2017-yil matematika variant yechimlari (spectrum)

23-variant

Bizning kanal : @axborotnoma

Adminsratorlar hayati : @axborotnoma_bot

Matematika yordam guruhi : @axborotnomaguruhi

Reklama xizmati : @axborotnoma_reklama

23-variant

1. $\begin{cases}\log_3(x^2+y^2)=3\\ \log_3 x+\log_3 y=0\end{cases}$ tenglamalar sistemasining barcha yechimlari ko'paytmasini toping.

Yechish:

1) $\begin{cases}\log_3(x^2+y^2)=3\\ \log_3 x+\log_3 y=0\end{cases}\Rightarrow\begin{cases}x^2+y^2=3^3\\ \log_3 xy=0\end{cases}\Rightarrow$

$$\Rightarrow \begin{cases} x^2+y^2=27 \\ xy=3^0 \end{cases} \Rightarrow \begin{cases} x^2+y^2=27 \\ xy=1 \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} x=\frac{1}{y} \\ \frac{1}{y^2}+y^2=27 \end{cases}$$

$y^4 - 27y^2 + 1 = 0.$

$y^2 = a,\ a \geq 0.$

$a^2 - 27a + 1 = 0.$

$$a_{1,2} = \frac{27 \pm \sqrt{27^2-4}}{2} = \frac{27 \pm 5\sqrt{29}}{2}$$

$$a_1 = \frac{27+5\sqrt{29}}{2},$$

$$a_2 = \frac{27-5\sqrt{29}}{2}$$

$$y^2 = \frac{27+5\sqrt{29}}{2}$$

$$y_{1,2} = \pm\sqrt{\frac{27+5\sqrt{29}}{2}}$$

$$y^2 = \frac{27-5\sqrt{29}}{2}$$

$$y_{3,4} = \pm\sqrt{\frac{27-5\sqrt{29}}{2}}$$

$y > 0$ bo'lganligi sababli $y = \sqrt{\frac{27+5\sqrt{29}}{2}}$;

$$y = \sqrt{\frac{27-5\sqrt{29}}{2}}$$

$x > 0$ bo'lganligi sababli

$$x = \frac{\sqrt{2}}{\sqrt{27+5\sqrt{29}}},\ x = \frac{\sqrt{2}}{\sqrt{27-5\sqrt{29}}}$$

Sistema 2 ta yechimga ega. Barcha yechimlari ko'paytmasi

$$\frac{\sqrt{2}}{\sqrt{27+5\sqrt{29}}} \cdot \frac{\sqrt{27+5\sqrt{29}}}{2}$$

$$\cdot \frac{\sqrt{2}}{\sqrt{27-5\sqrt{29}}} \cdot \frac{\sqrt{27-5\sqrt{29}}}{\sqrt{2}} = 1.$$

Javob: 1.

2. Hisoblang: $\sin45^\circ \cdot \sin15^\circ \cdot \cos165^\circ$.

Yechish:

1) $\cos165^\circ = \cos(180^\circ - 15^\circ) = -\cos15^\circ$

2) $\sin15^\circ \cdot \cos165^\circ = -\sin15^\circ \cdot \cos15^\circ =$

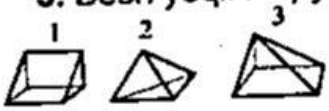
$$= -\frac{1}{2} \cdot 2\sin15^\circ\cos15^\circ = -\frac{1}{2}\sin2 \cdot 15^\circ =$$

$$= -\frac{1}{2}\sin30^\circ = -\frac{1}{4}$$

3) $$\sin45^\circ \cdot \left(-\frac{1}{4}\right) = \frac{\sqrt{2}}{2} \cdot \left(-\frac{1}{4}\right) = -\frac{\sqrt{2}}{8}$$

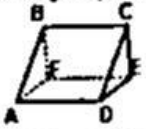
Javob: $-\frac{\sqrt{2}}{8}$.

3. Besh yoqli ko'pyoq(lar)ni aniqlang.

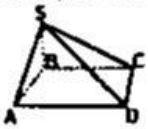


Yechish:

Besh yoqli ko'pburchaklar



1) *ABCD, BCEF, AFED, ABF, CED – 5 ta yoq.*



3) *SBA, SBC, SCD, SAD, ABCD – 5 ta yoq.*

Javob: 1, 3.

4. $\left|\frac{x}{y}\right| < 1$ bo'lsa, $\frac{x}{y} + \frac{x^2}{y^2} + \frac{x^3}{y^3} + \ldots$ ni hisoblang.

Yechish:

1) $b_1 = \frac{x}{y},\ b_2 = \frac{x^2}{y^2}$

$q = \frac{b_2}{b_1} = \frac{x^2}{y^2} \cdot \frac{y}{x} = \frac{x}{y} < 1$ *bo'lganligi uchun cheksiz kamayuvchi geometrik progressiya bo'ladi.*

2) *yig'indini hisoblaymiz:*

$$S = \frac{b_1}{1-q}$$

$$S=\frac{\frac{x}{y}}{1-\frac{x}{y}}=\frac{x}{y}\cdot\frac{y}{y-x}=\frac{x}{y-x}$$

Javob: $\frac{x}{y-x}$.

5. (x_0, y_0) quyidagi tenglamalar sistemasining yechimi bo'lsa, $x_0^2+y_0^3$ ni toping: $\begin{cases} y-2=\sqrt{x} \\ \sqrt{x-3}=y-3 \end{cases}$

Yechish:

1) aniqlanish sohasi $\begin{cases} y-2\ge 0 \\ y-3\ge 0 \\ x\ge 0 \\ x-3\ge 0 \end{cases} \Rightarrow \begin{cases} y\ge 3 \\ x\ge 3 \end{cases}$

2) $\begin{array}{l} y-2=\sqrt{x} \\ \underline{y-3=\sqrt{x-3}} \\ 1=\sqrt{x}-\sqrt{x-3} \end{array}$

$\sqrt{x-3}=\sqrt{x}-1$

$(\sqrt{x-3})^2=(\sqrt{x}-1)^2$,

$x-3=x-2\sqrt{x}+1,\ 2\sqrt{x}=4,\ \sqrt{x}=2,\ x=4.$

3) $y-2=2,\ y=4.\ (4;4)$

4) $x_0^2+y_0^3=4^2+4^3=16+64=80.$

Javob: 80.

6. Bir guruh bolalarning o'rtacha og'irligi 40 kg ga teng. Qiz bolalarning o'rtacha og'irligi 35 kg, o'g'il bolalarning o'rtacha og'irligi esa 50 kg ligi ma'lum. Agar guruh a'zolarining 9 nafari o'g'il bolalar bo'lsa, qiz bolalar sonini toping.

Yechish:

$\frac{a_1+a_2+\ldots+a_n}{n}=40$ guruh bolalari

$\frac{b_1+b_2+\ldots+b_m}{m}=35$ qizlar

$\frac{c_1+c_2+\ldots+c_k}{k}=50$ o'g'il bolalar

$k=?\ m=?$

$n=k+m$

$a_1+a_2+\ldots+a_n=b_1+b_2+\ldots+b_m+$

$+c_1+c_2+\ldots+c_k$

$k=9$ da $c_1+c_2+\ldots+c_9=50\cdot 9$

$b_1+b_2+\ldots+b_m+c_1+c_2+\ldots+c_9=$

$=35m+50\cdot 9$

$40\cdot(9+m)=35m+50\cdot 9$

$40m-35m=50\cdot 9-40\cdot 9$

$5m=10\cdot 9,\ m=18$

Qizlar soni 18 nafar.

Javob: 18.

7. $\bar{a}(x+y;\ 2-x)$, $\bar{b}(y-2x;\ 1)$ $2\bar{a}+\bar{b}=(3;\ 3)$ bo'lsa, $(x;\ y)$ ni toping.

Yechish:

$\bar{a}(\bar{a}_1;\ \bar{a}_2)$, $\bar{b}(\bar{b}_1;\ \bar{b}_2)$

$\bar{a}+\bar{b}=(\bar{a}_1+\bar{b}_1;\ \bar{a}_2+\bar{b}_2)$

1) $2\bar{a}(2x+2y;\ 4-2x)$

2) $2\bar{a}+\bar{b}=(2x+2y;\ 4-2x)+(y-2x;\ 1)=$

$=(2x+2y+y-2x;$

$4-2x+1)=(3y;\ 5-2x)$

3) $(3y;\ 5-2x)=(3;\ 3)$

$3y=3,\ y=1$

$5-2x=3,\ x=1$

$(1;\ 1).$

Javob: $(x;\ y)=(1;\ 1)$.

8. $|2x-1|=x$ tenglama yechimlari sonini toping. Bu yerda $|a|$ – a sonning butun qismi.

Yechish:

$[a]$ – a sonning butun qismi.

$[2x-1]=x$

1) $x\le 2x-1<x+1.$

2) $x\le 2x-1,\ -x\le -1,\ x\ge 1$

3) $2x-1<x+1,\ x<2$

4) $1\le x<2$ tengsizlik $x=1$ dan iborat yagona butun yechimga ega.

Javob: 1 ta.

9. $(x^2-x-3)^2-(x^2-x-3)-3=x$ tenglamaning butun yechimlari ko'paytmasini toping.

Yechish:

$(x^2 - x - 3)^2 - (x^2 - x - 3) - 3 = x$

$(x^2 - x - 3)^2 - x^2 + x + 3 - 3 - x = 0$

$(x^2 - x - 3)^2 = x^2$

$|x^2 - x - 3| = |x|$, $x^2 - x - 3 = \pm x$

a) $x^2 - x - 3 = x$, $x^2 - 2x - 3 = 0$,

$x = -1$, $x = 3$

b) $x^2 - x - 3 = -x$, $x^2 - 3 = 0$, $x^2 = 3$,

$x = \pm\sqrt{3}$

Tenglamaning yechimlari $x = -1$, $x = 3$, $x = \pm\sqrt{3}$. *Butun yechimlari* -1 *va* 3. *Butun yechimlari ko'paytmasi* -3.

Javob: -3.

10. Qarang: 9-variant 30-savol (73-bet).

11. ABC teng yonli uchburchakda B(3; 7), C(−1; −5), A uchi koordinata o'qida. A uchning koordinatalarini toping.

Berilgan:

ΔABC

$AB = BC$

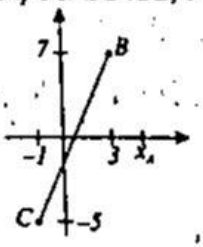
$B(3; 7)$, $(-1; -5)$

A – koordinatalar o'qida

$A(x; y) - ?$

Yechish:

A nuqta OX o'qida bo'lsa, $A(x; 0)$, *OY oqida bo'lsa,* $A(0; y)$.



Shartiga ko'ra:

$AB = AC$

$\Rightarrow \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2} =$

$= \sqrt{(x_C - x_A)^2 + (y_C - y_A)^2}$

$(x - 3)^2 + 49 = (x + 1)^2 + 25$

$x^2 - 6x + 9 + 49 = x^2 + 2x + 1 + 25 \Rightarrow$

$8x = 32$, $x = 4$

Demak, A nuqtaning koordinatalari $A(4; 0)$.

Javob: (4; 0).

12. Tenglamani yeching:

$\sqrt{6^{x+2} - 2} = 8 - 36 \cdot 6^x$

Yechish:

$\sqrt{6^{x+2} - 2} = 8 - 6^{x+2}$

$\sqrt{6^{x+2} - 2} \geq 0$ *b'olganligi uchun*

$8 - 6^{x+2} \geq 0$ *bo'ladi* $6^{x+2} \leq 8$.

$6^{x+2} = a$ *deb belgilaymiz.*

$\sqrt{a - 2} = 8 - a$ *tenglamani yechamiz.*

$\begin{cases} a - 2 \geq 0 \\ 8 - a \geq 0 \end{cases} \Rightarrow 2 \leq a \leq 8$

$a - 2 = (8 - a)^2$

$a - 2 = 64 - 16a + a^2$,

$a^2 - 17a + 66 = 0$.

$a = 6$, $a = 11$.

$2 \leq a \leq 8$ *bo'lganligi uchun tenglamaning ildizi* $a = 6$ *bo'ladi.*

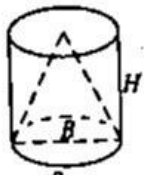
$6^{x+2} = 6$.

$x + 2 = 1$, $x = -1$.

Javob: -1.

13. Silindr va konus umumiy asosga va balandlikka ega. Silindr hajmi 9 ga teng. Konus hajmini toping.

Yechish:



$H = 2R = 2r$

$V = 9$

$V_k = ?$

1) $V = \pi R^2 H = 2\pi R^3 = 9$

2) $V_k = \frac{1}{3}\pi R^2 H = \frac{2\pi R^3}{3} = \frac{9}{3} = 3$

Javob: 3.

14. Qarang: 4-variant 13-savol (30-bet).

15. $y = \frac{x^3 + 1}{x + 1}$ funksiyaning eng kichik butun qiymatini toping.

Yechish:

$y = \frac{x^3 + 1}{x + 1}$, $x \neq -1$

Qisqa ko'paytirish formulasiga asosan

$y = \frac{x^3 + 1}{x + 1} = \frac{(x + 1)(x^2 - x + 1)}{x + 1} =$

$= x^2 - x + 1 = (x - 0{,}5)^2 + \frac{3}{4}$

Funksiyaning eng kichik qiymati 1.

Javob: 1.

16. Agar $\int_a^b (3x^2+1)dx = 36$ va $a^2 + ab + b^2 = 17$ bo'lsa, b – a ni toping.

Yechish:

1) Integralni hisoblaymiz.

$$\int_a^b (3x^2+1)dx = \left(\frac{3x^{2+1}}{2+1} + x\right)\Big|_a^b =$$

$$= (x^3 + x)\Big|_a^b = b^3 + b - a^3 - a$$

$2)\ b^3 + b - a^3 - a = (b^3 - a^3) + (b - a) =$
$= (b - a)(b^2 + ab + a^2) + (b - a) =$
$= (b - a)(b^2 + ab + a^2 + 1) =$
$= (b - a)(17 + 1) = 18(b - a)$
$3)\ 18(b - a) = 36,\ b - a = 2.$

Javob: 2.

17. Qarang: 4-variant 6-savol (29-bet).

18. $\vec{a}(-2; 3)$ va $\vec{b}(2; n)$ vektorlar berilgan. n ning qanday qiymatida bu vektorlar o'zaro perpendikulyar bo'ladi?

Yechish:

$\vec{a}(-2; 3),\ \vec{b}(2; n),\ \vec{a} \perp \vec{b},\ n = ?$
$\vec{a} \perp \vec{b}$ *bo'lishi uchun* $\vec{a} \cdot \vec{b} = 0$ *bo'lishi kerak.*
$\vec{a} \cdot \vec{b} = (-2; 3) \cdot (2; n) = -2 \cdot 2 + 3 \cdot n = 0$
$-4 + 3n = 0,\ n = \frac{4}{3}.$

Javob: $\frac{4}{3}$.

19. Tenglamani yeching:

$$\sqrt{x} + \frac{3}{\sqrt{5+x}} = \sqrt{5+x}.$$

Yechish:

1) aniqlanish sohasi, $x \geq 0$,
$x > -5. \Rightarrow x \geq 0.$
$2)\ \sqrt{x(5+x)} + 3 = 5 + x$
$\sqrt{5x + x^2} = 2 + x,\ x + 2 \geq 0,\ x \geq -2$
$5x + x^2 = 4 + 4x + x^2$
$x = 4.$

Javob: 4.

20. x va y quyidagi tenglamalar sistemasining yechimlari bo'lsa, x·y qiymatini toping.

$$\begin{cases} 0{,}2^x - 2^{0{,}5y} = 3 \\ 0{,}04^x - 2^y = 21 \end{cases}$$

Yechish:

$$\begin{cases} 0{,}2^x - 2^{0{,}5y} = 3 \\ 0{,}04^x - 2^y = 21 \end{cases}$$

$x \cdot y = ?$

$$1)\ \begin{cases} 5^{-x} - 2^{0{,}5y} = 3 \\ 5^{-2x} - 2^y = 21 \end{cases} \quad 5^{-x} = a,\ 2^{0{,}5y} = b.$$

$$2)\ \begin{cases} a - b = 3 \\ a^2 - b^2 = 21 \end{cases} \Rightarrow \begin{cases} a - b = 3 \\ (a-b)(a+b) = 21 \end{cases} \Rightarrow$$

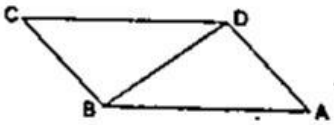
$$\Rightarrow \begin{cases} a - b = 3 \\ a + b = 7 \end{cases} \Rightarrow \begin{cases} a = 5 \\ b = 2 \end{cases}$$

$3)\ 5^{-x} = 5,\ -x = 1,\ x = -1.$
$2^{0{,}5y} = 2,\ 0{,}5y = 1,\ y = 2.$
$(-1; 2)$
$3)\ x \cdot y = -1 \cdot 2 = -2.$

Javob: –2.

21. ABCD parallelogrammda |BC| = 2, |DC| = 4, ∠DAB = 60° bo'lsa, |BD| ni toping.

Yechish:



ABCD parallelogramm $\angle DAB = 60°$, $BC = 2,\ DC = 4,$ *BD diagonalni kosinuslar teoremasidan foydalanib topamiz.*
$BD^2 = AB^2 + AD^2 - 2AB \cdot AD \cdot \cos A$
$BD^2 = 4^2 + 2^2 - 4 \cdot 2\cos 60°$
$BD^2 = 16 + 4 - 8 = 12$
$BD = 2\sqrt{3}.$

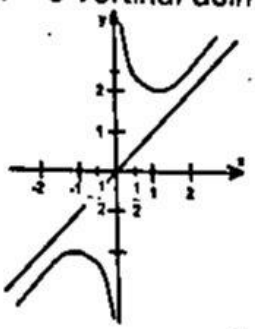
Javob: $2\sqrt{3}$.

22. $y = \frac{x^2+1}{x}$ funksiyaning qiymatlar sohasiga tegishli bo'lmagan butun sonlar yig'indisini toping.

Yechish:

$y = \frac{x^2+1}{x}$, $x \neq 0$.

Funksiya grafigini yasaymiz.
$x = 0$ vertikal asimptota.



$$K = \lim_{x\to\infty}\frac{y}{x} = \lim_{x\to\infty}\frac{x^2+1}{x^2} = \lim_{x\to\infty}\left(1+\frac{1}{x^2}\right) = 1$$

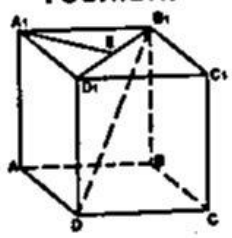
$$b = \lim_{x\to\infty}(y-kx) = \lim_{x\to\infty}\left(\frac{x^2+1}{x} - x\right) = 0$$

$y = x$ og'ma asimptota.
Funksiyaning qiymatlar sohasi:
$(-\infty; -2] \cup [2; \infty)$.
Qiymatlar sohasiga tegishli bo'lmagan oraliq $(-2; 2)$. Butun sonlar $-1, 0, 1$.
Yig'indisi $-1 + 0 + 1 = 0$.

Javob: 0.

23. Kubning diagonalidan ushbu diagonal bilan kesishmaydigan qirrasigacha bo'lgan masofa 2 ga teng. Kubning hajmini toping.

Yechish:



$ABCDA_1B_1C_1D_1$ – kub,
$AB = a$,
B_1D – diagonal.
AA_1 qirradan B_1D diagonalgacha bo'lgan masofa AA_1 qirradan BB_1D_1D tekislikkacha bo'lgan masofaga teng, bu masofa A_1E kesma uzunligiga teng.
$A_1E = 2$, $V = ?$

$A_1E^2 = A_1B_1^2 - B_1E^2$

$$2^2 = a^2 - \left(\frac{a\sqrt{2}}{2}\right)^2 = \frac{a^2}{2},\ a = 2\sqrt{2}$$

$$V = a^3 = (2\sqrt{2})^3 = 16\sqrt{2}$$

Javob: $16\sqrt{2}$.

24. x va y quyidagi tenglamalar sistemasining yechimlari bo'lsa, $|x + y|$ qiymatini toping.

$$\begin{cases} 5^{2x} - (0{,}25)^y = 21 \\ 5^x - (0{,}5)^y = 3 \end{cases}$$

Yechish:

$$\begin{cases} 5^{2x} - (0{,}25)^y = 21 \\ 5^x - (0{,}5)^y = 3 \end{cases} \quad |x + y| = ?$$

1) $\begin{cases} 5^{2x} - 2^{-2y} = 21 \\ 5^x - 2^{-y} = 3 \end{cases}$

$5^x = a$, $2^{-y} = b$.

2) $\begin{cases} a^2 - b^2 = 21 \\ a - b = 3 \end{cases} \Rightarrow \begin{cases} (a-b)(a+b) = 21 \\ a - b = 3 \end{cases} \Rightarrow$

$\Rightarrow \begin{cases} a + b = 7 \\ a - b = 3 \end{cases} \Rightarrow \begin{cases} a = 5 \\ b = 2 \end{cases}$

3) $5^x = 5$, $x = 1$
$2^y = 2$, $-y = 1$, $y = -1$.
$(1; -1)$
4) $|x + y| = |1 + (-1)| = 0$.

Javob: 0.

25. (x_0, y_0) quyidagi tenglamalar sistemasining yechimi bo'lsa, $\frac{x_0}{y_0}$ ni toping:

$$\begin{cases} \sqrt{x} + \sqrt{y} = 3 \\ \sqrt{x} - y = 1 \end{cases}$$

Yechish:

$\begin{cases} \sqrt{x} + \sqrt{y} = 3 \\ \sqrt{x} - y = 1 \end{cases}$ *sistemani qo'shish usuli bilan yechamiz.*

$$\begin{array}{l} \sqrt{x} + \sqrt{y} = 3 \\ + \\ \sqrt{x} - \sqrt{y} = 1 \end{array}$$

$2\sqrt{x} = 4$, $\sqrt{x} = 2$; $x = 4$
$\sqrt{y} = 1$, $y = 1$. $(4; 1)$

$$\frac{x_0}{y_0} = \frac{4}{1} = 4$$

Javob: 4.

26. Agar $f(x) = mx^2 - (m - 14)x - 2$ parabolaning simmetriya o'qi tenglamasi $x = -3$ bo'lsa, m ning qiymatini toping.

Yechish:

$f(x) = mx^2 - (m - 14)x - 2.$

Simmetriya o'qi tenglamasi $x = -\frac{b}{2a}$ yoki $x = \frac{m-14}{2m}$.

Misol shartiga ko'ra: $x = -3$, bundan

$\frac{m-14}{2m} = -3$, $m - 14 = -6m$

$7m = 14$, $m = 2$.

Javob: 2.

27. Agar $a < 0$ va $b > 0$ bo'lsa, $ax + a > bx + b$ tengsizlikni yeching.

Yechish:

$a < 0$, $b > 0$ bo'lsa, $ax + a > bx + b$ tengsizlikni yechamiz.

$ax + a > bx + b$

$bx - ax < -b + a$

$x(b - a) < -b + a$

$a < 0$, $b > 0$ bo'lganligi uchun $b - a > 0$

$x < \frac{-b+a}{b-a} = \frac{-(b-a)}{b-a} = -1$, $x < -1$.

Javob: $x < -1$.

28. ABC uchburchakda C burchagi 90° ga teng, AC = 20, BC = 14. tgA ni toping.

Yechish:

ΔABC to'g'ri burchakli

$\angle C = 90°$

$AC = 20$

$BC = 14$

$tgA = ?$

O'tkir burchak tangensiga ko'ra

$tgA = \frac{CB}{AC} = \frac{14}{20} = 0,7$

Javob: 0,7.

29. Qarang: 4-variant 4-savol (28-bet).

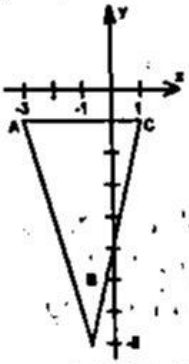
30. A(–3; –1), B(–1; –8), C(1; –1) nuqtalarini tutashtirishdan hosil bo'lgan uchburchak yuzini toping.

Yechish:

$A(-3; -1)$, $B(-1; -8)$, $C(1; -1)$

ΔABC teng yonli, AC – asos.

$|AC| = 4$, BD – balandlik, $|BD| = 7$



$S = \frac{|AC| \cdot |BD|}{2} = \frac{4 \cdot 7}{2} = 14$

Javob: 14.

31. Qarang: 8-variant 32-savol (66-bet).

32. Qarang: 7-variant 34-savol (58-bet).

33. A="MSDOS.SYS – operatsion sistemani faollashtiruvchi dastur."
B="Biror nomga ega bo'lgan va kompyuter tashqi xotirasida joylashgan baytlar majmuiga katalog deyiladi."
C="Brainware – kompyuter tomonidan ishlatiladigan barcha dasturlar to'plamidir." Shu mulohazalar asosida quyidagi mantiqiy ifodaning natijasini toping:
C and not (A or B)

Yechish:

Mulohazalarni tahlil qilamiz:

A="MSDOS.SYS – operatsion sistemani faollashtiruvchi dastur." – rost (1)

B="Biror nomga ega bo'lgan va kompyuter tashqi xotirasida joylashgan baytlar majmuyiga katalog deyiladi." – yolg'on (0)
C="Brainware – komyuter tomonidan ishlatiladigan barcha dasturlar to'plamidir." – yolg'on.
C and not (A or B) = 0 and not (1 or 0) = 0 and not 1 = 0 and 0 = 0.

Javob: yolg'on.

34. Paskal tilida yozilgan dastur natijasini aniqlang.

```
Var k: byte; S:string; B:array[1..11] of byte;
Begin Randomize; S:='INFORMATIKA';
k:=1; b[k]:=1+Random(1)+Random(1);
While k<b[k]+2 Do begin k:=k+3;
b[k]:=b[k-3]+2; Write(S[b[k]]); end;
Readln; End
```

Yechish:

Dasturda k – 0..255 diapazondagi butun o'zgaruchi; S – satr va b – 11 ta 0..255 diapazondagi butun sondan iborat massivdan foydalanilgan.
Randomize – tasodifiy sonlar generatori.

```
s:='INFORMATIKA';
k:=1; b[k]:=1+Random(1)+Random(1); { random(1) 0 qiymatni, qabul qiladi. Demak, b[1]=1 bo'ladi}
While k<b[k]+2 Do {Toki k<b[k]+2 bajar: }
   begin k:=k+3;
         b[k]:=b[k-3]+2;
         Write(S[b[k]]); { S[b[k]] qiymatini ekranda aks ettir}
   end;
```

Batafsilroq while operatorini ko'rib chiqamiz:
k=1, b[1]=1 – boshlang'ich qiymatlar.
1-qadam. 1<(1+2) (rost)
k=k+3=1+3=4,
b[4]=b[1]+2=1+2=3.
S[b[k]]=S[b[4]]=S[3]='F' ni ekranga chiqaradi.
2-qadam. 4<(3+2) (rost)
k=k+3=4+3=7,
b[7]=b[1]+2=3+2=5.
S[b[k]]=S[b[7]]=S[5]='R' ni ekranga chiqaradi.
3-qadam. 7<(5+2) (yolg'on) – sikl tugaydi va dastur bajarilishi to'xtaydi.

Javob: FR.

35. Qarang: 5-variant 31-savol (43-bet).

36. Qarang: 21-variant 32-savol (155-bet).