 \alpha$ B) $\operatorname{tg} \alpha$ C) $2/\operatorname{ctg} \alpha$ D) $2\operatorname{ctg} \alpha$ E) To'g'ri javob yo'q
15. Ifodaning eng katta qiymatini toping: $\sin(x+\pi/4) - \sin(x-\pi/4)$
 A) 2 B) 1 C) $\sqrt{2}$ D) $\sqrt{2}/2$ E) 1/2
16. $\sqrt{x} > \sqrt{x-2}$ tengsizlikni yeching.
 A) $x < 0$ B) $x > 0$ C) $x = 0$ D) $x > 2$ E) to'g'ri javob yo'q
17. t ning qanday qiymatlarida $x^2 - tx + 9 = 0$ tenglama yechimga ega emas?
 A) $-3 < t < 3$ B) $-3 < t < 0$ C) $-9 < t < 0$ D) $-6 < t < 6$ E) $0 < t < 6$
18. To'g'ri burchakli teng yoqli uchburchakning gipotenuzasi $5\sqrt{2}$ ga teng. Uchburchakning yuzini toping.
 A) $10\sqrt{2}$ B) 12,5 C) 10,5 D) $5\sqrt{2}/2$ E) 25
19. Uchburchakning tomonlari 3 cm, 5 cm va 6 cm. Katta tomoniga tushirilgan mediananing uzunligini toping.
 A) 3 B) $2\sqrt{2}$ C) $\sqrt{6}$ D) 2 E) 4
20. Muntazam sakkizburchakning ichki burchagining tangensi nechga teng?
 A) $\sqrt{3}$ B) $-\sqrt{3}$ C) 1 D) -1 E) $1/\sqrt{3}$
21. Hisoblang: $\frac{1}{15} + \frac{1}{35} + \frac{1}{63} + \frac{1}{99} + \dots + \frac{1}{255}$
 A) 7/51 B) 5/15 C) 2/25 D) 3/35 E) 7/40
22. Yig'indini hisoblang: $\sqrt{23-8\sqrt{7}} + \sqrt{23+8\sqrt{7}}$
 A) 7 B) 6 C) 8 D) 9 E) 5
23. Tenglamani yeching: $\frac{0, (3) + 0, (16)}{0, (319) + 1, (680)} \cdot x = 8^{0, (6)}$
 A) 4 B) 32 C) 2 D) 1 E) 16
24. t ning qanday qiymatlarida $x^2 + (t-2)x + 1/4 = 0$ tenglamaning ikkala ildizi ham manfiy?
 A) $t < 2$ B) $t < 1$ C) $t > 2$ D) $t \leq -1$ E) $t > 3$
25. $\frac{(x^2 + x + 1)(x^2 + 2x - 3)}{x^2 + 3x + 2} \leq 0$ tengsizlik nechta butun yechimga ega?

- A) 5 B) 4 C) 3 D) cheksiz ko'p E) 2
26. $|(x-6)^3+28|=36$ tenglama ildizlarining yig'indisini toping
A) -2 B) 6 C) -6 D) 10 E) -10
27. $(x+2)(x^2+10x+25)\sqrt{49-x^2} \leq 0$ tengsizlikni qanoatlantiruvchi barcha butun sonlar yig'indisini toping.
A) 25 B) 13 C) 20 D) 28 E) 21
28. ABC to'g'ri burchakli uchburchakning katetlar 8 va 10. C to'g'ri burchagi uchidan CE mediana va CD bissektrisa o'tkazilgan. CDE uchburchak yuzini hisoblang.
A) $2\frac{2}{9}$ B) $2\frac{2}{7}$ C) $2\frac{3}{8}$ D) $3\frac{2}{5}$ E) 6
29. ABCD trapetsiyaning asoslari BC va AD ga teng bo'lib, uning dioganallari O nuqtada kesishadi. Agar, BO=2, DO=4 va BOC uchburchakning yuzi 6 ga teng bo'lsa, trapetsiya yuzini toping.
A) 42 B) 48 C) 52 D) 54 E) 60
30. Radiusi $\sqrt{2}$ teng bo'lgan ikki doira umumiy vatarini uzunligi 2 ga teng. Bu doiralarning umumiy qismining yuzini toping.
A) $\pi-1$ B) $\frac{\pi}{2}-1$ C) $\pi-2$ D) $\frac{\pi}{2}-\frac{1}{2}$ E) $\frac{\pi-3}{2}$
31. $k < 0$ bo'lsa, $y=kx+3$ funktsiya grafigi qaysi choraklardan o'tadi?
A) 1;2 va 3 B) 1;2 va 4 C) 1 va 4 D) 2;3 va 4 E) 2 va 4
32. Tenglamaning eng katta va eng kichik ildizlari yig'indisining yarmini toping $x^2-4-|x|+3=0$
A) $3/2$ B) 2 C) 0 D) 1 E) $2,5$
33. Hisoblang: $1-2+3-4+5-\dots-198+199-200$
A) -50 B) -60 C) -100 D) -98 E) -101
34. $\alpha=255^\circ$ burchakning radian o'lchovini toping.
A) $7\pi/5$ B) $17\pi/12$ C) $11\pi/8$ D) $13\pi/9$ E) $19\pi/15$
35. Tengsizlikni yeching: $1 < 1-2x \leq 3$
A) $0 \leq x < 1$ B) $0 < x \leq 1$ C) $-1 \leq x < 0$ D) $0 < x \leq 2$ E) $-2 \leq x < 0$
36. Proporsiyali tenglamani yeching: $2\frac{4}{5} : x = 1\frac{2}{3} : 2\frac{6}{7}$
A) 4,8 B) 3,25 C) 4,4 D) $33/7$ E) $32/7$
37. a ning qanday qiymatlarida $(x-1)(2x-1)=2x^2-ax+1$ tenglama ayniyatga aylanadi?
A) 2 B) -3 C) 3 D) -2 E) -1

38. Tomonlari 1, $\sqrt{10}$ va 3 ga teng uchburchakka tashqi chizilgan doiraning yuzini toping.

A) 5π B) $2,5\pi$ C) 4π D) $3,5\pi$ E) 9π

39. Asoslari 7 va 13, o'tmas burchagi 135° bo'lgan teng yonli trapetsiyaning yuzini toping.

A) 60 B) 30 C) $10\sqrt{3}$ D) 120 E) 136,5

40. Muntazam uchburchakning balandligi 12. Uchburchakka ichki chizilgan aylananing radiusini toping.

A) 3 B) 4 C) 5 D) 6 E) $2\sqrt{3}$

9-sinf 5-variant

1. $\frac{a^{4/3} + 8a^{1/3}}{a^{2/3} - 2a^{1/3} + 4} : (\sqrt[3]{a} + 2) + 4$ ifodaning qiymatini $a=64$ da hisoblang.

A) 9 B) 6 C) 12 D) 15 E) 8

2. a ning qanday qiymatlarida $x^2 + ax + (a-2)$ kvadrat uchhad ildizlari $x_1^2 + x_2^2 = 3$ shartni qanoatlantiradi?

A) 1 B) 3 C) 0 D) 5 E) 4

3. Agar $25x^2 + 16y^2 + 9z^2 + 3 = 10x + 8y + 6z$ bo'lsa, $x+y+z$ ga teskari sonni toping.

A) 60/47 B) 47/60 C) -60/47 D) -60/47 E) 1

4. Teng yonli trapetsiyada yon tomon va katta asos b ga, kichik burchak esa α ga teng. Trapetsiyaning yuzini toping.

A) $2b^2 \sin \alpha$ B) $b^2 \sin 2\alpha$ C) $b^2 \sin \alpha / 2$ D) $2b^2 \sin \alpha \sin(\alpha/2)$
E) $2b^2 \sin \alpha \cos^2(\alpha/2)$

5. $a(2;4)$ va $b(3;-5)$ vektorlarga yasalgan uchburchakning yuzini toping.

A) 11 B) 14 C) 26 D) 13 E) 14

6. Uchburchakning ikkita burchagi yig'indisi 72° . Uchburchakning o'tkir burchagi bissektrisalari kesishishidan hosil bo'lgan o'tkir burchakni toping.

A) 144° B) 90° C) 72° D) 54° E) 36°

7. Hisoblang: $\frac{(\sqrt{3}/\sqrt{2})^2 \cdot (2,25)^{-2}}{(1,125)^{-2} \cdot 0,5} - \frac{1}{2}$

A) 1/8 B) 1/4 C) 0,5625 D) 0,5 E) 1

8. $y = \sqrt{(|x|-3)/(x^2-9)}$ funksiyaning aniqlanish sohasini toping.

A) $(-\infty; -3] \cup [3; \infty)$ B) $(-\infty; -3) \cup (-3; 3) \cup (3; \infty)$

C) $(-\infty; \infty)$ D) $(-\infty; -3)$ E) $(-3; 3)$

9. $x^2 + 3ax + 2a = 0$ tenglamaning bir ildizi -1 ga teng. Ikkinchi ildizni toping.

A) 1 B) 2 C) 3 D) -3 E) -2

10. A(1;2) nuqtadan $8x - 6y + 5 = 0$ to'g'ri chiziqqacha bo'lgan masofani toping.

A) 0,1 B) 0,6 C) 8 D) 10 E) 0,5

11. $y = 2x^2 + 4x - 7$ funksiyaning eng kichik qiymatini toping.

A) -1 B) -9 C) -7 D) -11 E) $-4,5$

12. Agar $4x - y = -2$ va $3x - 2y = 1$ bo'lsa, $x - y$ ko'paytmani toping.

A) -3 B) -2 C) 4 D) 2 E) -6

13. 150 dan oshmaydigan 7 ga karrali barcha natural sonlar yig'indisini toping

A) 1610 B) 1421 C) 1594 D) 1617 E) 1631

14. Ifodani soddalashtiring: $\cos(\pi - \alpha)\cos(2\pi - \alpha) + \cos^2\alpha$

A) $2\cos^2\alpha$ B) 1 C) $\cos 2\alpha$ D) $0,5\sin 2\alpha$ E) 0

15. $y = \sqrt{4 - x^2} + 2\sqrt{-x}$ funksiyaning aniqlanish sohasini toping.

A) $(-\infty; 2)$ B) $[-2; 0]$ C) $(-2; 2)$ D) $(-\infty; -2]$ E) \emptyset

16. Quyidagi sonlarni o'sish tartibida joylashtiring:

$a = \cos(\pi/8)$; $b = \cos(\pi/9)$; $c = \cos(\pi/7)$

A) $c < a < b$ B) $c < b < a$ C) $b < a < c$ D) $b < c < a$ E) $a < b < c$

17. Tenglamani yeching: $\sin\left(2x - \frac{\pi}{2}\right) = 0$

A) $\frac{\pi}{2} + \frac{\pi n}{3}$, $n \in \mathbb{N}$ B) $3\pi n$, $n \in \mathbb{N}$ C) $\frac{\pi}{4} + \frac{\pi n}{2}$, $n \in \mathbb{N}$

D) $\pi n/3$, $n \in \mathbb{N}$ E) $\pi n/6$, $n \in \mathbb{N}$

18. Tomonlari 32 va 24 bo'lgan to'g'ri burchakli to'rtburchakka aylana ichki chizilgan. Aylana uzunligini toping.

A) 20π B) 32π C) 40π D) 48π E) 80π

19. To'g'ri burchakli trapetsiyaning asoslari 6 va 12, katta yon tomoni esa 10 ga teng. Trapetsiyaning yuzini toping.

A) 90 B) 72 C) 45 D) 36 E) 180

20. ABC uchburchakda $AB = BC = 10$, $AC = 12$. $\cos A = ?$

A) $4/5$ B) $5/6$ C) $3/5$ D) $3/4$ E) $5/12$

21. Hisoblang: $\frac{1}{2 \cdot 5} + \frac{1}{5 \cdot 8} + \frac{1}{8 \cdot 11} + \frac{1}{11 \cdot 14} + \frac{1}{14 \cdot 17}$

A) $15/34$ B) $5/17$ C) $5/34$ D) $16/173$ E) $15/136$

22. Soddalashtiring:

$$\sqrt{2+\sqrt{3}}\sqrt{2+\sqrt{2+\sqrt{3}}}\sqrt{2+\sqrt{2+\sqrt{2+\sqrt{3}}}}\sqrt{2-\sqrt{2+\sqrt{2+\sqrt{3}}}}$$

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

23. Agar $a-3b$ va $3, 3b-a$ va 4 sonlar berilgan tartibda proporsiya tashkil qilsa, $(a^2-b^2)/(ab)$ ni hisoblang.

A) $8/3$ B) $7/3$ C) $6/5$ D) $9/5$ E) 2

24. a ning qanday qiymatida $x^2+ax+a-2=0$ tenglama ildizlari kvadratlarining yig'indisi eng kichik qiymat qabul qiladi?

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

25. k ning qanday qiymatlarida $\frac{3x+1}{x+1} = k - 2$ tenglama manfiy ildizga ega ?

A) (3;5) B) $(-\infty;3) \cup (5; \infty)$ C) (2;4) D) (1;3) E) $(-\infty;1) \cup (3; \infty)$

26. $|x-4| > |x+4|$ tengsizlikni yeching

A) (-4;4) B) $(0;4) \cup (4;+\infty)$ C) $(-4;+\infty)$ D) $(-\infty;-4) \cup (-4;0)$ E) $(-\infty;0)$

27. N ta sonning o'rta arifmetigi 13 ga teng, boshqa M ta sonning o'rta arifmetigi 28 ga teng bo'lsa, $M+N$ ning o'rta arifmetigi nimaga teng?

A) N/M B) $(M+N)/N$ C) $(13N+28M)/(M+N)$
D) $(13M+28N)/(M+N)$ E) $(13N+28M)/(M-N)$

28. To'g'riburchakli uchburchakning gipotenuzasi $5\sqrt{2}$ ga teng. Bunday uchburchak qanday eng katta yuzaga ega bo'lishi mumkin?

A) 25 B) 20 C) 16,5 D) 15,5 E) 12,5

29. Teng yonli trapetsiyaning diagonallari o'zaro perpendikulyar. Agar trapetsiyaning o'rta chizig'i 6 ga teng bo'lsa, uning yuzini toping.

A) 36 B) 32 C) 49 D) 40 E) 25

30. To'g'riburchakli uchburchak tomonlari 6, 8, 10 ga teng. Uchburchakka tashqi va ichki chizilgan aylanalarning markazlari orasidagi masofani toping.

A) $\sqrt{5}$ B) $\sqrt{3}$ C) $\sqrt{2}$ D) $\sqrt{6}$ E) 4

31. Quyidagi funksiyalarning grafigi qaysi chorakda kesishadi:

$y=x-2$ va $y=2x+1$?

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

32. Ikkita butun sonning yig'indisi -5, ko'paytmasi esa 6 ga teng. Shu sonlarning klichigini toping.

A) -6 B) -5 C) -3 D) -2 E) -1

33. Tenglama ildizlarining ko'paytmasini toping: $(4-x^2) \cdot \sqrt{1-x} = 0$

A) -4 B) 2 C) 4 D) -2 E) 8

34. Hisoblang: $4\cos 45^\circ \operatorname{ctg} 60^\circ \operatorname{tg} 60^\circ - 3\sin 45^\circ$

A) 0,5 B) $\sqrt{2}/2$ C) 1 D) $\sqrt{3}$ E) $\sqrt{3}/2$

35. a ning qanday qiymatlarida $(a-2)x^2 - 2ax + 2a - 3 = 0$ tenglama bitta ildizga ega bo'ladi?

A) 2 B) 0 C) 1 va 6 D) -6; 1 va 2 E) 1; 2 va 6

36. c ning qanday qiymatlarida $x^2 - 4x + c = 0$ tenglama haqiqiy yechimga ega?

A) $c > 4$ B) $c \leq 4$ C) $-2 \leq c \leq 2$ D) $c < 4$ E) $c = 2$

37. Hisoblang: $\sin^4(13\pi/12)\cos^4(23\pi/12)$

A) -0,5 B) $-\sqrt{2}/2$ C) $-\sqrt{3}/2$ D) -1 E) to'g'ri javob yo'q

38. $a(-3;2)$ va $b(4;k)$ vektorlar berilgan. k ning qanday qiymatlarida bu vektorlar perpendikulyar bo'ladi?

A) 2 B) 0 C) 1 D) 6 E) 3

39. Rombning perimetri 40 sm, o'tmas burchagi 150° bo'lsa, rombgacha ichki chizilgan doiraning yuzini toping.

A) 25π B) $6,25\pi$ C) 10π D) 9π E) to'g'ri javob yo'q

40. Oltiburchakda hammasi bo'lib nechta diagonal o'tkazish mumkin?

A) 9 B) 5 C) 6 D) 7 E) 8

10-sinf

1-variant

1. $|x| + |y| < 100$ tengsizlik nechta har xil butun yechimga ega bo'ladi?

A) 19801 B) 1000 C) 9000 D) 200 E) 19900

2. $a = \sin 1$ va $b = \log_3 \sqrt{7}$ sonlarni taqqoslang.

A) $a = b$ B) $a > b$ C) $a = b + 1$ D) $a < b$ E) taqqoslab bo'lmaydi

3. Hisoblang: $\frac{1}{2 \sin 10^\circ} - 2 \sin 70^\circ$

A) 1 B) 1/2 C) 1/4 D) 1,5 E) 1/3

4. Hisoblang: $\arcsin \frac{5}{13} + \operatorname{arctg} \frac{2}{3}$

A) $\pi/4$ B) $\pi/3$ C) $\pi/6$ D) $\pi/8$ E) $\pi/2$

5. $f(x) = \frac{-6x - 5 - x^2}{\ln(x - 2)}$ funksiyaning aniqlanish sohasini toping.

A) [1;5] B) (2;5] C) (1;2) D) (2;3) U (3;5] E) (-oo;1)

6. $y = (e-1)^{\log_{e-1}(16-x^2)}$ funksiyaning grafigi qaysi choraklarda joylashgan.

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

7. a ning qanday qiymatlarida $y_1 = x^2 - 4x + 3a$ parabola $y_2 = x^2 - 4x - a^2$ parabolaning ichida yotadi?

A) (-oo; -3) U (0; oo) B) (-3; 0) C) [0; 3] D) [-3; 4] E) (0; 3]

8. Soddashtiring: $\frac{\ln(14 + 6\sqrt{5})}{\ln(3 + \sqrt{5})}$

A) 2/3 B) 2 C) 1/3 D) 1 E) 3

9. $a^2 - b^2 = 23$ tenglikni qanoatlantiruvchi nechta $(a;b)$ butun sonlar juftligi bor?

A) 1 B) 2 C) 4 D) \emptyset E) 3

10. $|x^2 - 4x + 1| = x$ tenglama nechta ildizga ega?

A) 0 B) 2 C) 1 D) 3 E) 4

11. $x^2 - \frac{\sqrt{85}}{4}x + 1\frac{5}{16} = 0$ tenglamaning katta va kichik ildizlari kublarining ayirmasini toping.

A) -2 B) -1 C) 2 D) 1 E) $1/2 (\sqrt{85} - 6)$

12. k ning qanday qiymatida
$$\begin{cases} 3x + (k-1)y = k+1 \\ (k+1)x + y = 3 \end{cases}$$

tenglamalar sistemasi cheksiz ko'p yechimga ega bo'ladi?

- A) -1 B) -2 C) 0 D) 2 E) 1

13. $x(x^2 + 4x + 4)\sqrt{25 - x^2} \geq 0$ tengsizlikni butun yechimlari yig'indisini toping.

- A) 15 B) 10 C) 8 D) 12 E) 0

14. N ta sonning o'rta arifmetigi 13 ga teng, boshqa M ta sonning o'rta arifmetigi 28 ga teng bo'lsa, $M + N$ ning o'rta arifmetigi nimaga teng?

- A) N/M B) $(M + N)/41$ C) $(13N + 28M)/(M + N)$
D) $(13M + 28N)/(M + N)$ E) $(13N + 28M)/(MN)$

15. Soddashtiring: $\sin^2\alpha + \sin^2\beta - \sin^2\alpha\sin^2\beta + \cos^2\alpha\cos^2\beta$

- A) 1 B) 0 C) -1 D) -2 E) 2

16. $\sin^4 15^\circ + \cos^4 15^\circ$ yig'indini toping.

- A) 5/6 B) 2/3 C) 7/8 D) 5/7 E) 2/7

17. $\cos^2 5^\circ + \cos^2 1^\circ - \cos 6^\circ - \cos 4^\circ$ ni soddashtiring.

- A) 0 B) $\frac{1}{2}$ C) $-\frac{3}{2}$ D) 1,5 E) 1

18. ABC to'g'ri burchakli uchburchakda AB - gipotenuza, AM va AN lar o'tkir burchaklarining bissektrisalari. Agar $AB = 12$, $AM^2 + BN^2 = 169$ bo'lsa, MN ning uzunligini toping.

- A) 5 B) 2,5 C) -28 D) 6 E) 4

19. Uchburchak ichida yotgan M nuqtadan uchburchak tomonlariga parallel to'g'ri chiziqlar o'tkazilgan, natijada umumiy uchga ega bo'lgan uchta uchburchak hosil bo'ladi. Agar ularning yuzlari 3; 12; 27 ga teng bo'lsa, berilgan uchburchakning yuzi nimaga teng?

- A) 84 B) 72 C) 108 D) 144 E) 96

20. Rombning perimetri 52 ga teng bo'lib, diagonallari uzunliklarining yig'indisi 34 ga teng. Romb yuzini toping.

- A) 30 B) 128 C) 32 D) 120 E) 24

21. Ikki parallel tekisliklarni birlashtiruvchi kesmalarning uzunliklari 2:3 nisbatda. Bu kesmalarning tekisliklar bilan hosil qilgan burchaklarining nisbati 2 ga teng bo'lsa, katta burchakning kosinusini toping.

- A) $-\frac{3}{2}$ B) $\frac{5}{7}$ C) $\frac{1}{3}$ D) $-\frac{2}{2}$ E) $\frac{1}{8}$

22. Quyidagi sistema nechta yechimga ega:
$$\begin{cases} x^2 + y^2 = 25 \\ x - y = 5 \end{cases}$$

- A) 4 B) 3 C) 2 D) 1 E) 23

23. $y = 5^{1-\sin x} - 2$ funksiyaning eng kichik qiymatini toping.
A) 4 B) 3 C) -1 D) -2 E) mavjud emas
24. a ning shunday qiymatlari yig'indisini topingki, unda $(a-2)x^2 - 2ax + 2a - 3 = 0$ tenglama bitta ildizga ega bo'lsin.
A) 7 B) 5 C) 9 D) 10 E) -3
25. Quyidagi tenglama nechta ildizga ega:
 $\sqrt{3x^2 + 6x + 7} + \sqrt{5x^2 + 10x + 14} = 4 - 2x - x^2$
A) 4 B) 2 C) 2 D) 1 E) \emptyset
26. Tengsizlikni yeching: $|x - 5| \leq |x + 5|$.
A) $(-\infty; 5)$ B) $(0; 5]$ C) $[-5; 5]$ D) $[0; \infty)$ E) $(-\infty; \infty)$
27. x ni 6 ga bo'linganda 3 qoldiq qoldi. $3x$ ni 6 bo'linganda necha qoldiq qoladi?
A) 0 B) 1 C) 2 D) 3 E) 4
28. Ikki toq sonning yig'indisi 5 ga qoldiqsiz bo'linadi. Bu sonlarning kublari qanday raqam bilan tugaydi?
A) 8 B) 6 C) 5 D) 4 E) 0
29. To'rtburchakning burchaklari orasidagi nisbat 2:3:3:4 bo'lsa, uning eng katta burchagini toping.
A) 100° B) 120° C) 135° D) 150° E) 160°
30. To'g'ri burchakli uchburchakning katetlari 30 va 40. Gipotenuzaga tushirilga medianani toping.
A) 15 B) 18 C) 20 D) 25 E) 35
31. Agar α -yettiburchakning ichki burchaklari yig'indisi bo'lsa, $\cos \alpha$ ni hisoblang.
A) 0 B) 1 C) -1 D) $-2/2$ E) $-1/2$
32. Quyidagi tenglamaning ildizlari o'rta arifmetigini toping: $8x - 2x^2 - x^3 = 0$
A) -1 B) 1 C) $2/3$ D) $-2/3$ E) 4
33. Agar $2\cos = -3\sin = 0$ bo'lsa, $\cos 2 =$ ni toping.
A) $4/9$ B) $5/16$ C) $5/13$ D) $9/16$ E) to'g'ri javob yo'q
34. $|x-2| \leq 5$ tengsizlikni barcha butun yechimlari yig'indisini toping.
A) 20 B) 18 C) 22 D) 24 E) to'g'ri javob yo'q
35. x ning qanday qiymatlarida $y = 4x - x^2$ funksiya kamayadi?
A) $[0; 2]$ B) $[2; +\infty)$ C) $(-\infty; -2]$ D) $[0; 4]$ E) $[4; +\infty)$
36. Hisoblang: $60^2 - 59^2 + 58^2 - 57^2 + \dots + 2^2 - 1^2$.
A) 1850 B) 980 C) 1230 D) 1830 E) 2460
37. $\log_{x+1}(x^2 + x - 6)^2 = 4$ tenglamaning nechta ildizi bor?
A) 4 B) 3 C) 2 D) 1 E) birorta ham yo'q
38. Quyidagi tenglamaning ildizlari ko'paytmasini toping:

$$4^{x^2+2} - 9 \cdot 2^{x^2+2} + 8 = 0$$

- A) 1 B) -1 C) 2 D) -2 E) 4

39. Muntazam to'rtburchakli piramidaning balandligi 7 ga, asos tomoni 8 ga teng. Piramida yon qirrasini toping.

- A) -65 B) 9 C) 12 D) 13 E) 15

40. Aylananing markazi 6 ga teng. Aylana nuqtasidan diametrga tushirilgan perpendikulyar diametрни 1:3 nisbatda bo'ladi. Perpendikulyar uzunligini toping.

- A) 3-3 B) 3-2 C) 4 D) 3,6 E) 4,2

10-sinf

2-variant

1. Teng yonli trapetsiyaning diagonali uni ikkita teng yonli uchburchakka bo'ladi. Trapetsiya burchaklarini toping.

- A) $72^\circ, 108^\circ$ B) $45^\circ, 135^\circ$ C) $80^\circ, 100^\circ$ D) $82^\circ, 98^\circ$ E) $60^\circ, 120^\circ$

2. x ning qanday qiymatlarida $\frac{\sin x + \operatorname{tg} x}{\cos x + \operatorname{ctg} x}$ ifodaning ishorasi musbat

bo'ladi?

- A) $\pi/2 + \pi k, \pi k, k \in \mathbb{Z}$ B) $(-\infty; \infty)$ C) $(0; \infty)$ D) $(-\infty; 0)$ E) $\pi k, k \in \mathbb{Z}$

3. ABC muntazam uchburchakning ichidan ixtiyoriy D nuqta olinib, undan BC, CA va AB tomonlarga mos ravishda PD, PE va PF perpendikulyar tushurilgan.

$\frac{PD + PE + DF}{BD + CE + AF}$ ni hisoblang.

- A) $1: \sqrt{3}$ B) 1:1 C) 1:2 D) 2:1 E) $\sqrt{3} : 1$

4. a ning qanday qiymatlarida $-3 < \frac{x^2 + ax - 2}{x^2 - x + 2} < 2$ tengsizlik x ning

barcha qiymatlarida o'rinli bo'ladi?

- A) $-1 < a < 2$ B) $-3 < a < 2$ C) $-2 < a < 1$ D) $a > 0$ E) $a < 0$

5. ABCD to'g'ri to'rtburchakda AD = 12, CD = 9. D-diagonallar kesishish

nuqtasi. $\left| \vec{CD} - \vec{AD} - \vec{OA} + \vec{OB} \right|$ ni toping.

- A) 9 B) 4,5 C) 6 D) 15 E) 12

6. Hisoblang: $5,468^2 + 10,64 - 4,532^2$

- A) 15 B) 18 C) 20 D) 25 E) 16

7. Tengsizlikni yeching: $(x - 1) - 14 + 5x - x^2 = 0$

- A) $[1; 7] \cup -2$ B) $[-2; 7]$ C) $[-2; 1) \cup (1; 7]$ D) $[1; +\infty)$ E) $(-\infty; 1]$

8. $\begin{cases} y = -11 - x^2 \\ y = x - 4 \end{cases}$ tenglamalar sistemasi nechta yechimga ega?
A) \emptyset B) 1 C) 2 D) 3 E) 4
9. n ning nechta natural qiymatlarida $\frac{n^2 - 3n + 4}{n - 1}$ ifodaning qiymati butun son bo'ladi?
A) 4 B) 1 C) 2 D) 3 E) 5
10. $\text{tg}\alpha = -3 - 2$ shartni qanoatlantiruvchi o'tmas burchakni toping.
A) 165° B) 150° C) 135° D) 120° E) $157,5^\circ$
11. Agar y_1 va y_2 sonlari $y^2 - by - b - 1 = 0$ tenglamaning ildizlari bo'lsa, b ning qanday qiymatida $y_1^2 + y_2^2$ ning qiymati eng kichik bo'ladi?
A) 1,2 B) 0,85 C) 1 D) 1,5 E) 2
12. $y = \sqrt{\frac{(x-2)(4-x)}{x(x+1)}}$ funksiyaning aniqlanish sohasini toping.
A) $(-1; 0) \cup [2; 4]$ B) $[-1; 0] \cup (2; 4)$ C) $(-1; 4] \cup [2; 4)$
D) $(-\infty, -1) \cup [0; 2] \cup [4; \infty)$ E) $(-\infty, -1] \cup [0; 2) \cup (4; \infty)$
13. Soddalashtiring: $\frac{a + 2a + 3a + \dots + na}{n^2 - 2a - 3} + \frac{3a}{2(n-3)}$
A) n/a B) a/n C) $a/2$ D) $na/2$ E) $2/na$
14. Cheksiz kamayuvchi geometrik progressiyaning yig'indisini toping: $1/2 - 1/3 + 1/4 - 1/9 + 1/8 - 1/27 + \dots$
A) 0,2 B) $1/2$ C) $3/4$ D) 1,2 E) 2,5
15. Hisoblang: $\text{tg}22,5^\circ + \text{tg}^{-1}22,5^\circ$
A) -2 B) -2^{-1} C) 4-2 D) $4^{-1}-2$ E) 2-2
16. Hisoblang: $1 - \sin^6 22,5^\circ + \cos^6 22,5^\circ$
A) $(-3 - 1)/2$ B) $(-6 + 5)/4$ C) $(10 + 3-2)/8$ D) $(16 + 7-2)/16$
E) $(10 + 2-3)/5$
17. Agar $\sin\alpha - (1 - 2\sin^2(\alpha/2)) = 1/3$ bo'lsa, $\cos(\pi/4 - \alpha) - \sin(3\pi/4 - \alpha)$ ni hisoblang.
A) $5/6$ B) $3/4$ C) $4/5$ D) $-3/4$ E) $-3/2$
18. Uchburchakning balandligi 12 ga teng bo'lib, 21 ga teng tomonini 5:16 kabi nisbatda bo'ladi. Uchburchakning perimetrini toping.
A) 54 B) 62 C) 56 D) 108 E) 48
19. Uchburchakning asosiga parallel to'g'ri chiziq uning yuzini teng ikkiga bo'ladi. Asosidan hisoblanganda yon tomonlari qanday nisbatda bo'linadi?

A) $(\sqrt{2} - 1):1$ B) $1:1$ C) $1/2 :1$ D) $(\sqrt{3} - 1):1$ E) $(2\sqrt{2} - 1):1$

20. Parallelogramning o'tkir burchagi 30° dan kichik emas, 45° dan katta emas. Tomonlariga o'tkazilgan balandliklarining ko'paytmasi 10 ga teng. Parallelogram yuzining eng katta qiymatini toping.

A) 20 B) $10\sqrt{3}$ C) $10\sqrt{2}$ D) $5\sqrt{3}$ E) $20\sqrt{2}$

21. Tenglamani yeching: $(x + 3\frac{2}{9}) : 4\frac{1}{6} = 6$

A) $22\frac{7}{9}$ B) $21\frac{7}{9}$ C) $22\frac{2}{9}$ D) $23\frac{2}{9}$ E) $21\frac{1}{6}$

22. $2x^2 - 5x + 12$ tengsizlikning butun yechimlari yig'indisini toping.

A) 4 B) 9 C) 7 D) 5 E) 6

23. Agar $\sin(x + \pi/6) + \sin(x - \pi/6) = 2\sqrt{3} \cos x$ bo'lsa, $\tan x$ ni toping.

A) -1 B) 1 C) 0 D) 2 E) $1/2$

24. n ning qanday qiymatlarida $nx - x^2 = 0$ tenglama yechimga ega?

A) $n > 0$ B) $n < 0$ C) $n = 1$ D) $n = 0$ E) barcha n larda

25. Son oxirida nechta nol qatnashsadi: $p = 30! + 70!$?

A) 5 B) 7 C) 14 D) 16 E) 24

26. Barcha ikki honali musbat sonlarning yig'indisini toping.

A) 4900 B) 4905 C) 4950 D) 4500 E) 5005

27. Agar $8^x = 16^{y+1}$ va $2x = 5y - 2$ bo'lsa, $x+y$ ni toping.

A) -1 B) 2 C) 3 D) 1 E) 6

28. Rombning perimetri 16 ga, ichki chizilgan aylananing radiusi 1 ga teng. Rombning o'tmas burchagini toping.

A) 110° B) 120° C) 135° D) 145° E) 150°

29. Qo'shma burchaklarning biri ikkinchisidan 3 marta katta. Shu burchaklardan kichigini toping.

A) 75° B) 60° C) 45° D) 40° E) 30°

30. Silindr yon sirtining yuzi 24π , hajmi esa 48π . Silindr balandligini toping.

A) 8 B) 6 C) 4 D) 3 E) 2

31. Ifodaning qiymatini toping:

$$24 - 27 - 25 - 24 + 18 - 36 - 16 - 36 - 21 - 5$$

A) 0 B) 15 C) 115 D) 1 E) 45

32. Quyidagi sonlarni kamayish tartibida yozing:

$$a = \log_3 10, b = \log_5 18, c = \log_6 5.$$

A) $b > c > a$ B) $c > b > a$ C) $a > b > c$ D) $a > c > b$ E) $b > a > c$

33. Quyidagi tenglamalar sistemasidan $x^2 + y^2$ ni toping:

$$\begin{cases} 5x + 2y = 23 \\ y - 3x = -5 \end{cases}$$

A) 16 B) 9 C) 25 D) 10 E) 36

34. $e^{-x} = x - 5$ tenglamaning nechta ildizi bor?

A) 1 B) 2 C) 3 D) - E) aniqlab bo'lmaydi

35. Agar $a^2 + b^2 = 8$, $ab = 5$ bo'lsa, $a^4 + a^2b^2 + b^4$ ni qiymatini toping.

A) 49 B) 39 C) 36 D) 89 E) 69

36. Hisoblang: $\sqrt{17 + 12\sqrt{2}} - \sqrt{3 - 2\sqrt{2}}$

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

37. k ning nechta butun qiymatida $y = 2 - kx$ va $y = kx^2 - 2kx + 3$ funksiyalar grafiklari kesishmaydi?

A) 2 B) 3 C) 4 D) 5 E) to'g'ri javob yo'q

38. $y = -x^2 + 2x + 3$ parabola uchi koordinatalini toping.

A) (-1; 3) B) (-1; 2) C) (1; 3) D) (1; 4) E) (1; -2)

39. Bir nuqtadan tekislikka uzunliklari 23 va 33 og'ma tushirilgan. Agar o'g'malarning tekislikka proyeksiyalari $-2:2:3$ nisbatda bo'lsa, nuqtadan tekislikkacha bo'lgan masofani toping.

A) 9 B) 11 C) $6\sqrt{5}$ D) 12 E) $\sqrt{417}$

40. Doiraga tashqi chizilgan teng yonli trapetsiyaning asoslari 18 va 8. Doira diametrini toping.

A) 10 B) 11 C) 12 D) 12,4 E) 14

10-sinf

3-variant

1. ABC uchburchakning AB va BC tomonlariga tushirilgan balandlik bu tomonlardan kichik emas. Uchburchakning burchaklarini toping.

A) $60^\circ, 60^\circ, 60^\circ$ B) $30^\circ, 30^\circ, 120^\circ$ C) $30^\circ, 60^\circ, 90^\circ$

D) $90^\circ, 45^\circ, 45^\circ$ E) $45^\circ, 60^\circ, 75^\circ$

2. n ning qanday qiymatlarida $\cos nx - \sin x$ ifodaning davri 3π ga teng bo'ladi?

A) -1, -3, -5, -15 B) 1, 3, 5, 15 C) $n = 5k$ D) $n = -5k$

E) 1, 2, 3, 4

3. Ushbu $x^2 + 1 = \log_3(x + 2) + 3x$ tenglamani nechta ildizi bor?

A) 2 B) 1 C) 3 D) \emptyset E) aniqlab bo'lmaydi

4. Ushbu $\cos x \cos 2x \cos 4x = 1$ tenglama $[-2\pi; 2\pi]$ kesmada nechta ildizga ega?

A) 1 B) 2 C) 3 D) 4 E) \emptyset

5. ABCDEF muntazam oltiburchak yuzasi 216 ga teng. ACF uchburchak yuzasini toping.

A) 36 B) 90 C) 72 D) 18 E) 54

6. Soddashtiring: $\sqrt[4]{28+16\sqrt{3}} - \sqrt[6]{5-2\sqrt{6}} + \sqrt[6]{5+2\sqrt{6}}$

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

7. Hisoblang: $1/\sin 15^\circ + \sqrt{3}/\cos 15^\circ$

A) $\sqrt{2}/4$ B) $\sqrt{3}/2$ C) $4\sqrt{3}$ D) $1/2$ E) $\sqrt{3}/4$

8. Hisoblang: $((\sqrt{0,5} + \sqrt{2} + \sqrt{4,5} - \sqrt{8}) : (1/2))^{1/2} - 4$

A) -12 B) -4 C) 2 D) -2 E) 3

9. Soddashtiring:

$1/(2(1 + \sqrt{a})) + 2/(2(1 - \sqrt{a})) - (a^2 + 2)/(1 - a^3)$

A) 1 B) $-a$ C) $-1/(a^2 + a + 1)$ D) $1 - \sqrt{a}$ E) $(1 - \sqrt{a})/(1 + \sqrt{a})$

10. $f(x) = \sqrt{12 - 3x^2} + \ln|x+1| - \sqrt{-x}$ funksiyaning aniqlanish sohasini toping.

A) $[-2; 2]$ B) $[-2; 1) \cup (1; 2]$ C) $[-2; -1) \cup (-1; 2]$

D) $[-2; -1) \cup (-1; 0)$ E) $[0; 2]$

11. k ning qanday qiymatlarida $kx^2 - (k - 7)x + 9 = 0$ tenglama ikkita bir xil manfiy ildizga ega bo'ladi?

A) 49; 1 B) 1 C) -49; -1 D) 49 E) -1

12. t ning qanday qiymatlarida $tx^2 - 6x - 1 < 0$ tengsizlik x ning barcha qiymatlarida o'rinli?

A) $t < -12$ B) $t < -9$ C) $t < -13$ D) $t < -8$ E) $t < -7$

13. Agar S_n arifmetik progressiyaning dastlabki n ta hadining yig'indisi bo'lsa, $S_5 - 3S_4 + 3S_3 - S_2$ ni toping.

A) 0 B) $-2a_1$ C) $2a_1$ D) $3a_1$ E) $-3a_1$

14. Faqat maxrajlarining ishorasi bilan farq qiluvchi ikkita cheksiz kamayuvchi geometrik progressiya berilgan. Ularning yig'indisi mos ravishda S_1 va S_2 ga teng. Shu progressiyaning istalgan bittasining hadlari kvadratlaridan tuzilgan cheksiz kamayuvchi geometrik progressiya hadlari yig'indisini toping.

A) $S_1 - S_2$ B) $S_1 + S_2$ C) $|S_1 - S_2|$ D) $(S_1 + S_2)^2$ E) $S_1^2 + S_2^2$

15. $\sin\alpha - \cos\alpha = m$ tenglik o'rinli bo'lmaydigan m ning qiymatlarini toping.

A) $[-31; 0] \cup (2; 31)$ B) $(-\infty; -1] \cup [1; \infty)$ C) $[-\infty; 0] \cup [2; \infty)$

D) $[-100; 0] \cup (0; 100)$ E) $[-1; 0,5] \cup (2; 14)$

16. Agar $(\operatorname{tg}\alpha + \sqrt{3})(\operatorname{tg}\beta + \sqrt{3}) = 4$ va $\alpha, \beta \in (0; \pi/2)$ bo'lsa, $9 - \left(\frac{\alpha + \beta}{\pi}\right)^2$ ni hisoblang.
 A) 0,25 B) 0,5 C) 0,36 D) 0,64 E) 0,16
17. $\cos 55^\circ - \cos 65^\circ - \cos 175^\circ$ ni hisoblang.
 A) $-10/8$ B) $-\sqrt{7}/8$ C) $-3/8$ D) $-\sqrt{2} - \sqrt{3}/8$ E) $-\sqrt{2} + \sqrt{3}/8$
18. Uchburchakning tomonlari 5; 7; 10 ga teng. Uchburchakning uchidan boshlab hisoblanganda bissektrisalar kesishgan nuqtasi katta burchakning bissektrisasini qanday nisbatda bo'ladi?
 A) 2:1 B) 3:2 C) 4:3 D) 6:5 E) 5:4
19. Yuzi $9\sqrt{3}$ ga teng bo'lgan muntazam uchburchakdan yuzi eng katta bo'lgan kvadrat qirqib olindi. Kvadratning perimetri nimaga teng?
 A) $18\sqrt{3} - 12$ B) $24 - 12\sqrt{3}$ C) $64\sqrt{3} - 96$ D) $54 - 16\sqrt{3}$ E) $48\sqrt{3} - 72$
20. Asoslari BC va AD bo'lgan ABCD trapetsiyaning diagonallari O nuqtada kesishadi. Agar $DO = 4$, $BO = 2$ va BOC uchburchakning yuzi 6 ga teng bo'lsa, trapetsiya yuzini toping.
 A) 42 B) 48 C) 52 D) 54 E) 60
21. Hisoblang: $\frac{3}{4} - 1\frac{1}{7} : \frac{2}{15} - 12\frac{1}{4} : 7\frac{1}{2}$
 A) $9\frac{1}{2}$ B) $8\frac{1}{4}$ C) $10\frac{1}{2}$ D) $11\frac{3}{4}$ E) $10\frac{1}{5}$
22. Hisoblang: $\sqrt{3 + 2\sqrt{2}} - \sqrt{3 - 2\sqrt{2}}$
 A) $4\sqrt{2}$ B) 0 C) 2 D) $2\sqrt{2}$ E) 6
23. Hisoblang: $3,(3) - 0,3 + 0,(2) + 0,(4)$
 A) 2,(3) B) 0,(6) C) 1,(4) D) 1,(6) E) 2,(6)
24. $x^7 = 5 - 3x$ tenglama nechta ildizga ega?
 A) 4 B) 3 C) 2 D) 1 E) yechimi yo'q
25. Agar $\operatorname{tg}(\alpha + \beta) = 5$, $\operatorname{tg}(\alpha - \beta) = 3$ bo'lsa, $\operatorname{tg} 2\beta$ ni toping.
 A) 15 B) 8 C) $1/8$ D) 1 E) 2
26. Hisoblang: $1 - \sin 92^\circ - \sin 2^\circ + 1/2 \sin 4^\circ$
 A) 0,5 B) 0 C) 1 D) -0,5 E) -1
27. Geometrik progressiyada $b_1 + b_9 = 5$ va $b_1^2 + b_9^2 = 17$. $b_4 - b_6 = ?$
 A) 6 B) 4 C) 3 D) 2 E) 1
28. Kub sirtining yuzi 24 bo'lsa, uning hajmini toping.
 A) 64 B) 16 C) 27 D) $2\sqrt{2}$ E) 8

29. Diagonallari soni 20 ta bo'lgan ko'pburchakning nechta tomoni bor?

- A) 6 B) 7 C) 8 D) 9 E) 10

30. Yon tomoni $2\sqrt{2}$, uchidagi burchagi 60° bo'lgan teng yonli uchburchakka tashqi chizilgan aylananing radiusini toping.

- A) 6 B) 2 C) 4 D) $4\sqrt{3}$ E) $3\sqrt{3}$

31. Biror p sonini 3 ga bo'linganda 1 qoldiq, 4 ga bo'linganda 3 qoldiq qolsa, p ni 12 ga bo'lgandagi qoldiqni toping.

- A) 9 B) 7 C) 5 D) 3 E) 1

32. $\log_2^2 x - 4\log_2 x - 1 = 0$ tenglamaning ildizlari ko'paytmasini toping.

- A) 8 B) 4 C) 16 D) $1/8$ E) $1/16$

33. Quyidagi funksiyaning aniqlanish sohasiga nechta butun son kiradi: $y = \sqrt{7 - |x - 2|}$

- A) 7 B) 10 C) 13 D) 15 E) 14

34. Agar ishchilar oyligi 20%ga oshsa, keyin yana 20%ga oshsa, hammasi bo'lib necha foizga oshgan?

- A) 40 B) 50 C) 42 D) 44 E) 46

35. a ning qanday qiymatlarida $\begin{cases} x + ay = 1 \\ ax + y = 2a \end{cases}$ sistema yechimga ega emas?

- A) 1 B) 1; -1 C) 1; 2; -1 D) 0; 1; -1 E) $a \in \mathbb{R}$

36. $98^{2004} - 97$ ayirmaning oxirgi raqamini toping.

- A) 1 B) 3 C) 5 D) 7 E) 9

37. Agar $|a| + b^2 + c^2 = 2b - 4c - 5$ bo'lsa, $2a + b + c$ ni toping.

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

38. Arifmetik progressiyada $a_3 = 5$ va $a_2 + a_6 + a_7 = 0$. a_1 ni toping.

- A) 10 B) 15 C) 8 D) -2,5 E) -10

39. $x^2 + y^2 + 4x + 6y - 3 = 0$ tenglama bilan berilgan aylananing radiusini toping.

- A) 5 B) 4 C) 6 D) 3 E) 3,5

40. Agar α - to'qqizburchakning ichki burchaklari yig'indisi bo'lsa, $\cos \alpha$ ni toping.

- A) 1 B) $1/2$ C) 0 D) $-1/2$ E) -1

10-sinf
4-variant

1. Hisoblang: $\sqrt{4 - 3\sqrt{5} + 2\sqrt{5} - \sqrt[4]{125}}$
A) $1 + \sqrt[4]{5}$ B) 1 C) 2 D) $1 + \sqrt{5}$ E) 5
2. Agar A, B, C - uchburchakning burchaklari bo'lsa, $\sin \frac{A}{2} \sin \frac{B}{2} \sin \frac{C}{2} = a$ shartni qanoatlantiruvchi a ning eng kichik qiymatini toping.
A) 1/8 B) 3/2 C) 3/4 D) 1/2 E) 1/16
3. $\sin 47^\circ + \sin 61^\circ - \sin 11^\circ - \sin 25^\circ$ ifodaning qiymatini toping.
A) 1 B) 1/2 C) $\cos 7^\circ$ D) $0,5 \cos 7^\circ$ E) $\sin 7^\circ$
4. k ning qanday qiymatlarida $|\ln(x + 15)| = -(x + k)^2$ tenglama yechimga ega bo'ladi?
A) -15 B) 14 C) 15 D) 10 E) -e
5. Hisoblang: $(900 - 35,5 - 28,5) / (2,5 - 1\frac{2}{5} + 1,8 - 2\frac{1}{2})$
A) 2/5 B) 3/7 C) 5/7 D) 7/10 E) 3/10
6. $-4x + 12 - x$ tengsizlik qaysi oraliqlarda yechimga ega emas?
A) $(-\infty; -3) \cup (-2; \infty)$ B) $[-3; -2]$ C) $(-\infty; 0]$ D) $[-3; 0)$ E) $(-\infty; -3]$
7. Tengsizlikni yeching: $|x^2 - 6| < 1$
A) $(-\sqrt{7}; \sqrt{7})$ B) $(-\sqrt{7}; -\sqrt{5}) \cup (\sqrt{5}; \sqrt{7})$
C) $[-\sqrt{7}; -1) \cup (1; \sqrt{7})$ D) $(1; \sqrt{3})$ E) $(-\sqrt{3}; -1)$
8. ABC uchburchakda $\angle A = 75^\circ$, $\angle C = 60^\circ$ va $BC = \sqrt{2} + \sqrt{3}$. $AB = ?$
A) $\sqrt{3}$ B) $\sqrt{2}$ C) $3\sqrt{3}$ D) 3 E) $\sqrt{2} + \sqrt{3}$
9. $\begin{cases} x^2 + y^2 = 16 \\ |x| + |y| = 5 \end{cases}$ tenglamalar sistemasi nechta yechimga ega?
A) 10 B) 2 C) 3 D) \emptyset E) 8
10. Hisoblang: $\arctg(1/2) - \arctg(1/3)$
A) $\pi/4$ B) $\pi/4 + \pi n$ C) $-\pi/4 + \pi n$ D) $-\pi/4$ E) $3\pi/4$
11. Agar $a^2 + 3ab + b^2 = 44$ va $a^2 + ab + b^2 = 28$ bo'lsa, $a^2 - ab + b^2$ ning qiymatini toping.
A) 14 B) 18 C) 12 D) 19 E) 16
12. Tengsizlikni yeching: $|x + 1| > 2|x + 2|$
A) $(-2; -1)$ B) $[-3; -1]$ C) $(-3; -5/3)$ D) $(-3; 0)$ E) $(-3; -2)$

13. Hisoblang: $\sqrt{2^3 \sqrt{5^3 \sqrt{2^3 \sqrt{5^3 \dots}}}}$

- A) 17 B) 12 C) 14 D) 41 E) 20

14. $y = -x^2 - 6x + 11$ funksiyaning qiymatlari sohasini toping. A) $[0; \infty)$
B) $[0; 11]$ C) $[-2; \infty)$ D) $(2; \infty)$ E) $(-\infty; \infty)$

15. Agar $\cos 37^\circ = a$ bo'lsa, $\sin 16^\circ$ ni toping.

- A) $a^2 - 1$ B) $a - 1$ C) $2a^2 - 1$ D) $1 - 2a^2$ E) aniqlab bo'lmaydi

16. $\sin^6 \alpha + \cos^6 \alpha + 3\sin^2 \alpha - \cos^2 \alpha$ ni soddalashtiring.

- A) -1 B) 0 C) 1 D) 2 E) 4

17. Agar $\sin 2x = 2/5$ bo'lsa, $\sin^8 x + \cos^8 x$ ni toping.

- A) $16/25$ B) $398/625$ C) $527/625$ D) $256/625$ E) $8/25$

18. Kateti $\sqrt{2}$ ga teng bo'lgan to'g'riburchakli teng yonli uchburchakning medianalari kesishgan nuqtasi bilan issektrisalar kesishgan nuqtalari orasidagi masofani toping.

- A) $(\sqrt{2} - 1)/2$ B) $(\sqrt{2} - \sqrt{3})/3$ C) $(2\sqrt{3} - 3)/6$
D) $(3\sqrt{2} - 4)/3$ E) $(2\sqrt{3} - 3)/2$

19. Kvadrat hosil qilish uchun o'lchovlari 8 va 20 bo'lgan to'g'ri to'tburchakdan eng kamida qancha olish mumkin?

- A) 10 B) 12 C) 6 D) 8 E) 15

20. $|\vec{a}| = \sqrt{137}$, $|\vec{a} + \vec{b}| = 20$ va $|\vec{a} - \vec{b}| = 18$ bo'lsa $|b|$ ni toping.

- A) $7\sqrt{2}$ B) $7\sqrt{3}$ C) $8\sqrt{2}$ D) 12 E) 15

21. Tenglamani ildizini toping: $0,7(6y - 5) = 0,4(y - 3) - 1,16$

- A) -0,3 B) 0,25 C) -0,2 D) 0,3 E) 0,75

22. $[-2\pi; 2\pi]$ oraliqda $(\cos^2 x - \cos x) / \sin x = 0$ tenglama nechta yechimga ega?

- A) 6 B) 3 C) 2 D) 4 E) 1

23. Tenglamani ildizini toping: $\sqrt{x \sqrt{x \sqrt{x \sqrt{x \dots}}} = 25$

- A) 25 B) $5\sqrt{5}$ C) 5 D) $\sqrt{5}$ E) ildizi yo'q

24. Ifodani soddalashtiring: $\frac{\sin 2\alpha + \sin 5\alpha - \sin 3\alpha}{\cos \alpha + 1 - 2\sin^2 2\alpha}$

- A) $2\cos \alpha$ B) $\sin \alpha$ C) $0,5\sin \alpha$ D) $2\sin \alpha$ E) $\operatorname{tg} \alpha$

25. Tengsizlikni yeching: $\log_{0,5}(x - 2) > \log_{0,5}(3 - x)$

- A) $x < 2,5$ B) $2 < x < 3$ C) $2 < x < 2,5$ D) $x > 2,5$ E) $2 \leq x \leq 2,5$

26. Qanday sonning 7 foizi 126 dan ikki marta kichik?
A) 3600 B) 900 C) 256 D) 145 E) 600
27. Hisoblang: $\sin 1920^\circ$
A) 0 B) $\sqrt{3}/2$ C) 0,5 D) $\sqrt{2}/2$ E) 1
28. Doiraning yuzi 96% ga oshishi uchun uning radiusini necha foizga oshirish kerak?
A) 4 B) 62 C) 40 D) 140 E) 196
29. To'g'ri burchakli uchburchakning kateti 8 ga, shu katetning gipotenuzaga proyeksiyasi 6,4 ga teng bo'lsa, uchburchak yuzini toping.
A) 25,6 B) 48 C) 51,2 D) 24 E) 18
30. Tomonlari arifmetik progressiyani tashkil etuvchi to'g'ri burchakli uchburchakning o'tkir burchaklaridan kichigini toping.
A) $\arctg 1,5$ B) 35° C) $\arctg 0,75$ D) 30° E) 40°
31. $\tg 75^\circ$ ni hisoblang.
A) $1 + \sqrt{3}$ B) $2 + \sqrt{3}$ C) $\sqrt{2} - \sqrt{3}$ D) $(1 + \sqrt{2})/2$ E) $2/\sqrt{3}$
32. Quyidagi ifodaning eng katta qiymatini toping:
 $4b - a^2 + 2ab - 2b^2$.
A) 1 B) 2 C) 6 D) 2 E) 8
33. Geometrik progressiyada $b_1 + b_9 = 5$ va $b_1^2 + b_9^2 = 17$.
 $b_4 - b_6 = ?$
A) 4 B) 3 C) 2 D) 10 E) 6
34. $|1 - |1 - x|| = 0,5$ tenglamaning yechimlari yig'indisini toping.
A) 1 B) 2,5 C) 4,5 D) 4 E) 2
35. $x^2 - 5^x - 5^{2+x} < 0$ tengsizlikning eng katta butun yechimini toping.
A) -5 B) 5 C) 2 D) 4 E) 6
36. Ifodani soddalashtiring: $\frac{\cos \alpha - 1}{\tg \alpha - \sin \alpha}$
A) $\tg \alpha$ B) $\ctg \alpha$ C) $-\ctg \alpha$ D) $-\tg \alpha$ E) -1
37. t ning qanday qiymatlarida $x^2 + 4x + 3 + t < 0$ tengsizlik yechimga ega emas?
A) (1; +oo) B) 0 C) (-oo; 1] D) [1; +oo) E) (-oo; 1)
38. A(2; 4), B(3;6) va C(6; 14) nuqtalar berilgan. $|\vec{AB} + \vec{AC}|$ ni toping.
A) $13\sqrt{2}$ B) 14 C) 13 D) 12 E) 10
39. \vec{a} va \vec{b} birlik vektorlari orasidagi burchak 60° bo'lsa, $|\vec{a} + \vec{b}|$ ni toping.

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

40. $x + 3y - 12 = 0$ to'g'ri chiziq va koordinata o'qlari kesmalari bilan chegaralangan uchburchakning yuzini toping.

A) 12 B) 24 C) 36 D) 48 E) 64

10-sinf 5-variant

1. Tenglamani yeching: $\frac{x^3}{4-x^2} + x^2 - 4 = 0$

A) $-\sqrt{2}$ B) 2 C) $\sqrt{2}$ D) -2 E) \emptyset

2. $y = 2 \sin^2 x + 4 \cos^2 x + 6 \sin x - \cos x$ funksiyaning eng katta va eng kichik qiymatini toping.

A) -6; 6 B) $3 - \sqrt{10}$; $3 + \sqrt{10}$ C) $-\sqrt{10}$; $\sqrt{10}$ D) -4; 4 E) -2; 2

3. Hisoblang: $\cos 55^\circ - \cos 65^\circ - \cos 175^\circ$

A) 1/2 B) -3/2 C) $\frac{\sqrt{3}+1}{8\sqrt{2}}$ D) -1/8 E) $\frac{\sqrt{3}+1}{8}$

4. $\frac{\sqrt{3x+1}}{9-x} > 1$ tengsizlik nechta butun yechimga ega?

A) 2 B) 3 C) 4 D) 6 E) 7

5. $\frac{2x-7}{3x+7} < 0$ tengsizlikning barcha butun yechimlari yig'indisini toping.

A) 5 B) 6 C) 7 D) 4 E) 3

6. Agar $\frac{3x-4}{x^2-3x+2} = \frac{a}{x-2} + \frac{b}{x-1}$ bo'lsa, $a + b = ?$

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

7. $\frac{\ln^3(x^4)}{\ln^4(x^3)} - \ln^3 \sqrt{x}$ ni soddalashtiring.

A) 64/243 B) 32/81 C) 32/243 D) 64/81 E) 64/27

8. Soddalashtiring: $[\sin^3 \alpha (\operatorname{ctg}^2 \alpha + 1) + \cos^3 \alpha (\operatorname{tg}^2 \alpha + 1)]^2 - \sin 2\alpha - 1$

A) 1 B) 0 C) $1/2 \sin 2\alpha$ D) $2 \sin 2\alpha$ E) -1

9. m ning qanday qiymatlarida $\begin{cases} 2x - y = m + 1 \\ x - 2y = 2 - m \end{cases}$ tenglamalar sistemasi

musbat ($x > 0, y > 0$) yechimga ega?

A) $(0; \infty)$ B) $(1; \infty)$ C) $(-\infty; 0)$ D) $(-\infty; \infty)$ E) $(0; 1)$

10. a ning qanday qiymatlarida $4x^2 + (3a - 2)x + 1 = 0$

tenglama yagona musbat ildizga ega?

A) $(-\infty; 2/3)$ B) $2/3$ C) $2; -2/3$ D) $-2/3$ E) 2

11. Quyidagi tenglamalar sistemasidan x ning qiymatini

$$\text{toping } \begin{cases} \frac{xy}{x+y} = \frac{10}{7} \\ \frac{yz}{y+z} = \frac{40}{13} \\ \frac{xz}{x+z} = \frac{5}{8} \end{cases} \quad \begin{array}{l} \text{A) } 80/79 \\ \text{B) } 5/7 \\ \text{C) } 7/13 \\ \text{D) } 79/80 \\ \text{E) } 7/5 \end{array}$$

12. Tenglamni yeching: $\sqrt[3]{x + \sqrt[3]{x + \sqrt[3]{x + \dots}}} = 4$

A) 56 B) 48 C) 60 D) 54 E) 64

13. Agar $a_1, a_2, a_3, \dots, a_n$ arifmetik progressiyaning ayirmasi $d=1$ bo'lsa, $(a_3 - a_1) + (a_5 - a_3)^2 + \dots + (a_{19} - a_{17})^9$ yig'indisini toping.

A) 1022 B) 8192 C) 4094 D) 8194 E) 4098

14. Agar $f(x) = \frac{2x+1}{3x-1}$ bo'lsa, $f\left(\frac{1}{x}\right) + f\left(\frac{x}{9}\right)$ ni toping.

A) $1/3$ B) $x/3$ C) $-x/3$ D) $-1/3$ E) $1/(3x-1)$

15. Hisoblang: $\cos(2\pi/7) + \cos(4\pi/7) \cos(6\pi/7)$

A) $-1/2$ B) $1/2$ C) $1/4$ D) $1/8$ E) $-1/4$

16. Agar $\sin\alpha = -0,8$ va $\alpha \in (\pi; 3\pi/2)$ bo'lsa, $\text{tg}(\alpha/2)$ ni hisoblang.

A) 1 B) -1 C) 2 D) -2 E) 1,5

17. Agar $\cos 15^\circ - \sin 15^\circ = a/(4\cos 15^\circ)$ bo'lsa, a ni toping.

A) $\sqrt{3}$ B) $\sqrt{3}+1$ C) $\sqrt{3}+2$ D) $\sqrt{3}+3$ E) $\sqrt{3}+4$

18. M nuqta ABC uchburchakning AB tomonini BM:MA = 3:5 nisbatda, N nuqta esa BC tomonini BN:NC = 4:2 nisbatda bo'ladi. ABC uchburchak yuzini MBN uchburchak yuziga nisbatini toping.

A) 4:1 B) 6:1 C) 3:2 D) 10:3 E) 9:4

19. To'g'ri to'rtburchakning diagonali 18 ga teng. Bu to'g'ri to'rtburchak qanday eng katta yuzaga ega bo'lishi mumkin?

A) aniqlab bo'lmaydi B) 180 C) 162 D) 174 E) 167

20. Tekislikka unda yotmaydigan nuqtadan uzunliklari 13 va 37 ga teng ikki og'ma o'tkazilgan. Agar og'malarning proyeksiyalari uzunliklari 1:7 kabi nisbatda bo'lsa, nuqtadan tekislikkacha bo'lgan masofani toping.

A) 12 B) 11,5 C) 11 D) 1,5 E) 9

21. $|2 - x| - 4$ tengsizlik nechta butun yechimga ega?

A) 9 B) 8 C) 6 D) 4 E) 3

22. Ifodani soddalashtiring: $\frac{\cos 2\alpha + \cos(\pi - \alpha) - \sin \alpha}{\sin(\pi/2 - \alpha)}$

A) $\cos \alpha$ B) $\sin \alpha$ C) $-\sin \alpha$ D) $-\cos \alpha$ E) $3\cos \alpha$

23. Arifmetik progressiyada $a_3 = 5$ va $a_2 + a_6 + a_7 = 0$. a_1 ni toping. A) 10

B) 15 C) 8 D) -2,5 E) -10

24. Quyidagi tenglama ildizlari yig'indisini toping:

$$(x^2 + 4x) - \sqrt{x-3} = 0$$

A) 3 B) -1 C) 4 D) -4 E) 1

25. Tenglamani yeching: $3^x - 6 - 3^{-x} = 1$

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

26. $2^a = 5$ ma'lum bo'lsa, $\lg 2$ ni toping.

A) a B) $1/a$ C) $a/(a+1)$ D) $a+1$ E) \sqrt{a}

27. n ning qanday qiymatlarida $|x^2 - 6x| = n$ tenglama faqat uchta ildizga ega bo'ladi?

A) 1 B) 2 C) 6 D) 8 E) 9

28. $\vec{a}(4;1)$ va $\vec{b}(-2;2)$ vektorlar berilgan. Agar $\vec{a} = \vec{c} + 3\vec{b}$ bo'lsa, \vec{c} vektorning koordinatasini toping.

A) (10; -5) B) (-10; 4) C) (2; -5) D) (-2; 5) E) (-6; 4)

29. ABCD parallelogramning A burchagi bissektrisasi BC tomonni K nuqtada kesadi. Agar $BK=15$, $KC=9$ bo'lsa, parallelogramning perimetrini toping.

A) 64 B) 66 C) 74 D) 78 E) 86

30. Trapetsiyaning bir asosi ikkinchisidan 6 smga katta, o'rta chizig'i esa 8 sm. Trapetsiyaning kichik asosini toping.

A) 6 B) 12 C) 5 D) 8 E) 11

31. O'zidan avvalgi barcha natural sonlar yig'indilarining 1/10 qismiga teng bo'lgan natural sonni toping.

A) 19 B) 20 C) 21 D) 25 E) 30

32. $a+b+c=12$ va $ab+bc+ac=0$ bo'lsa, $a^2+b^2+c^2$ ni toping.

A) 134 B) 114 C) 164 D) 100 E) 184

33. m ning qanday qiymatlarida $3x-4=2(x-m)$ tenglama musbat yechimga ega bo'ladi?

- A) $m > -2$ B) $m < 2$ C) $m = 1$ D) $m = 2$ E) $0 < m < 2$

34. Agar $\lg 2 = a$ va $\lg 3 = b$ bo'lsa, $\lg_5 6$ toping.

- A) $(a+b)/2$ B) $(a+b)/(1-b)$ C) $(a+b)/(1-a)$ D) $(a+b)/(2a)$ E) $2a+2b$

35. Quyidagi funksiyaning eng katta qiymatini toping: $y = \frac{3}{x^2 + 2x + 3}$

- A) 1,2 B) 3 C) 2 D) 1,5 E) 1

36. Quyidagi tenglamaning ildizlari yig'indisi nechaga teng:

$$(x^2 - 9)\sqrt{2-x} = 0$$

- A) -3 B) -1 C) 0 D) 2 E) 5

37. $1,0(6)$ sonni oddiy kasr ko'rinishida yozing.

- A) $16/15$ B) $16/13$ C) $17/14$ D) $31/30$ E) $19/16$

38. m ning qanday qiymatlarida $\vec{a}(m^2+m;1)$ va $\vec{b}(-1;2)$ vektorlar perpendikulyar bo'ladi?

- A) -2 B) 1 C) -3; 1 D) 2; -1 E) 1; -2

39. To'g'rito'rtburchakning tomonlari 3 va 4. Uning diagonallari orasidagi burchakni toping.

- A) $\arcsin 0,96$ B) $\arccos 0,8$ C) $\arctg 3/4$ D) $\arctg 4/3$ E) $\arcsin 0,64$

40. To'g'ri burchakli uchburchak katetlarining gipotenuzaga proyeksiyalari 2 va 8. Uchburchak yuzini toping.

- A) 10 B) 16 C) 20 D) 24 E) 40

11-sinf
1-variant

1. Tenglamalar sistemasini yeching:
$$\begin{cases} x + y + z = a \\ x^2 + y^2 + z^2 = a^2 \\ x^3 + y^3 + z^3 = a^3 \end{cases}$$
- A) $(0; 0; a)$, $(0; a; 0)$, $(a; 0; 0)$ B) $(a; 0; 0)$, $(0; -a; 0)$, $(-a; a; a)$
C) yechimi yo'q D) $(0; 0; a)$, $(0; a; 0)$, $(0; 0; 0)$
E) cheksiz ko'p yechimi bor
2. $|x| + |y| < 100$ tenglama nechta har xil butun yechimlarga ega?
A) 19801 B) 10000 C) 16100 D) 200 E) 1980
3. $x^2 + y^2 + z^2 = 2xyz$ tenglama nechta butun yechimga ega?
A) 1 B) yechimi yo'q C) 2 D) 3 E) cheksiz ko'p
4. Teng yonli trapetsiyaning diagonalini uni ikkita teng yonli uchburchakka bo'ladi. Trapetsiyaning burchaklarini toping.
A) $72^\circ, 108^\circ$ B) $135^\circ, 45^\circ$ C) $100^\circ, 80^\circ$ D) $82^\circ, 98^\circ$ E) $102^\circ, 188^\circ$
5. Tenglamani yeching: $x^3 - [x] = 3 ([a] - a \text{ sonining butun qismi})$.
A) $x = \sqrt[3]{4}$ B) $x = \sqrt[3]{2}$ C) $x = \sqrt[3]{3}$ D) yechimi yo'q
E) $x = \sqrt[3]{4}$, $x = \sqrt[3]{2}$, $x = \sqrt[3]{3}$
6. n ning qanday butun qiymatlarida $20^n + 16^n - 3^n - 1$ ifoda 323 ga bo'linadi?
A) $n = 2k$ B) $n = 2, 4, 8, 10$ C) $n = 3, 4, 5, 6$
D) $n = 2, 4, 6, 8, 10, 12$ E) $n \in \emptyset$
7. ABC uchburchakning AB va BC tomonlariga tushirilgan balandlik bu tomonlardan kichik emas. Uchburchakning burchaklarini toping.
A) $60^\circ, 60^\circ, 60^\circ$ B) $30^\circ, 30^\circ, 120^\circ$ C) $30^\circ, 60^\circ, 90^\circ$
D) $90^\circ, 45^\circ, 45^\circ$ E) $45^\circ, 60^\circ, 75^\circ$
8. Muntazam ABC uchburchakning ichidan shunday O nuqta olinganki, $\angle AOB = 113^\circ$, $\angle BOC = 123^\circ$. Tomonlari OA , OB , OC kesmalarga teng bo'lgan uchburchakning burchaklarini toping.
A) $53^\circ, 63^\circ, 64^\circ$ B) $30^\circ, 60^\circ, 90^\circ$ C) $45^\circ, 45^\circ, 90^\circ$
D) $10^\circ, 40^\circ, 120^\circ$ E) $43^\circ, 57^\circ, 80^\circ$
9. $3 \cdot 2^x + 1 = y^2$ tenglamani qanoatlantiruvchi $(x; y)$ butun sonlar juftligini toping.
A) $(0; 2)$, $(0; -2)$, $(3; 5)$, $(3; -5)$, $(4; 7)$, $(4; -7)$
B) $(0; 2)$, $(0; -2)$ C) $(3; 5)$ D) $(4; 7)$, $(-4; 7)$ E) \emptyset

10. Hisoblang:
$$\frac{2}{\sqrt{4-3\sqrt[4]{5}+2\sqrt{5}-\sqrt[4]{125}}}$$

- A) $1 + \sqrt[4]{5}$ B) 1 C) 2 D) $\sqrt{5}$ E) 5

11. $x^2 = y^2 + 2y + 13$ tenglamani qanoatlantiruvchi (x; y) butun sonlar juftligini toping.

- A) (4; 1), (-4; 1) B) (4; 1), (4; -1), (-4; 1), (-4; -3)
C) (4; -3), (-4; -3) D) (4; 1) E) cheksiz ko'p

12. Tenglamani yeching:
$$\frac{x^3}{\sqrt{4-x^2}} + x^2 - 4 = 0$$

- A) $\pm\sqrt{2}$ B) 2 C) ± 2 D) $\sqrt{2}$ E) yechimi yo'q

13. Sonlarni taqqoslang: $a = \sin 1$, $b = \log_3 \sqrt{7}$.

- A) $a = b$ B) $a > b$ C) $a = b + 1$ D) $a < b$ E) taqqoslab bo'lmaydi

14. x ning qanday qiymatlarida $\frac{\sin x + \operatorname{tg} x}{\cos x + \operatorname{ctg} x}$ ifoda musbat bo'ladi?

- A) $x \neq \frac{\pi}{2} + \pi k$, $x \neq \pi k$, $k \in \mathbb{Z}$ B) $(-\infty; \infty)$ C) $(0; \infty)$ D) $(-\infty; 0)$

- E) $x \neq \pi k, k \in \mathbb{Z}$

15. n ning qanday qiymatlarida $\cos nx \cdot \sin \frac{5}{n} x$ ning davri 3π ga teng?

- A) $\pm 1, \pm 3, \pm 5, \pm 15$ B) 1, 3, 5, 15 C) 1, 2, 3, 4 D) $n = 5k$ E) $n \neq 5k$

16. Agar A, B, C uchburchakning burchaklari bo'lsa,

$\sin \frac{A}{2} \sin \frac{B}{2} \sin \frac{C}{2} \leq a$ shartni qanoatlantiruvchi a ning eng kichik qiymatini

toping.

- A) $a = \frac{1}{8}$ B) $a = \frac{3}{2}$ C) $a = \frac{3}{8}$ D) $a = \frac{1}{2}$ E) $a = \frac{1}{16}$

17. $y = 2\sin^2 x + 4\cos^2 x + 6\sin x \cos x$ funksiyaning eng katta va eng kichik qiymatini toping.

- A) $3 - \sqrt{10}$; $3 + \sqrt{10}$ B) -6; 6 C) $-\sqrt{10}$ D) -4; 4 E) -2; 2

18. Hisoblang:
$$\frac{1}{2\sin 10^\circ} - 2\sin 70^\circ$$

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

19. $y = \frac{x}{ax^2 + b}$ funksiyaning eng katta qiymatini toping

bunda: $a > 0, b > 0$.

A) $\frac{1}{2\sqrt{ab}}$ B) aniqlab bo'lmaydi C) $\frac{a}{b}$ D) ab E) \sqrt{ab}

20. $\frac{1+x^2}{1+x}$ ifodaning eng kichik qiymatini toping ($x \geq 0$).

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

21. ABC muntazam uchburchak ichidan ixtiyoriy P nuqta olinib, undan BC, CA va AB tomonlarga mos ravishda PD, PE va PF

perpendikulyarlar tushirilgan. $\frac{PD+PE+PF}{BD+CE+AF}$ ni hisoblang.

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

22. Agar teng yonli trapetsiyaning balanligi h , yon yomoni esa unga tashqi chizilgan aylana markazidan α burchak ostida ko'rinsa, trapetsiyaning yuzini toping.

A) $S = h^2 \cos \frac{\alpha}{2}$ B) $S = h^2 \operatorname{ctg} \frac{\alpha}{2}$ C) $S = h^2 \sin \frac{\alpha}{2}$

D) $S = \frac{1}{2} h^2 \operatorname{ctg} \alpha$ E) $S = h^2 \cos \alpha$

23. $x^2 + 1 = \log_3(x+2) + 3x$ tenglamaning nechta ildizi bor?

A) 2 B) 1 C) 3 D) \emptyset E) aniqlab bo'lmaydi

24. Hisoblang: $\sin 47^\circ + \sin 61^\circ - \sin 11^\circ - \sin 25^\circ$

A) 1 B) $1/2$ C) $\cos 7^\circ$ D) $1/2 \cos 7^\circ$ E) $\sin 7^\circ$

25. Hisoblang: $\cos \frac{2\pi}{15} + \cos \frac{4\pi}{15} - \cos \frac{7\pi}{15} - \cos \frac{\pi}{15}$

A) $1/2$ B) 1 C) $1/4$ D) $1/A$ E) $-1/2$

26. Hisoblang: $\cos 55^\circ \cdot \cos 65^\circ \cdot \cos 175^\circ$

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $-\frac{\sqrt{3}+1}{8\sqrt{2}}$ D) $-\frac{1}{8}$ E) $-\frac{\sqrt{3}+1}{8}$

27. Soddashtiring: $\sin^2\left(\frac{\pi}{8} + \alpha\right) - \sin^2\left(\frac{\pi}{8} - \alpha\right)$

- A) $\sin 2\alpha$ B) $\cos 2\alpha$ C) $(1/2) \sin 2\alpha$ D) $(\sqrt{2}/2) \sin 2\alpha$
E) $(1/2) \cos 2\alpha$

28. Agar $\arctg a + \arctg b + \arctg c = \pi$ bo'lsa, $a + b + c$ ni topung?

- A) 0 B) $3\sqrt{abc}$ C) abc D) ab/c B) 1

29. Hisoblang: $4\arctg \frac{1}{5} - \arctg \frac{1}{239}$

- A) $\pi/4$ B) $\pi/3$ C) $\pi/6$ D) $\pi/8$ E) $\pi/12$

30. Hisoblang: $\arcsin \frac{5}{13} + 2\arctg \frac{2}{3}$

- A) $\pi/4$ B) $\pi/3$ C) $\pi/6$ D) $\pi/8$ E) $\pi/2$

31. $y = \arctg\left(\arcsin \frac{\sin x - \cos x}{\sin x + \cos x}\right)$ funksiyaning aniqlanish sohasini toping.

- A) $(\pi\kappa; \pi/2 + \pi\kappa]$, $\kappa \in \mathbb{Z}$ B) $[\pi\kappa; \pi/2 + \pi\kappa]$, $\kappa \in \mathbb{Z}$
C) $(\pi\kappa; \pi/2 + \pi\kappa)$, $\kappa \in \mathbb{Z}$ D) $[\pi\kappa; \pi/2 + \pi\kappa)$, $\kappa \in \mathbb{Z}$
E) $(-\infty; +\infty)$

32. Teng yonli uchburchakda r/R munosabat eng katta qiymatga ega bo'lsa, burchaklar qanday qiymatga ega bo'ladi (r , R – ichki, tashqi chizilgan aylana radiuslari)?

- A) teng tomonli B) to'g'ri burchakli C) aniqlab bo'lmaydi
D) uchidagi burchak 120° E) bunday burchak mavjud emas

33. Uchburchakning balandliklari 12, 15 va 20 ga teng. Bu qanday uchburchak?

- A) to'g'ri burchakli B) o'tmas burchakli C) aniqlab bo'lmaydi
D) teng yonli E) o'tkir burchakli

34. Berilgan kvadrat ichiga uchlari tomonlarda yotuvchi kvadrat chizilgan. Ularning yuzalarining nisbati 3:2 ga teng. Tomonlar orasidagi burchakni aniqlang.

- A) 30° B) 15° C) 45° D) $22,5^\circ$ E) 60°

35. a ning qanday qiymatlarini $ax^2 + 2(a+3)x + a + 2 = 0$ tenglama ildizlari nomanfiy?

- A) $[-2,25; -2]$ B) $[-2,1; -1]$ C) $[1, 2]$ D) $(-\infty; -2]$ E) $[-3; -2]$
36. Agar $a + b = 1$ bo'lsa, $a^4 + b^4$ ning eng kichik qiymatini toping.
A) 1 B) $1/2$ C) $1/4$ D) $1/8$ E) $1/16$
37. a ning qanday qiymatlarida $-3 < \frac{x^2 + ax - 2}{x^2 - x + 1} < 2$ tengsizlik x ning barcha qiymatlarida o'rinli bo'ladi?
A) $-1 < a < 2$ B) $-3 < a < 2$ C) $-2 < a < 1$ D) $a > 0$ E) $a < 0$
38. $\begin{cases} x^2 + y^2 + 2x \leq 1 \\ x - y + a = 0 \end{cases}$ sistema yagona yechimga ega bo'ladigan a ning barcha qiymatlarini toping.
A) $a = 3$; $a = -1$ B) $a = 3$; $a = 1$ C) $a = -1$ D) $a = 1$ E) $a = 3$
39. Agar $2x + 4y = 1$ bo'lsa, $x^2 + y^2$ ning eng kichik qiymatini toping.
A) 1 B) $1/10$ C) $1/20$ D) $1/5$ E) $1/15$
40. Hisoblang $1 + 2x + 3x^2 + 4x^3 + \dots + (n + 1)x^n$ ($x \neq 1$)
A) $\frac{1 - x^{n+1}}{(1-x)^2} - \frac{(n+1)x^{n+1}}{1-x}$ B) $\frac{(n+1)x^{n+1}}{(1-x)^2}$ C) $\frac{1 - x^{n+1} - (n+1)x^{n+1}}{(1-x)^2}$
D) $\frac{1 - x^{n+1}}{(1-x)^2}$ E) hisoblash mumkin emas
41. $(4/5)^x = 4$ tenglama yechimi qaysi oraliqda yotadi?
A) $(-\infty; -1)$ B) $(0; 1)$ C) $[2; \infty)$ D) $(-1; 0)$ E) $(1;$
42. $|x| \cdot (x^2 - 4) = -1$ tenglama nechta ildizga ega?
A) 1 B) 2 C) 3 D) 4 E) \emptyset
43. $\cos(\lg(2 - 3^{x^2})) = 3^{x^2}$ tenglama nechta ildizga ega?
A) \emptyset B) cheksiz ko'p C) 1 D) 2 E) 3
44. $2|x - 3| + x - 1 + 2\sin\frac{\pi x}{2} = 0$ tenglama nechta ildizga ega?
A) \emptyset B) 1 C) 2 D) 4 E) cheksiz ko'p
45. Hisoblang: $\left(\frac{81 \cdot 2}{567} + \frac{33}{77}\right) \cdot 24,5 + \frac{2}{3} : 0, (3)$
A) 7,5 B) 15,5 C) 19,5 D) 20,5 E) 17,5

11-sinf
2-variant

1. Soddashtiring: $\frac{3}{a-\sqrt{a^2-6}} + \frac{3}{a+\sqrt{a^2-6}}$
A) $1,5a$ B) $3a$ C) $2,5a$ D) $2a$ E) a
2. Agar $x^2 + 4xy + y^2 = 15 + 3xy$, $x + y = 4$ bo'lsa, $xy = ?$
A) 0 B) 1 C) 2 D) 3 E) -1
3. $\sqrt{\frac{3x+1}{9-x}} > 1$ tenglama nechta butun yechimga ega?
A) 2 B) 3 C) 4 D) 6 E) 7
4. Tengsizlikni yeching: $|x^2 - 6| < 1$.
A) $(-\sqrt{7}; \sqrt{7})$ B) $(-\sqrt{7}; -\sqrt{5}) \cup (\sqrt{5}; \sqrt{7})$ C) $(-\sqrt{7}; -1) \cup (1; \sqrt{7})$
D) $(1; \sqrt{3})$ E) $(-\sqrt{3}; -1)$
5. $\operatorname{tg} \alpha = 1/2$, $\operatorname{tg} \beta = 2/3$, $\operatorname{tg} \gamma = 9/10$, α , β , γ - o'tkir burchaklar bo'lsa, γ ni α va β orqali ifodalang.
A) $\gamma = \beta - \alpha$ B) $\gamma = \alpha - \beta$ C) $\gamma = \alpha + \beta$ D) $\gamma = 2\alpha - \beta$ E) $\gamma = 2\beta - \alpha$
6. Agar $a^2 + 9/a^2 = 22$ bo'lsa, $a - 3/a$ ni hisoblang.
A) 3 B) -3 C) ± 4 D) 1 E) 0
7. $f(x) = \begin{cases} 2x^2 + 1, & |x| < 3 \\ 5x - 1, & |x| \geq 3 \end{cases}$ bo'lsa, $f(x^2 + 7)$ ni hisoblang.
A) $5x^2 - 34$ B) $2x^2 - 8$ C) $5x^2 + 36$ D) $5x^2 + 34$ E) $2(x^2 + 7)^2 + 1$
8. Agar $f(x+1) = 3 - 2x$ va $f(\varphi(x)) = 6x - 3$ bo'lsa, $\varphi(x)$ ni toping.
A) $4 - 3x$ B) $3x - 4$ C) $4x + 3$ D) $4x - 3$ E) $6x - 8$
9. Hisoblang: $1 - \sqrt{3} \operatorname{ctg} 40^\circ + \frac{1}{\cos 20^\circ}$
A) $\sin 20^\circ$ B) $1/2$ C) 0 D) $\sqrt{3}/2$ E) $\cos 28^\circ$
10. Hisoblang: $\lg \operatorname{tg} 22^\circ + \lg \operatorname{tg} 68^\circ + \lg \sin 90^\circ$
A) 0,5 B) 1 C) 0 D) 0,6 E) -1
11. Hisoblang: $((3 \cdot 128^{\frac{3}{7}} \cdot e^{-\ln 48})^{-\frac{1}{2}} - (\operatorname{tg} \frac{7\pi}{6})^{-1})^2 + \frac{12}{\sqrt{6}}$
A) 1 B) 2 C) 3 D) 4 E) 5
12. $y = x^2$ funksiyaning grafigi $a(-3; 2)$ vektorga parallel ko'chirilgan bo'lsa, uning tenglamasini aniqlang.
A) $y = x^2 + 6x + 4$ B) $y = x^2 + 5$ C) $y = x^2 - 1$ D) $y = x^2 + 9$ E) $y = x^2 + 4x - 9$

13. Funksiyaning qiymatlar sohasini toping: $y = \sqrt{x - x^2}$.

A) $[0; 1]$ B) $[1/2; 1]$ C) $[0; 1/2]$ D) $[0; 2]$ E) $[1; \sqrt{2}]$

14. Agar $f(x) = \frac{1-x}{1+x}$ bo'lsa, $f\left(\frac{1}{x}\right) + \frac{1}{f(x)}$ ni toping.

A) $\frac{4x}{1-x^2}$ B) $\frac{4x}{x^2-1}$ C) $\frac{x^2+1}{x^2-1}$ D) $\frac{2x(x^2+1)}{x^2-1}$ E) $\frac{2(x^2+1)}{1-x^2}$

15. $(-\infty; 2]$ oraliqda $y = x^2 - 4x + 7$ funksiyaga teskari funksiyani toping.

A) $2 \pm \sqrt{x-3}$ B) $2 - \sqrt{x-3}$ C) $2 + \sqrt{x-3}$ D) $2 + \sqrt{3-x}$
E) $2 \pm \sqrt{3-x}$

16. Funksiyaning qiymatlar sohasini toping: $y = \left(\operatorname{tg} \frac{\pi}{6}\right)^{x^2-4x+2}$

A) $\left[\frac{1}{\sqrt{3}}; 3\right]$ B) $(0; \sqrt{3}]$ C) $[0; 3]$ D) $(-\infty; 3]$ E) $\left[-\frac{1}{\sqrt{3}}; \sqrt{3}\right]$

17. Tenglamani yeching: $9^x + 6^x = 2 \cdot 4^x$

A) 1 B) 0 C) 0; 1 D) E) -1

18. $\left(\cos \frac{\pi}{6}\right)^{x^2-3x-10} < \left(\sin \frac{\pi}{6}\right)^{x^2-3x-10}$ tengsizlikni eng katta butun yechimini toping

A) -2 B) 1 C) 3 D) 4 E) 5

19. Funksiyaning aniqlanish sohasini toping:

$$f(x) = \log_3(81^{-3} - 3^{x^2+3}).$$

A) $(-\infty; 3) \cup (-2; \infty)$ B) $(-\infty; -1) \cup (3; \infty)$ C) $(1; 3)$ D) $(-3; 1)$
E) $(0; \infty)$

20. Hisoblang: $(0,125)^{\log_{2\sqrt{2}}\left(\frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \frac{1}{32} + \dots\right)}$

A) 16 B) 25 C) 36 D) 32 E) 24

21. $\log_{30} 8$ ni $\lg 5 = a$, $\lg 3 = b$ orqali ifodalang.

A) $\frac{3-3a}{1+b}$ B) $\frac{3(1-b)}{1+a}$ C) $\frac{3(a-b)}{a+b}$ D) $\frac{b-1}{a+1}$ E) $\frac{a+1}{1-b}$

22. Ifodani soddalashtiring: $5^{\sqrt{\log_5 a}} - a^{\sqrt{\log_a 5}}$ ($a > 1$)

A) a B) $-a^2$ C) $5a$ D) 1 E) 0

23. Tengsizlikni yeching: $\frac{\log_3(1-2x)}{\log_{0,2}(x^2+2x+1)} < 0$
- A) $(1/2; 1)$ B) $(-\infty; 1/2)$ C) $(-\infty; 0)$ D) $(-\infty; -1) \cup (-1; 0)$
E) $(-\infty; -1) \cup (-1; 1/2)$
24. $\operatorname{tg} \alpha = 2$ bo'lsa, $\frac{2-5\cos 2\alpha}{6+10\sin 2\alpha} - \frac{13-3\operatorname{tg} 2\alpha}{10\cos 2\alpha-15\sin \alpha}$ ni hisoblang.
- A) $3/4$ B) $4/5$ C) $6/7$ D) $7/8$ E) $8/9$
25. $2\sin 6x(\cos^4 3x - \sin^4 3x) = \sin kx$ tenglik doim bajariladigan k ning qiymatini toping.
- A) 12 B) 24 C) 6 D) 18 E) 4
26. Hisoblang: $\arcsin \frac{4}{5} + \arccos \frac{1}{\sqrt{50}}$.
- A) $3\pi/4$ B) $\pi/2$ C) $\pi/6$ D) $\pi/2$ E) $\pi/3$
27. $1 - \sin 5x = (\cos \frac{3x}{2} - \sin \frac{3x}{2})^2$ tenglamaning $[360^\circ; 450^\circ]$ oraliqdagi ildizlari yig'indisini toping.
- A) 495° B) 1575° C) 1170° D) 1255° E) 975°
28. $\log_{\sin x} \cos x = 1$ tenglamani yeching.
- A) $\pi/4$ B) $\pi/4 + \pi n, n \in \mathbb{Z}$ C) $-\pi/4 + \pi n, n \in \mathbb{Z}$
D) $\pi/4 + 2\pi n, n \in \mathbb{Z}$ E) $-\pi/4 + 2\pi n, n \in \mathbb{Z}$
29. Tengsizlikni yeching: $\cos^2 x - \frac{5}{2}\cos x + 1 \leq 0$.
- A) $[0; \pi/3] \cup [5\pi/3; 2\pi]$ B) $[0; \pi/2]$ C) $[5\pi/3; 2\pi]$
D) $[\pi/3; \pi/2] \cup [3\pi/2; 5\pi/3]$ E) $[\pi/3; \pi/2]$
30. $\sqrt{6}\sin x + \sqrt{3}\sin 2x = 0$ tenglamaning $[\pi; 2\pi]$ oraliqdagi ildizlari yig'indisini toping.
- A) π B) 3π C) $11\pi/6$ D) $17\pi/4$ E) $9\pi/2$
31. Funksiyaning eng katta qiymatini toping: $y = \frac{1}{2^{\cos x}} + \ln e^2$.
- A) 2,5 B) 3 C) $1 + e^2$ D) 4 E) aniqlash mumkin emas
32. k ning qanday qiymatlarida: $f(x) = 1 - \cos 2x - k \cos 2x$ funksiya o'zgarmas bo'ladi?
- A) 2 B) -2 C) 1,5 D) -1,5 E) -1
33. Funksiyaning eng kichik qiymatini toping: $y = (\sqrt{3}\cos 3x + \sin 3x)^7$.

A) -14 B) -21 C) -64 D) -128 E) -3^7

34. $\sqrt{\sin x} + \sqrt{\cos x} = 1$ tenglamaning $[-3\pi; \pi]$ oraliqdagi ildizlari yig'indisini toping.

A) -3π B) -2π C) $-\pi$ D) $3\pi/2$ E) 3π

35. Tenglama nechta ildizga ega $|x - 4| + |x - 1| + |x + 2| = 0$?

A) ildizi yo'q B) 2 C) 3 D) 1 E) cheksiz ko'p

36. Tenglamani yeching: $\log_2(3^{2x} - 26 \cdot 3^x) = x$

A) 9 B) 6 C) 4 D) 3 E) 2

37. Tengsizlikni yeching: $\log_{x^2}(x+2) \leq 1$

A) $(-\infty; -1] \cup [2; \infty)$ B) $(-\infty; -1) \cup [2; \infty)$

C) $(-2; -1) \cup (-1; 0) \cup (0; 1) \cup [2; \infty)$

D) $(-1; 2]$ E) $(-\infty; -1) \cup [-1; \infty)$

38. Tenglamani yeching: $2^{x-4} + 2^{x-2} + 2^{x-1} = 6,5 + 3,25 + 1,625 + \dots$

A) 4 B) 2 C) 1 D) 0 E) aniqlash mumkin emas

39. Tenglamani yeching: $5^{x-3} - 5^{x-4} - 16 \cdot 5^{x-5} = 2^{x-3}$

A) 2 B) 3 C) 4,5 D) 5 E) 6

40. $2^{x^2} \cdot 3^x = 6$ tenglamani yechimlaridan biri 1. Ikkinchisini toping.

A) $-\log_2 6$ B) $\log_2 3$ C) $\log_3 6$ D) $\sqrt{3}$ E) $-\sqrt{3}$

41. To'g'riburchakli uchburchakning gipotenuzasiga o'tkazilgan balandlik va katetlarning gipotenuzadagi proyeksiyalari ayirmasi 6 ga teng.

Gipotenuza uzunligini toping.

A) $6\sqrt{5}$ B) $10\sqrt{3}$ C) $2\sqrt{10}$ D) $3\sqrt{10}$ E) 10

42. ABC to'g'riburchakli uchburchakning gipotenuzasiga CD balandlik o'tkazilgan. Agar $\angle B = 60^\circ$ va $BD = 2$ bo'lsa, gipotenuza uzunligini toping.

A) 8 B) 9 C) 6 D) 7 E) 10

43. Gipotenuzasi 10 ga, katetlaridan biri 8 ga teng bo'lgan to'g'riburchakli uchburchakning kichik burchagining bissektrisasini toping.

A) $\frac{3\sqrt{5}}{2}$ B) $\frac{2\sqrt{10}}{3}$ C) $\frac{8\sqrt{10}}{3}$ D) $\frac{5\sqrt{3}}{2}$ E) $\frac{6\sqrt{3}}{5}$

44. Katetining uzunligi $\sqrt{2}$ ga teng tengyonli to'g'riburchakli uchburchakning medianalari kesishgan nuqtasi bilan bissektrisalar kesishgan nuqtasi orasidagi masafoni toping.

A) $\frac{\sqrt{2}-1}{2}$ B) $\frac{2-\sqrt{3}}{3}$ C) $\frac{2\sqrt{3}-3}{6}$ D) $\frac{3\sqrt{2}-4}{3}$ E) $\frac{2\sqrt{3}-3}{2}$

45. Quyidagi uchta sonlardan qaysinisi o'tkir burchakli uchburchakning tomonlari bo'la oladi ?

- A) 2; 3; 4 B) 4; 5; 7 C) 5; 6; 7 D) 8; 15; 17 E) 5; 7; 13

11-sinf

3-variant

1. Parallelogramning diagonallari yig'indisi 8 ga teng. Tomonlari kvadratlarining yig'indisini eng kichik qiymatini toping.

- A) 32 B) 30 C) 64 D) 48 E) 34

2. Parallelogramning perimetri 14. Uning diagonallari parallelogramni to'rtta uchburchakka ajratadi. Ikki qo'shni uchburchak perimetrlarining ayirmasi 2 ga teng. Parallelogramm katta tomonini uzunligini toping.

- A) 10 B) 12 C) 8 D) 10,5 E) 8,5

3. Trapetsiyaning asoslari 28 va 12 ga teng. Diagonallari o'rtalari orasidagi masofani toping.

- A) 8 B) 10 C) 6 D) 9 E) 7

4. ABCD trapetsiyaning o'rta chizig'i uni o'rta chiziqi 13 va 17 ga teng bo'lgan ikkita trapetsiyaga ajratadi. ABCD trapetsiyaning katta asosini toping.

- A) 19 B) 21 C) 18 D) 30 E) 23

5. Qavariq n burchakli ko'pburchakning diagonallari soni 25 tadan kam emas, 30 tadan ortiq emas. Ko'pburchak tomonlari sonini toping.

- A) 7 B) 8 C) 9 D) 10 E) 11

6. Radiusi $\sqrt{2}$ ga teng bo'lgan ikki doiraning umumiy vatari uzunligi 2 ga teng. Ikki doira umumiy qismining yuzini toping.

- A) $\pi - 1$ B) $\pi/2 - 1$ C) $\pi - 2$ D) $(\pi - 1)/2$ E) $(\pi - 3)/2$

7. Teng yonli trapetsiyaga ichki chizilgan doiraning markazi yuqori asosining uchidan 3, pastki asosining uchidan 4 birlik masofada yotadi. Trapetsiyaga ichki chizilgan doiraning yuzini toping.

- A) $2,86\pi$ B) $4,86\pi$ C) $3,24\pi$ D) $6,76\pi$ E) $5,76\pi$

8. C (-6; 4; 3) nuqtadan o'tkazilgan a (-3; 2; -4) va b (4; 3; -2) vektorlar teng yonli uchburchakning yon tomonlaridir. Uchburchak C uchidan asosiga o'tkazilgan balandlik asosining koordinatalari yig'indisini toping.

- A) -1 B) 1 C) -2,5 D) 2,5 E) 3

9. Uchburchak yuzi 72 ga teng. Uning tekislikka ortogonal proyeksiyasi kavadratdan iborat. To'g'ri to'rtburchakning tekisligi proyeksiya tekisligi bilan 60° li burchak tashkil etadi. Kvadrat perimetrini toping.

A) 32 B) 26 C) 30 D) 28 E) 24

10. Agar prizmaning barcha qirralari soni 60 ga teng bo'lsa, u holda yoqlarining soni nechta?

A) 20 B) 21 C) 22 D) 24 E) 25

11. Qirrasining uzunligi a ga teng oktaedrning to'la sirtining yuzini toping.

A) $2a^2\sqrt{3}$ B) $a^2\sqrt{3}$ C) $\frac{2\sqrt{3}}{3}a^2$ D) $4a^2\sqrt{3}$ E) $\frac{\sqrt{3}}{3}a^2$

12. Qirralarining uzunligi a ga teng bo'lgan kub yuqori asosining markazi pastki asosining tomonlari o'rtalari bilan birlashtirilgan. Pastki asoslarining o'rtalari ham o'zaro birlashtirilgan. Hosil bo'lgan piramida to'la sirtini toping.

A) $\frac{2a^2}{3}$ B) $3a^2$ C) $1,5a^2$ D) $2a^2$ E) $\frac{\sqrt{3}}{3}a^2$

13. Asosi muntazam oltiburchakdan iborat prizmaning yon yoqlari kvadratdan iborat. Agar asosining tomoni $2\sqrt{5}$ ga teng bo'lsa, prizmaning katta diagonal uzunligini toping.

A) $4\sqrt{5}$ B) 10 C) $3\sqrt{5}$ D) 12 E) 11

14. $y = x^2 + 4(a - 2)x + 5$ parabolaning uchi $x + a = 0$ to'g'ri chiziqda yotsa, a ning qiymatini toping.

A) 4 B) 8 C) -4 D) -2 E) 1

15. Funksiyaning qiymatlar sohasini toping: $f(x) = |x - 1| + |x - 3|$.

A) $[0; +\infty)$ B) $[1; +\infty)$ C) $[2; +\infty)$ D) $[3; +\infty)$ E) $[4; +\infty)$

16. $y = \frac{4}{2-x} - 3$ funksiyaga teskari funksiyani toping.

A) $y = \frac{4}{2-x} - 2$ B) $y = \frac{4}{3-x} - 2$ C) $y = \frac{4}{x+3} + 2$
D) $y = \frac{4}{x-2} + 3$ E) $y = -\frac{4}{x+3} + 2$

17. Agar x uchun $2^{3x} \cdot 7^{x-2} = 4^{x+1}$ bo'lsa, $\frac{x^2 - 1}{x + 2}$ ning qiymatini hisoblang.

A) 2/3 B) 0,75 C) 0,6 D) 0 E) 2,5

18. $2^x \cdot x^2 - 2 \cdot x^2 + 2 - 2^x = 0$ tenglamaning ildizlari ko'paytmasini toping.

A) 1 B) -1 C) 2 D) -2 E) -5,5

19. Tenglamaning ildizlari yig'indisini toping: $9 \cdot 16^x - 7 \cdot 12^x - 16 \cdot 9^x = 0$.

- A) 2 B) -2 C) 3 D) -1 E) 1
20. Tenglamaning ildizlari ko'paytmasini toping:
 $(\sqrt{3+2\sqrt{2}})^x + (\sqrt{3-2\sqrt{2}})^x = 6$.
- A) 2 B) 4 C) -4 D) -2 E) 16
21. Sistema ildizlarini ifodalovchi nuqtalar orasidagi masofani toping:

$$\begin{cases} x^{\sqrt{4}} = y \\ y^{\sqrt{y}} = x^4 \end{cases}$$
- A) $\sqrt{7}$ B) 4 C) $\sqrt{10}$ D) $2\sqrt{2}$ E) 9
22. a ni b orqali ifodalang: $5^a = 3, 75^b = 81$.
- A) $\frac{2b}{4-b}$ B) $\frac{b}{4+b}$ C) $\frac{3b}{b-4}$ D) $\frac{2b}{4+b}$ E) $\frac{b}{4-b}$
23. $3^{-x} = 4 + x - x^2$ tenglamani nechta yechimi bor?
- A) \emptyset B) 1 C) 2 D) 3 E) 4
24. $2^x = x^3$ tenglama nechta haqiqiy ildizga ega?
- A) 2 B) 1 C) 3 D) \emptyset E) aniqlab bo'lmaydi
25. Tengsizlikni eng katta butun yechimini toping: $2 \cdot 3^x + \frac{7}{3^x} < 61 \cdot 3^{-x}$
- A) 2 B) -2 C) 1 D) 4 E) 0
26. Funksiyaning aniqlanish sohasini toping: $y = \log_3(x(x-3)) - \log_3 x$.
- A) $(-\infty; 0)$ B) $(-\infty; -1)$ C) $(-\infty; -2)$ D) $(1; +\infty)$ E) $(2; +\infty)$
27. Hisoblang: $\frac{1}{\log_2 4} + \frac{1}{\log_4 4} + \frac{1}{\log_8 4} + \frac{1}{\log_{16} 4} + \frac{1}{\log_{32} 4} + \frac{1}{\log_{64} 4} + \frac{1}{\log_{128} 4}$
- A) 4 B) 16 C) 7 D) 32 E) 8
28. Hisoblang: $\left(\frac{\log_6 27 + 2 \log_6 2}{\log_6 \sqrt[3]{0,25} + \log_6 \frac{1}{3}} \right)^3$.
- A) -27 B) 27 C) -8 D) $8 \log_6 27$ E) 16
29. $\log_4 39,2$ ni a va b orqali ifodalang: $\log_7 2 = a, \log_2 10 = b$.
- A) $\frac{1}{a} + \frac{2}{3} - \frac{b}{2}$ B) $\frac{1}{a} + \frac{3}{2} - \frac{b}{2}$ C) $\frac{1}{a} - \frac{3}{2} + \frac{b}{2}$ D) $\frac{1}{a} - \frac{2}{3} + \frac{b}{2}$ E) $\frac{1}{a} - \frac{2}{3} + \frac{b}{3}$
30. $3^{\log_3 2^x} + x^{\log_3 x} = 162$ tenglamaning ildizlari ko'paytmasini toping.
- A) 9 B) 3 C) 1 D) $1/3$ E) $2/4$

31. $12^{\log_{12}(x+3)} > 2x - 5$ tenglamaning eng kichik butun yechimini toping.
 A) -1 B) -2 C) -3 D) 2 E) -2,5
32. Hisoblang: $\cos^8 165^\circ - \cos^8 165^\circ$.
 A) $\frac{3\sqrt{2}}{5}$ B) $\frac{5\sqrt{3}}{8}$ C) $\frac{7\sqrt{2}}{16}$ D) $\frac{7\sqrt{3}}{16}$ E) $\frac{3\sqrt{3}}{8}$
33. Hisoblang: $\operatorname{tg}(\operatorname{arctg} 2 - \operatorname{arccos} \frac{12}{13})$.
 A) 19/22 B) 1/2 C) 2/13 D) 0 E) 18/22
34. Hisoblang: $\sin(2 \operatorname{arctg} 3) - \cos(2 \operatorname{arctg} 2)$.
 A) 1,2 B) 1,4 C) -0,8 D) 0,8 E) 1,6
35. $\frac{\cos 2x}{\frac{\sqrt{2}}{2} + \sin x} = 0$ tenglamaning $[0; 4\pi]$ kesmada nechta ildizi bor?
 A) 8 B) 6 C) 4 D) 2 E) 12
36. Tenglamani yeching: $\log_{\sin x} \cos x = 1$.
 A) $\pi/4$ B) $\pi/4 + \pi n, n \in \mathbb{Z}$ C) $-\pi/4 + \pi n, n \in \mathbb{Z}$
 D) $\pi/4 + 2\pi n, n \in \mathbb{Z}$ E) $-\pi/4 + 2\pi n, n \in \mathbb{Z}$
37. Tengsizlikni $[0; \pi]$ oraliqdagi barcha yechimlarini aniqlang:
 $(\pi - e)^{\ln(\cos^4 x - \sin^4 x)} \geq 1$.
 A) $[0; \pi/2] \cup [8\pi/2; 2\pi]$ B) $[0; \pi/2] \cup [3\pi/2; 2\pi]$
 C) $[0; \pi/4] \cup [3\pi/4; 2\pi]$ D) $[\pi/4; \pi/2] \cup [3\pi/2; 2\pi]$
 E) $[0; \pi/4] \cup [3\pi/2; \pi]$
38. Agar $\begin{cases} x^3 + 2x^2y + xy^2 - x - y = 2 \\ x^3 - 2xy^2 + x^2y + x + y = 6 \end{cases}$ bo'lsa, $x + y$ ni toping.
 A) 1 B) 2 C) -1 D) -2 E) 3
39. Agar $5 \leq x \leq y \leq z \leq t \leq 320$ bo'lsa, $x/y + z/t$ ifodaning eng kichik qiymatini toping.
 A) 0,25 B) 0,5 C) 1,6 D) 0,6 E) aniqlab bo'lmaydi
40. Tengsizlikni yeching: $x^2 - 7x + 12 < |x - 4|$.
 A) (2; 4) B) \emptyset C) (3; 4) D) (2; 3) E) $(-\infty; 3) \cup (4; +\infty)$
41. Agar $\sqrt{x+3} - \sqrt{x+14} + \sqrt{x+3} + \sqrt{x+14} = 4$ bo'lsa, $\frac{x}{x+1}$ ni hisoblang.
 A) 2/3 B) -2/3 C) 3 D) 3/2 E) -3/2

42. $\sqrt{|x|-2} < \frac{2|x|}{x}$ tengsizlikni nechta butun yechimi bor?

A) 6 B) 5 C) 3 D) 4 E) 7

43. O'suvchi geometrik progressiyaning dastlabki uchta hadining yig'indisi 24 ga teng. Shu progressiyaning ikkinchi hadini toping.

A) 8 B) aniqlab bo'lmaydi C) 10 D) 6 E) 7

44. Hisoblang: $100^2 - 97^2 + 96^2 - 93^2 + 92^2 - 89^2 + \dots + 4^2 - 1^2$.

A) 7575 B) 5055 C) 6675 D) 6775 E) 7475

45. Tenglamani yeching: $1 - 3x + 9x^2 - \dots - (3x)^9 = 0$.

A) $\pm 1/3$ B) $1/3$ C) $-1/3$ D) $1/5$ E) $3/4$

11-sinf

4-variant

1. Bir hil raqamlardan iborat ikki honali sonlar yig'indisini toping.

A) 495 B) 505 C) 491 D) 550 E) 521

2. $1; 3; 7; 15; 31; \dots; 2^n - 1$ ketma-ketlikning dastlabki n ta hadining yig'indisini toping.

A) $4^n + 3n$ B) $2(2^n - 1) - n$ C) $2^n + n + 1$ D) $2^{2n} + 4n$
E) aniqlab bo'lmaydi

3. a ning qanday qiymatida $2a + a\sqrt{2}a + a + \frac{a}{\sqrt{2}} + \dots$ cheksiz kamayuvchi geometrik progressiyaning yig'indisi 8 ga teng bo'ladi?

A) 1 B) $\frac{4}{\sqrt{2}}$ C) $2 - \sqrt{2}$ D) $2 + \sqrt{2}$ E) $2(2 - \sqrt{2})$

4. Hisoblang: $\sqrt[3]{3\sqrt[3]{3\sqrt[3]{3\sqrt[3]{3\sqrt[3]{3}}}}}$

A) $\sqrt[3]{3}$ B) $\sqrt[6]{3}$ C) 1 D) $\sqrt{3}$ E) 3

5. Agar $\begin{cases} \operatorname{tg}\alpha = \frac{3 + \sqrt{x}}{2} \\ \operatorname{tg}\beta = \frac{3 - \sqrt{x}}{2} \\ \alpha + \beta = \frac{\pi}{4} \end{cases}$ bo'lsa, x ni toping.

A) $\pi/3$ B) -17 C) $-\pi/6 + \pi k, k \in \mathbb{Z}$ D) 17 E) to'g'ri javob yo'q

6. α, β, γ o'tkir burchaklar bo'lib, $\operatorname{tg} \alpha = 1/2$, $\operatorname{tg} \beta = 1/5$, $\operatorname{tg} \gamma = 7/9$ bo'lsa, γ ni α va β lar orqali ifodalang.

A) $\gamma = \alpha + \beta$ B) $\gamma = 2\alpha + \beta$ C) $\gamma = \alpha + 2\beta$ D) $\gamma = \alpha - \beta$ E) $\gamma = 2(\alpha + \beta)$

7. Hisoblang: $\cos 36^\circ \cdot \cos 72^\circ$.

A) $1/2$ B) $1/8$ C) $1/4$ D) $1/12$ E) $3/4$

8. Soddashtiring: $\sin^6 x + \cos^6 x + (3/4) \sin^2 2\alpha$

A) 1 B) -1 C) $\sin^2 \alpha$ D) $\cos^2 \alpha$ E) to'g'ri javob yo'q

9. $\sin \frac{x}{2} \cos^3 \frac{x}{2} - \sin^3 \frac{x}{2} \cos \frac{x}{2}$ ifodaning eng katta qiymatini toping.

A) 1 B) $1/2$ C) 2 D) $1/4$ E) $1/8$

10. Hisoblang: $\sin^4 \frac{\pi}{8} + \cos^4 \frac{3\pi}{8} + \sin^4 \frac{5\pi}{8} + \cos^4 \frac{7\pi}{8}$.

A) 1 B) $1/2$ C) 2 D) $1/4$ E) $1/8$

11. Agar $\sin \alpha = 1/3$ bo'lsa, $\cos(\pi/4 - \alpha) \sin(3\pi/4 - \alpha)$ ni hisoblang.

A) $5/6$ B) $3/4$ C) $4/5$ D) $\sqrt{3}/4$ E) $\sqrt{3}/2$

12. Soddashtiring:
$$\frac{1 - \sin^2 \frac{\alpha}{8} - \cos^2 \alpha - \sin^2 \alpha}{4 \sin^4 \frac{\alpha}{16}}$$

A) $\operatorname{tg}^2 \frac{\alpha}{16}$ B) 1 C) -1 D) $\operatorname{ctg}^2 \frac{\alpha}{16}$ E) $-\operatorname{ctg}^2 \frac{\alpha}{16}$

13. Agar $\operatorname{tg} \alpha = 1/2$ bo'lsa, $\sin(2\alpha + \pi/4)$ ni hisoblang.

A) $1/2$ B) $-1/2$ C) -2 D) $4/5$ E) $-4/5$

14. Hisoblang: $\sin 20^\circ \sin 40^\circ \sin 80^\circ$

A) $\frac{\sqrt{6} + \sqrt{2}}{16}$ B) $\frac{\sqrt{6} - \sqrt{2}}{16}$ C) $\frac{\sqrt{2} + 1}{8}$ D) $\frac{\sqrt{2}}{2}$ E) $\frac{\sqrt{3}}{2}$

15. $\sin 16^\circ$ ni $\cos 37^\circ = a$ orqali ifodalang.

A) $a^2 - 1$ B) $a - 1$ C) $2a^2 - 1$ D) $1 - a^2$ E) aniqlab bo'lmaydi

16. m ning $\sqrt{m-1}$; $\sqrt{5m-1}$; $\sqrt{12m+1}$ lar ko'rsatilgan tartibda arifmetik progressiya tashkil qiladigan qiymatlari yig'indisini toping.

A) 12 B) 13 C) 8 D) 15 E) aniqlab bo'lmaydi

17. Agar $a = 2^5 + 2^{-5}$ va $b = 2^5 - 2^{-5}$ bo'lsa, $a^2 - b^2$ ni toping?

A) 0 B) 2 C) $1/2$ D) $1/4$ E) 4

18. Hisoblang: $\sqrt{7+4\sqrt{3}} + \sqrt{7-4\sqrt{3}}$

A) 3 B) 5 C) 4 D) 6 E) 7

19. Soddashtiring: $\sqrt{21-2\sqrt{21+2\sqrt{19-6\sqrt{2}}}}$

- A) $3\sqrt{2} + 1$ B) $3\sqrt{2} + 2$ C) $3\sqrt{2} - 2$ D) $2\sqrt{3} + 2$ E) $3\sqrt{2} - 1$

20. $a = 5,2$ da $\frac{a^2 - a - 6 - (a+3)\sqrt{a^2 - 4}}{a^2 + a - 6 - (a-3)\sqrt{a^2 - 4}}$ ifodani qiymatini hisoblang.

- A) 1,5 B) -2,5 C) -1,5 D) 2,4 E) -3,2

21. Soddashtiring: $(\sqrt[3]{9+4\sqrt{5}} + \sqrt[3]{\sqrt{5}+2}) \cdot \sqrt[3]{\sqrt{5}-2}$

- A) 2 B) 1 C) 3 D) 4 E) 6

22. Soddashtiring: $\sqrt{a^{\frac{2}{3}} - 2a^{\frac{1}{3}} + a^{\frac{4}{3}}} : a^{\frac{2}{3}}$

- A) $a - 2$ B) $a^2 - 1$ C) $a - 1$ D) $\sqrt{a-3}$ E) $\sqrt{a^2-1}$

23. Agar $\frac{4x^2 - 4xy + 3y^2}{2y^2 + 2xy - 5x^2} = 1$ bo'lsa, $\frac{x+y}{x-y}$ ni hisoblang.

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

24. a ning qanday qiymatlarida $(a^2 + 2)x = a(x - 7) + 2$ tenglamaning ildizlari cheksiz ko'p bo'ladi?

- A) $-\sqrt{2}$ B) C) $\sqrt{2}$ D) $-\sqrt{2}; \sqrt{2}$ E) to'g'ri javob yo'q

25.
$$\begin{cases} xy/(x+y) = \frac{10}{7} \\ yz/(y+z) = \frac{40}{13} \\ 7x/(x+z) = \frac{5}{3} \end{cases}$$
 sistemasidan x ni toping.

- A) 80/79 B) 3/7 C) 7/13 D) 79/80 E) 7/5

26. k ning qanday qiymatlarida $\begin{cases} 3x + (k-1)y = k+1 \\ (k+1)x + y = 3 \end{cases}$ tenglamalar sistemasi

cheksiz ko'p yechimga ega bo'ladi?

- A) -1 B) -2 C) 0 D) 2 E) 1

27. Ushbu $(x^2 - x - 1)(x^2 - x - 7) \leq -5$ tengsizlikni eng katta va eng kichik butun ildizlari ayirmasini toping.

- A) 2 B) 3 C) 4 D) 5 E) 6

28. Agar $9 \leq x \leq y \leq z \leq t \leq 81$ bo'lsa, $x/y + z/t$ ifodaning eng kichik qiymatini toping?

- A) 2/3 B) 3/2 C) 1/5 D) 1/3 E) aniqlab bo'lmaydi

29. Tenglamaning ildizlari yig'indisini toping: $|x + 1| = 2|x - 2|$.
A) 2 B) 3 C) 4 D) 1 E) 0
30. Agar $\sqrt[3]{1 + \sqrt{x-1}} + \sqrt[3]{1 - \sqrt{x-1}} = 2$ bo'lsa, $\frac{x}{x+2}$ ni hisoblang.
A) $2/3$ B) $-2/3$ C) $1/3$ D) $-1/3$ E) $3/5$
31. a soni $b^2 - 3$ bilan to'g'ri proporsional. $b = 5$ bo'lganda $a = 88$ bo'lsa, $b = -3$ bo'lganda a soni nechaga teng bo'ladi?
A) 24 B) 6 C) 18 D) 12 E) 36
32. $\sqrt{5 - |2x - 1|} < 2$ tengsizlikning butun yechimlari sonini toping..
A) 2 B) 3 C) 4 D) 6 E) cheksiz ko'p
33. Funksiyaning aniqlanish sohasini toping: $y = \sqrt{\frac{x^2 - 4x + 4}{1 - x^2}}$
A) $(-1; 1)$ B) $(-1; 1) \cup \{2\}$ C) $(-1; 2)$ D) $(-\infty; -1) \cup \{2\}$
E) $(-\infty; -1) \cup (1; +\infty)$
34. m ning qanday qiymatlarida $4x^2 - (\sqrt{3}m - 3)x - 9 = 0$ tenglama turli ishorali ildizlarga ega bo'ladi?
A) 1,5 B) $\pm \sqrt{3}$ C) 1,5 D) $\sqrt{3}$ E) 0
35. Hisoblang: $\left(1 - \frac{1}{5^2}\right)\left(1 - \frac{1}{6^2}\right) \dots \left(1 - \frac{1}{103^2}\right)$.
A) $64/103$ B) $67/103$ C) $69/103$ D) $415/515$ E) $416/515$
36. Agar $\vec{a}(x; 1; -1)$, $\vec{b}(1; 0; 1)$ vektorlar uchun $(\vec{a} + 3\vec{b})^2 = (\vec{a} - 2\vec{b})^2$ shart bajarilsa, x ni toping.
A) 0 B) 1 C) -1 D) 0,5 E) $-1/2$
37. Uchburchakning uchlari $A(3; -2; 1)$, $B(3; 0; 2)$, $C(1; 2; 5)$ nuqtalarda joylashgan. Shu uchburchakning BD medianasi va AC asosi orasidagi burchakni toping.
A) 30^0 B) 60^0 C) 45^0 D) $\arccos 1/3$ E) 75^0
38. \vec{b} vektor $\vec{a}(1; 2; 2)$ vektorga kollinear hamda bu vektorlarning skalyar ko'paytmasi 36 ga teng. \vec{b} vektorning uzunligini toping.
A) 3 B) 4 C) 12 D) 6 E) 5
39. Berilgan nuqtadan tekislikka uzunliklari 13 va 37 sm bo'lgan ikkita og'ma o'tkazilgan. Og'malarning tekislikdagi proyejsiyalari nisbati 1 : 7 kabi bo'lsa, tekislikdan berilgan nuqtagacha bo'lgan masofani toping.
A) 12 B) 11,5 C) 11 D) 10,5 E) 19

40. AB kesma α tekislikni O nuqtada kesib o'tadi. Agar $AO : OB = 3 : 2$ bo'lib, B nuqtadan x tekislikkacha bo'lgan masofa 8 ga teng bo'lsa, A nuqtadan α tekislikkacha bo'lgan masofani aniqlang.

A) 11 B) 12 C) 10 D) 9 E) 13

41. $x^2 = y^2 + 2y + 13$ tenglamani qanoatlantiruvchi $(x; y)$ butun sonlar juftligini toping.

A) (4; 1), (-4; 1) B) (4; 1), (4; -1), (-4; 1), (-4; -3) C) (4; -3), (-4; -3)
D) (4; 1) E) cheksiz ko'p

42. Tenglamani yeching: $\frac{x^3}{\sqrt{4-x^2}} + x^2 - 4 = 0$

A) $\pm\sqrt{2}$ B) 2 C) ± 2 D) $\sqrt{2}$ E) yechimi yo'q

43. Sonlarni taqqoslang: $a = \sin 1$, $b = \log_3 \sqrt{7}$.

A) $a = b$ B) $a > b$ C) $a = b + 1$ D) $a < b$ E) taqqoslab bo'lmaydi

44. x ning qanday qiymatlarida $\frac{\sin x + \operatorname{tg} x}{\cos x + \operatorname{ctg} x}$ ifoda musbat bo'ladi?

A) $x \neq \frac{\pi}{2} + \pi k$, $x \neq \pi k$, $k \in \mathbb{Z}$ B) $(-\infty; \infty)$

C) $(0; \infty)$ D) $(-\infty; 0)$ E) $x \neq \pi k, k \in \mathbb{Z}$

45. n ning qanday qiymatlarida $\cos nx \cdot \sin \frac{5}{n} x$ ning davri 3π ga teng?

A) $\pm 1, \pm 3, \pm 5, \pm 15$ B) 1, 3, 5, 15 C) 1, 2, 3, 4 D) $n = 5k$ E) $n \neq 5k$

