1-variant 2017 yil spectrum
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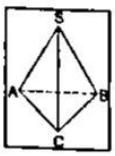
1-variant

1. Qirrasi $\sqrt{3\sqrt{3}}$ bo'lgan tetraedrning sirti yuzini toping.

Yechish:



SABC tetraedr

$SA = AB = \sqrt{3\sqrt{3}}$

$$S = 4 \cdot \frac{AB^2\sqrt{3}}{4} = AB^2 \cdot \sqrt{3} = \left(\sqrt{3\sqrt{3}}\right)^2 \cdot \sqrt{3} =$$

$$= 3 \cdot \sqrt{3} \cdot \sqrt{3} = 9.$$

Javob: 9.

2. $y = \sin^2 x$ funksiya grafigi berilgan bo'lib, uni parallel ko'chirish yordamida $y = \sin^2(x + a) + b$ funksiya grafigi hosil qilingan. Bunday parallel ko'chirishda koordinata boshi qanday nuqtaga ko'chadi?

Yechish:

Parallel ko'chirishda XOY koordinata tekisligidagi barcha nuqtalar bir xil yo'nalishda bir xil masofaga ko'chadi. $y = \sin^2 x$ funksiya grafigini parallel ko'chirish yordamida $y = \sin^2(x + a) + b$ funksiyani hosil qilsak koordinata boshi O(0; 0) nuqta N(–a; b) ga ko'chadi.

Javob: N(–a; b).

3. Quyida keltirilgan jumlalardan noto'g'risini toping.

Yechish:

Mulohazalardan quyidagisi noto'g'ri. To'g'ri burchakli uchburchakning balandligi gipotenuzaning yarmiga teng emas.

Javob: to'g'ri burchakli uchburchakning balandligi gipotenuzaning yarmiga teng.

4. $\begin{cases} 2(x+y) = 5xy \\ 8(x^3+y^3) = 65xy \end{cases}$ tenglamalar sistemasi nechta yechimga ega?

Yechish:

$x^3 + y^3 = (x + y)(x^2 - xy + y^2) =$

$= (x + y)((x + y)^2 - 3xy)$

$x + y = a$

$xy = b$ *belgilash kiritamiz*

$$\begin{cases} 2a = 5b \\ 8a(a^2 - 3b) = 65b \end{cases} \Rightarrow$$

$$\begin{cases} b = 0{,}4a \\ 8a(a^2 - 3 \cdot 0{,}4a) = 65 \cdot 0{,}4a \end{cases}$$

$8a(a^2 - 1{,}2a) = 65 \cdot 0{,}4a$

$4a(2a^2 - 2{,}4a - 6{,}5) = 0$

$a_1 = 0$

$20a^2 - 24a - 65 = 0$

$a_2 = \frac{5}{2}$ $\quad a_3 = -\frac{13}{10}$

$b = 0{,}4a$, $a_1 = 0$, $b_1 = 0$

$$\begin{cases} x + y = 0 \\ xy = 0 \end{cases} \Rightarrow \begin{matrix} x = 0 \\ y = 0 \end{matrix} \quad \underline{(0; 0)}$$

$a_2 = \frac{5}{2}$, $\quad b_2 = 1$

$$\begin{cases} x + y = 2{,}5 \\ xy = 1 \end{cases} \Rightarrow \begin{cases} x = 2, y = \frac{1}{2} \quad \underline{\left(2; \frac{1}{2}\right)} \\ x = \frac{1}{2}, y = 2 \quad \underline{\left(\frac{1}{2}; 2\right)} \end{cases}$$

$a_3 = -\frac{13}{10}$,

$b_3 = -\frac{13}{25}$ $\begin{cases} x + y = -\frac{13}{10} \\ x \cdot y = -\frac{13}{25} \end{cases}$ 2 ta yechim.

Javob: 5 ta.

5. $y = f(x)$ funksiya D to'plamda noqat'iy kamayuvchi bo'lsin. D to'plamdan olingan ixtiyoriy a, b elementlari uchun (a > b) quyidagi munosabatlardan qaysi biri o'rinli?

Yechish:

$y = f(x)$ funksiya D to'plamda noqat'iy kamayuvchi bo'lsa, ixtiyoriy a, b elementlar uchun (a > b) da $f(a) \le f(b)$ munosabat o'rinli bo'ladi.

Javob: $f(a) \le f(b)$.

6. $P(x) = x^4 - 2x^2 + x + 1$ ko'phadni $Q(x) = x^2 - x - 1$ ko'phadga bo'lganda $x = 2$ dagi bo'linmani toping.

Yechish:

$P(x) = x^4 - 2x^2 + x + 1$

$Q(x) = x^2 - x - 1$

$x = 2$

1) $(x^4 - 2x^2 + x + 1):(x^2 - x - 1)$ bo'lishni bajaramiz.

$$\begin{array}{r|l} x^4 - 2x^2 + x + 1 & x^2 - x - 1 \\ \hline x^4 - x^3 - x^2 & x^2 + x \\ \hline x^3 - x^2 + x & \\ \hline x^3 - x^2 - x & \\ \hline 2x + 1 & \end{array}$$

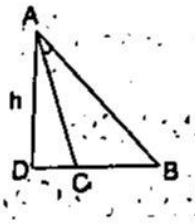
2) $\dfrac{x^4 - 2x^2 + x + 1}{x^2 - x - 1} = x^2 + x + \dfrac{2x + 1}{x^2 - x - 1}$

3) $x = 2$ da, $x^2 + x = 2^2 + 2 = 4 + 2 = 6$.

Javob: 6.

7. Tekislikka bir nuqtadan ikkita og'ma tushirildi. Og'malar uzunliklarning ayirmasi 5 ga, ularning proyeksiyalari esa 7 va 18 ga teng. Og'malar orasidagi burchak kosinusini toping. Og'malar umumiy perpendikulyardan bitta tomonda joylashgan.

Yechish:



AB, AC o'gmalar

AD perpendikulyar

DB, DC proeksiyalar

$AB - AC = 5$

$DB = 18$

$DC = 7$

$AD = h$

$\angle BAC = ?$

1) $AB = x$, $AC = y$.

$h^2 = x^2 - 18^2$,

$h^2 = y^2 - 7^2$.

$x^2 - 18^2 = y^2 - 7^2$, $x - y = 5$

$(x - y)(x + y) = 18^2 - 7^2 = 25 \cdot 11$,

$$\begin{cases} x + y = 55 \\ x - y = 5 \end{cases} \Rightarrow \begin{cases} x = 30 \\ y = 25 \end{cases} \Rightarrow h = 24.$$

2) $\cos\alpha = \dfrac{AB^2 + AC^2 - BC^2}{2AB \cdot AC}$

$BC = 18 - 7 = 11$.

$$\cos\alpha = \frac{30^2 + 25^2 - 11^2}{2 \cdot 30 \cdot 25} = \frac{1404}{2 \cdot 30 \cdot 25} = \frac{117}{125}.$$

Javob: $\dfrac{117}{125}$.

8. Tengsizlikni yeching:

$4^x \le 3 \cdot 2^{\sqrt{x}+x} + 4^{1+\sqrt{x}}$.

Yechish:

$4^x \le 3 \cdot 2^{\sqrt{x}+x} + 4^{1+\sqrt{x}}$

1) aniqlanish sohasi: $x \ge 0$

2) daraja xossasiga asosan

$2^{2x} \le 3 \cdot 2^{\sqrt{x}} \cdot 2^x + 4 \cdot 2^{2\sqrt{x}}$ *tengsizlikning ikkala qismini* $2^{2\sqrt{x}}$ *ga bo'lamiz.*

$2^{2x-2\sqrt{x}} \le 3 \cdot 2^{x-\sqrt{x}} + 4$

$2^{x-\sqrt{x}} = a$

$a^2 - 3a - 4 \le 0$. $-1 \le a \le 4$.

3) $2^{x-\sqrt{x}} \ge -1$, $x \in [0; \infty)$

$2^{x-\sqrt{x}} \le 4$, $2^{x-\sqrt{x}} \le 2^2$,

$x - \sqrt{x} - 2 \le 0$

$-1 \le \sqrt{x} \le 2$

$\sqrt{x} \le 2$, $x \le 4$.

Demak, $0 \le x \le 4$. $[0; 4]$.

Javob: [0; 4].

9. $0{,}5^{x^2} \cdot 2^{2x+2} = 64^{-1}$ tenglamani yeching

Yechish:

$0{,}5^{x^2} \cdot 2^{2x+2} = 64^{-1}$

1) $0{,}5 = 2^{-1}$, $64 = 2^6$

2) $2^{-x^2} \cdot 2^{2x+2} = 2^{-6}$

3) $2^{-x^2+2x+2} = 2^{-6}$

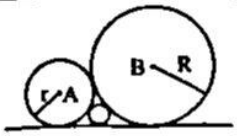
4) $-x^2 + 2x + 2 = -6$

$x^2 - 2x - 8 = 0$.

$x_1 = -2$, $x_2 = 4$.

Javob: –2 va 4.

10. R = 4 va r = 1 radiusli ikkita aylana bir-biriga va to'g'ri chiziqqa urinadi. Shu to'g'ri chiziqqa va aylanaga urinadigan kichik aylana radiusini toping.



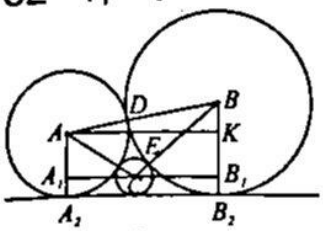
Yechish:

$R = 4$ va $r = 1$

$AD = 1$

$BD = 4$

$CE = r_1 = ?$



1) ΔAA_1C va ΔBB_1C to'g'ri burchakli.

$AA_1 = 1 - r_1$, $BB_1 = 4 - r_1$

$AC = 1 + r_1$, $BC = 4 + r_1$

2) $AK = A_1B_1$, ΔAKB to'g'ri burchakli.

$AB = AD + BD = 1 + 4 = 5$

$BB_2 = 4$, $AA_2 = 1$

$BK = BB_2 - AA_2 = 4 - 1 = 3$

$AK^2 = AB^2 - BK^2 = 5^2 - 3^2 = 4^2$.

$AK = 4$

3) $A_1C + CB_1 = A_1B_1 = AK = 4$

$$\sqrt{(1+r_1)^2+(1-r_1)^2}+\sqrt{(4+r_1)^2+(4-r_1)^2}=4$$

$$2\sqrt{r_1}+4\sqrt{r_1}=4$$

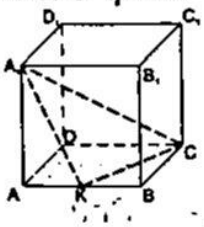
$$\sqrt{r_1}=\frac{2}{3}, r_1=\frac{4}{9}.$$

Javob: $\frac{4}{9}$.

11. ABCD $A_1B_1C_1D_1$ kubda K nuqta AB qirra o'rtasi. AB = 2 bo'lsa, A_1KC uchburchak yuzini toping.

Yechish:

$ABCD\,A_1B_1C_1D_1$ kub. a-qirra.



$AB = 2$, $a = 2$

$AK = KB = 1$

$A_1K^2 = AA_1^2 + AK^2$

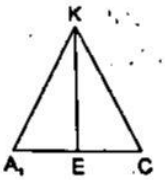
$CK^2 = CB^2 + KB^2$

$A_1K = \sqrt{2^2+1^2} = \sqrt{5}$,

$CK = \sqrt{2^2+1^2} = \sqrt{5}$

ΔA_1KC teng yonli. $A_1K = CK$

A_1C – kub diagonali, $A_1C = a\sqrt{3} = 2\sqrt{3}$



$$S_{A_1KC} = \frac{A_1C \cdot KE}{2},$$

$$A_1E = \frac{A_1C}{2}$$

$$KE = \sqrt{A_1K^2 - A_1E^2} = \sqrt{5-3} = \sqrt{2}$$

$$S_{A_1KC} = \frac{2\sqrt{3}\cdot\sqrt{2}}{2} = \sqrt{6}.$$

Javob: $\sqrt{6}$.

12. Balandligi 2 ga va asosining radiusi 1 ga teng bo'lgan konus sharga ichki chizilgan. Shar sirtining yuzini toping.

Berilgan:	**Yechish:**
$H = 2$	$S_{shar} = 4\pi R^2$, R – shar
$r = 1$	radiusi. Konus sharga
$S_{shar} = ?$	ichki chizilgan.

Shar radiusi ABC uchburchakka tashqi chizilgan aylana radiusiga teng bo'ladi.

ℓ – konus yasovchisi.

$$\ell^2 = H^2 + r^2, \ell = \sqrt{5}$$

$$R = \frac{\ell^2 \cdot 2r}{4 \cdot \frac{H \cdot 2r}{2}} = \frac{\ell^2}{2H}, R = \frac{5}{4}$$

$$S = 4\pi R^2 = 4\pi \cdot \left(\frac{5}{4}\right)^2 = \frac{4\pi \cdot 25}{16} = \frac{25\pi}{4} = 6{,}25\pi$$

Javob: $6{,}25\pi$.

13. $\frac{0,(1)}{0,(5)} + \frac{0,(13)}{0,(65)} + \frac{0,(19)}{0,(95)} - 0,(9)$ ni hisoblang.

Yechish:

$$\frac{0,(1)}{0,(5)} + \frac{0,(13)}{0,(65)} + \frac{0,(19)}{0,(95)} - 0,(9) =$$

$$= \frac{\frac{1}{9}}{\frac{5}{9}} + \frac{\frac{13}{99}}{\frac{65}{99}} + \frac{\frac{19}{99}}{\frac{95}{99}} - \frac{9}{9} = \frac{1}{5} + \frac{13}{65} + \frac{19}{95} - 1 =$$

$$= \frac{1}{5} + \frac{1}{5} + \frac{1}{5} - 1 = \frac{3}{5} - 1 = -\frac{2}{5} = -0{,}4.$$

Javob: –0,4.

14. $(x-1)^2+(y+1)^2=9$ aylana markazidan va A(2; 3) nuqtadan o'tuvchi to'g'ri chiziq tenglamasini toping.

Yechish:

$(x-1)+(y+1)^2=9$

1) aylana markazi (1; –1)

2) $y=kx+b$ to'g'ri chiziq tenglamasi (1; –1) va (2; 3) nuqtalardan o'tadi

$$\begin{cases}-1=k+b\\3=2k+b\end{cases}\Rightarrow\begin{cases}k=4\\b=-5\end{cases}$$

$y=4x-5.$

Javob: $y=4x-5$.

15. Agar $5a^2-7ab-6b^2=0$ bo'lsa, a ni b orqali ifodalang.

Yechish:

$5a^2-7ab-6b^2=0$ kvadrat tenglamani yechamiz.

$$a_{1,2}=\frac{7b\pm\sqrt{(-7b)^2-4\cdot5\cdot(-6b^2)}}{2\cdot5}=$$

$$=\frac{7b\pm13b}{10}$$

$$a_1=\frac{7b+13b}{10}=2b$$

$$a_2=\frac{7b-13b}{10}=-0{,}6b.$$

Javob: $a=-0{,}6b$; $a=2b$.

16. d_1, d_2 – romb diagonallari. Romb yuzi 24 ga, $\frac{1}{d_1}+\frac{1}{d_2}=\frac{7}{24}$ bo'lsa, $d_1^2+d_2^2$ ning qiymatini toping.

Yechish:

$$S=\frac{d_1\cdot d_2}{2}=24,\ \frac{1}{d_1}+\frac{1}{d_2}=\frac{7}{24}$$

$d_1\cdot d_2=48,$

$$\frac{d_1+d_2}{d_1\cdot d_2}=\frac{7}{24},$$

$$\frac{d_1+d_2}{48}=\frac{7}{24},$$

$d_1+d_2=14$

$d_1^2+d_2^2=(d_1+d_2)^2-2d_1d_2=14^2-2\cdot$
$=196-96=100.$

Javob: 100.

17. $\begin{cases}\frac{1}{x+y}+\frac{1}{x-y}=\frac{5}{8}\\\frac{1}{x-y}-\frac{1}{x+y}=\frac{3}{8}\end{cases}$ bo'lsa, $x\cdot y$ nin qiymatini toping.

Yechish:

1) $\frac{1}{x+y}=a,\ \frac{1}{x-y}=b$

$$\begin{array}{l}a+b=\frac{5}{8}\\+\\b-a=\frac{3}{8}\\\hline 2b=1\end{array}\qquad b=\frac{1}{2},\ a=\frac{1}{8}$$

2) $\frac{1}{x+y}=\frac{1}{8},\ \frac{1}{x-y}=\frac{1}{2}$

$$\begin{cases}x+y=8\\x-y=2\end{cases}\Rightarrow\begin{array}{l}x=5\\y=3\end{array}$$

3) $x\cdot y=5\cdot3=15.$

Javob: 15.

18. Natural n sonning kvadrati 10 ga bo'linganda hosil bo'lishi mumkin bo'lga qoldiqlar yig'indisini toping.

Yechish:

$n\in N$, $n^2:10$, $q=?$ q – qoldiq.

Masalan:

$11^2:10$, $q=1$

$12^2:10$, $q=4$

$13^2:10$, $q=9$

$14^2:10$, $q=6$

$15^2:10$, $q=5$

$16^2:10$, $q=6$

$17^2:10$, $q=9$

$18^2:10$, $q=4$

$19^2:10$, $q=1$

Demak, qoldiqlar 1, 4, 6, 9, 5 bo'lishi mumkin. Qoldiqlar yig'indisi:

$1+4+5+6+9=25$

Hosil bo'lish mumkin bo'lgan qoldiqlar yig'indisi 25 bo'ladi.

Javob: 25.

19. $\frac{|x+4|+x}{x+3} \geq 1$ tengsizlikning manfiy butun yechimlari nechta?

Yechish:

$\frac{|x+4|+x}{x+3} - 1 \geq 0$

$\frac{|x+4|-3}{x+3} \geq 0$ *tengsizlik*

$\begin{cases} |x+4| \geq 3 \\ x+3 > 0 \end{cases}$ *va* $\begin{cases} |x+4| \leq 3 \\ x+3 < 0 \end{cases}$ *tengsizliklar sistemasiga teng kuchli.*

1) $\begin{cases} |x+4| \geq 3 \\ x+3 > 0 \end{cases} \Rightarrow \begin{cases} x+4 \geq 3 \\ x+4 \leq -3 \\ x > -3 \end{cases} \Rightarrow$

$\Rightarrow \begin{cases} x \geq -1 \\ x \leq -7 \\ x > -3 \end{cases} \Rightarrow x \geq -1$

2) $\begin{cases} |x+4| \leq 3 \\ x+3 < 0 \end{cases} \Rightarrow \begin{cases} -3 \leq x+4 \leq 3 \\ x < -3 \end{cases} \Rightarrow$

$\Rightarrow \begin{cases} -7 \leq x \leq -1 \\ x < -3 \end{cases} \Rightarrow -7 \leq x < -3$

Manfiy butun yechimlari: –7, –6, –5, –4, –1.

Javob: 5.

20. $x^2 + y^2 + z^2 - 2y = 24$ tenglama bilan berilgan jismning markazi (a, b, c) nuqtada joylashgan. $a^2 + b^2 + c^2$ ni toping.

Yechish:

$x^2 + y^2 + z^2 - 2y = 24$ *markazi (a, b, c).*

$a^2 + b^2 + c^2 = ?$

1) sfera tenglamasi

$(x-a)^2 + (y-b)^2 + (z-c)^2 = R^2$

2) $x^2 + y^2 - 2y + 1 - 1 + z^2 = 24$

$x^2 + (y-1)^2 + z^2 = 25.$

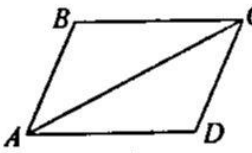
$a = 0, b = 1, c = 0, R = 5$

3) $a^2 + b^2 + c^2 = 0 + (-1)^2 + 0 = 1.$

Javob: 1.

21. ABCD rombning $\angle A = 60°$, tomoni 10 bo'lsa, AC ni toping.

Yechish:



AC – diagonal,
AB = 10
Romb diogonali uning burchak bissektrisasi.

ABCD – romb, $\angle A = 60°$ *bo'lsa,* $\angle B = 120°$

ΔABC da $\frac{AB}{\sin 30°} = \frac{AC}{\sin 120°}$

$AC = \frac{10 \cdot \frac{\sqrt{3}}{2}}{\frac{1}{2}} = 10\sqrt{3}.$

Javob: $10\sqrt{3}$.

22. Radiusi $x^2 + y^2 + z^2 - 2x - 2z = 23$ tenglama bilan berilgan aylananing radiusidan 2 marta katta bo'lgan, markazi esa birinchi aylananing markazida joylashgan aylana tenglamasini toping.

Yechish:

$x^2 + y^2 + z^2 - 2x - 2z = 23$

1) $(x-a)^2 + (y-b)^2 + (z-c)^2 = R^2$

$x^2 - 2x + 1 - 1 + y^2 + z^2 - 2z + 1 - 1 = 23$

$(x-1)^2 + y^2 + (z-1)^2 = 25$

Markazi (1; 0; 1) radiusi 5 ga teng bo'lgan sfera tenglamasi.

2) markazi (1; 0; 1) radiusi

$R_1 = 2R = 2 \cdot 5 = 10$ *bo'lgan sfera tenglamasi.*

$(x-1)^2 + y^2 + (z-1)^2 = 100.$

Javob: $(x-1)^2 + y^2 + (z-1)^2 = 100$.

23. $y = \lg\lg x$ funksiyaning aniqlanish sohasini toping.

Yechish:

$y = \lg\lg x$

$D(y) = ?$

$\begin{cases} \lg x > 0 \\ x > 0 \end{cases} \Rightarrow \begin{cases} x > 1 \\ x > 0 \end{cases} \Rightarrow x > 1$

$x \in (1; \infty).$

Javob: $(1; \infty)$.

24. $7\ln(x^2-2x) \le (2-x)^{\ln 7}$ tengsizlikni yeching.

Yechish:

1) aniqlanish sohasi:

a) $x^2-2x>0,\ x(x-2)>0,\ x<0,\ x>2.$

b) $2-x>0,\ x<2.\ x \in (-\infty;\ 0).$

2) tengsizlikning ikkala qismini logarifmlaymiz.

$\ln 7^{\ln(x^2-2x)} \le \ln(2-x)^{\ln 7}$

$\ln(x^2-2x)\cdot\ln 7 \le \ln 7\cdot\ln(2-x),\ \ln 7>0$

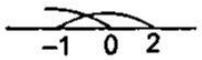
$\ln(x^2-2x) \le \ln(2-x)$

$x^2-2x \le 2-x$

$x^2-x-2 \le 0,\ (x+1)(x-2) \le 0$

$-1 \le x \le 2$

3) $x<0$ *va* $-1 \le x \le 2$



$x \in [-1;\ 0).$

Javob: $x \in [-1;\ 0)$.

25. To'g'ri burchakli uchburchakning gipotenuzasi $3\sqrt{5}$ ga teng. Katetlardan birinchisini $133\frac{1}{3}\%$ ga, ikkinchisini esa $16\frac{2}{3}\%$ ga kattalashtirilsa, ularning yig'indisi 14 m ga teng bo'ladi. Katetlarni toping.

Yechish:

$AB = 3\sqrt{5}\ m$

$AC = b$

$BC = a$

Masala shartiga ko'ra

$a_1 = a + 133\frac{1}{3}\cdot\frac{1}{100}a = a+\frac{4}{3}a = \frac{7}{3}a$

$b_1 = b + 16\frac{2}{3}\cdot\frac{1}{100}b = \frac{7}{6}b$

1) $a_1 + b_1 = 14$

$\frac{7}{3}a + \frac{7}{6}b = 14$

$2a + b = 12$

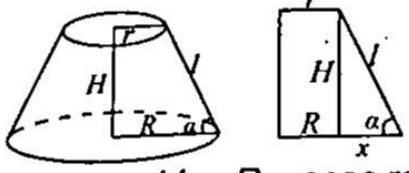
2) $a^2+b^2 = (3\sqrt{5})^2 = 45$

$$\begin{cases} 2a+b=12 \\ a^2+b^2=45 \end{cases} \Rightarrow \begin{cases} a=3 \\ b=6 \end{cases}$$

Javob: 3 m, 6 m.

26. Kesik konus yasovchisi katta asos tekisligi bilan α burchak tashkil qiladi. Asoslarining radiuslari r va R bo'lsa, hajmini toping.

Yechish:



l – yasovchi, r, R – asos radiuslari.

H – balandligi.

$x = R - r$

$tg\alpha = \frac{H}{x},\ H = x\cdot tg\alpha = (R-r)\cdot tg\alpha$

$V = \frac{\pi}{3}\cdot H(r^2+R^2+Rr) =$

$= \frac{\pi}{3}(R-r)(R^2+Rr+r^2)\cdot tg\alpha = \frac{\pi(R^3-r^3)\operatorname{tg}\alpha}{3}.$

Javob: $\frac{\pi(R^3-r^3)\operatorname{tg}\alpha}{3}$.

27. $a_1 = \lg 3,\ a_2 = \lg(2^x-2),\ a_3 = \lg(2^x+4)$ sonlar arifmetik progressiyani tashkil etadi. x qiymatini toping.

Yechish:

$a_1 = \lg 3,\ a_2 = \lg(2^x-2),\ a_3 = \lg(2^x+4)\ x = ?$

1) $2a_2 = a_1 + a_3$ *arifmetik progressiya xossasiga ko'ra.*

$2\lg(2^x-2) = \lg 3 + \lg(2^x+4)$

$\lg(2^x-2)^2 = \lg 3\cdot(2^x+4),\ 2^x = y$

2) $(y-2)^2 = 3(y+4)$

$y^2-4y+4-3y-12=0$

$y^2-7y-8=0,\ y=-1,\ y=8.$

3) $2^x = -1 \rightarrow \varnothing$

$2^x = 8,\ x = 3.$

Javob: 3.

28. Nechta natural son $\left[\frac{3x-2}{4}\right]=3$ tenglamaning yechimi bo'ladi? Bu yerda [a] – a sonning butun qismi.

Yechish:

$3 \le \frac{3x-2}{4} < 4,\ 12 \le 3x-2 < 16$

$14 \le 3x < 18$, $\frac{14}{3} \le x < 6$ oraliqqa tegishli natural son 5.
$x = 5$ bitta natural son tenglamaning yechimi bo'ladi.

Javob: 1 ta.

29. $\frac{3a+6b-5}{4a-2b-5} = 4$ bo'lsa, $26a - 28b - 45$ ni toping.

Yechish:

$\frac{3a+6b-5}{4a-2b-5} = 4$ bo'lsa, $26a - 28b - 45 = ?$

1) $3a + 6b - 5 = 4(4a - 2b - 5)$
$3a + 6b - 5 = 16a - 8b - 20$
$13a - 14b = 15$
2) $26a - 28b - 45 = 2(13a - 14b) - 45 =$
$= 2 \cdot 15 - 45 = 30 - 45 = -15.$

Javob: –15.

30. $\frac{2^x - 3^x}{3 \cdot 2^{x-1}} > 3 + \left(\frac{2}{3}\right)^x$ tengsizlikning butun sonlardan iborat yechimlari nechta?

Yechish:

$\frac{2^x - 3^x}{3 \cdot 2^{x-1}} > 3 + \left(\frac{2}{3}\right)^x$ tengsizlikni yechamiz.

1) $\frac{2 \cdot (2^x - 3^x)}{3 \cdot 2^x} = \frac{2}{3} \cdot \left(1 - \left(\frac{3}{2}\right)^x\right)$

2) $\frac{2}{3} \cdot \left(1 - \left(\frac{3}{2}\right)^x\right) > 3 + \left(\frac{2}{3}\right)^x$

$\left(\frac{3}{2}\right)^x = a$ belgilash kiritamiz.

$\frac{2}{3}(1-a) > 3 + \frac{1}{a}$

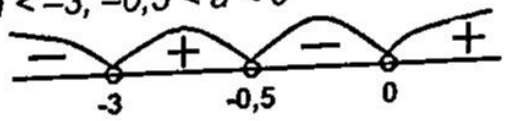
$\frac{2a(1-a) - 9a - 3}{3a} > 0$

$\frac{2a - 2a^2 - 9a - 3}{3a} > 0$

$\frac{2a^2 + 7a + 3}{3a} < 0$

$\frac{(2a+1)(a+3)}{a} < 0$

$a < -3, -0{,}5 < a < 0$



3) $\left(\frac{3}{2}\right)^x < -3$ tengsizlik yechimga ega emas.

$-\frac{1}{2} < \left(\frac{3}{2}\right)^x < 0$ tengsizlik ham yechimga ega emas, chunki $\left(\frac{3}{2}\right)^x > 0$.

Bundan tengsizlik yechimga ega emasligi kelib chiqadi. Demak, $x \in \varnothing$.

Javob: 0.

31. MS Excel. A1 = 5; A2 = 4; A3 = 6; B1 = 4; B2 = 7; B3 = 2 bo'lsa, =?(A1:B3; ">4")*??(A1:B3) formulaning natijasi 14 bo'lishi uchun ? va ?? belgilarining o'rniga qo'yish mumkin bo'lgan funksiyalar to'g'ri berilgan javobni aniqlang.

Yechish:

A1 = 5; A2 = 4; A3 = 6; B1 = 4; B2 = 7; B3 = 2 berilgan.
=?(A1:B3; ">4")*??(A1:B3) formulani 2 bo'lakka bo'lib qaraymiz:
=?(A1:B3; ">4") (1)
=??(A1:B3) (2)
Test javoblariga nazar solsak, to'rttala javobda ham ? o'rniga Счёмесли funksiyasi qo'yilishi kerak ekan. Счёмесли funksiyasi ko'rsatilgan diapazonda qo'yilgan shartga javob beradigan bo'shmas yacheykalar sonini hisoblaydi.
(1) formula natijasini hisoblaymiz: =Счёмесли (A1:B3; ">4")=3,
Ya'ni A1:B3 diapazonda 4 dan katta qiymatlar soni 3 ga teng.
Natija 14 bo'lishi uchun ?? funksiyaning qiymati 14/3=4,66667 bo'lishi kerak ekan. Berilgan javoblardagi funksiyalarni tahlil qilamiz:

A) *Степень(A1:B3) – berilishida xatolik bor (daraja ko'rsatilmagan).*
B) *Макс(A1:B3) = 7*
C) *Мин(A1:B3) = 2*
D) *Срзнач(A1:B3) = 4,66667*

Javob: Счётесли, Срзнач.

32. Rost mulohazalarga mos sonlar yig'indisini Rim sanoq sistemasida aniqlang:
CCXLVIII = "Kompyuter – raqamli qurilma emas"
XCVII = "Insonga uzluksiz ta'sir etib turuvchi axborotlar analog axborotlar deb ataladi"
XLIX = "Axborot xususiyatlariga quyidagilar kiradi: qimmatlilik, ishonchlilik, to'liqlik"

Yechish:
Rost mulohazalarni aniqlaymiz:
CCXLVIII = "Kompyuter – raqamli qurilma emas" – yolg'on
XCVII = "Insonga uzluksiz ta'sir etib turuvchi axborotlar analog axborotlar deb ataladi" – rost
XLIX = "Axborot xususiyatlariga quyidagilar kiradi: qimmatlilik, ishonchlilik, to'liqlik" – rost
Endi Rim raqamlarini tahlil qilamiz: I=1, V=5, X=10, L=50, C=100, D=500, M=1000.
Raqamlar yig'indisi hisoblanadi. Agar katta raqamdan oldin kichigi tursa, kattasidan kichigini ayirish kerak.
XCVII ni o'nlik sistemaga o'tkazadigan bo'lsak, XC=90, VII=7. Demak, XCVII=97.
Xuddi shunday XLIX=49 ligini aniqlash mumkin. Bu ikkala son yig'indisi 146 ga teng.
Ushbu sonni Rim raqamlariga o'girsak, CXLVI bo'ladi.

Javob: CXLVI.

33. Paskal. Dastur natijasini aniqlang.
```
Var a,b,c: integer; k:boolean; s:string;
Begin Randomize;
S:='INFORMATIKA';
a:=1; b:=1 + random(random(2)): k:=false;
While not k Do begin c:=2*a+b;
a:=c mod a+2; b:=c div b: if a=b then k:=true; end;
Write(S[a]+S[b]+S[c]): ReadLn; End.
```

Yechish:
Ushbu dasturda quyidagi o'zgaruvchilar qatnashadi:
a, b, c – butun turdagi o'zgaruvchilar; k – mantiqiy, ya'ni "chin" yoki "yolg'on" qiymatlar qabul qiladigan o'zgaruvchi; s – satrli turga mansub o'zgaruvchi.
```
Begin {Dastur boshlanishi}
Randomize; {tasodifiy sonlar generatori}
   S:='INFORMATIKA'; {S ga qiymat berish}
   a:=1;
   b:=1 + random(random(2)); {random(2) [0; 2) oraliqdan, ya'ni 0 yoki 1 qimatlarni,
random(random(2)) esa 0 qiymatni qabul qiladi. Demak, b=1 bo'ladi}
k:=false;{k=yolg'on}
   While not k Do  {k=yolg'on bo'lguncha, takrorla}
   begin {sikl tanasining boshi}
   c:=2*a+b;
   a:=c mod a+2; {c ni a ga bo'lganda hosil bo'ladigan qoldiqqa 2 ni qo'shamiz}
```

b:=c div b; {c ni b ga bo'lganda hosil bo'ladigan bo'linma}
if a=b then k:=true; {agar a=b bo'lsa, k=rost}
end; {sikl tanasining oxiri}
Write(S[a]+S[b]+S[c]); {S satrning a-, b-, c-chi pozitsiyadagi simvollarni satrga aylantirib, ekranga chiqarish}
ReadLn; {bo'sh kiritish operatori}
End. {dastur yakuni}
Dastur ishga tushirilganda, sikl 3 marta takrorlanib, quyidagi a, b, c va k lar quyidagi qiymatlarni qabul qilishadi:

a	b	c	k
2	3	3	False
3	2	7	False
4	4	8	True

k=rost bo'lganda, sikl to'xtaydi va ekranga S:='INFORMATIKA' satrining a, b, c pozitsiyalaridagi simvollarining birlashmasi, ya'ni (S[a]+S[b]+S[c]) = OOT.

Javob: OOT.

34. HTML tilidagi web-sahifada ta'riflash ro'yxatini hosil qilish uchun qanday teg ishlatiladi?

Yechish:
HTML-hujjatda ro'yhat yaratish uchun quyidagi teglardan foydalaniladi:
<UL> – raqamlanmagan ro'yhat;
<OL> – raqamlangan ro'yhat;
<DL> – ta'riflash ro'yhatini tashkil etish.

Javob: <DL>.

35. Axborot tizimining ta'minoti:

Yechish:
Axborot tizimining ta'minoti deganda texnik, matematik, axborot ta'minoti, huquqiy ta'minot, tashkiliy-dasturiy ta'minot tushuniladi.

Javob: texnik, matematik, axborot ta'minoti, huquqiy ta'minot, tashkiliy-dasturiy.

36. Axborot-resurs markazida 50 ta kompyuter o'rnatilmoqda, bunda ayrimlari kabel bilan ulanmoqda. Har bir kompyuterdan 8 ta kabel chiqishi lozim bo'lsa, jami bo'lib nechta kabel kerak?

Yechish:
*Har bir kompyuterdan 8 ta kabel chiqishi lozim bo'lsa, demak, har biri 8 ta kompyuterga ulanishi kerak: 50*8=400. Bitta kabel 2 ta kompyuterni birlashtirishini inobatga olsak: 400:2=200. Demak, jami bo'lib 200 ta kabel kerak ekan.*

Javob: 200.

2-variant

1. y = *f*(x) funksiya D to'plamda noqat'iy o'suvchi bo'lsin. D to'plamdan olingan ixtiyoriy a, b elementlari uchun (a > b) quyidagi munosabatlardan qaysi biri o'rinli?

Yechish:
y = f(x) funksiya D to'plamda noqat'iy o'suvchi bo'lsa, D to'plamdan olingan ixtiyoriy a, b elementlar uchun (a > b)