2017-yil matematika variant yechimlari (spectrum)

12-variant

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Reklama xizmati : @axborotnoma_reklama

12-variant

1. $y = (x + 2)^2e^{-4-x}$ funksiyaning [–4; 1] oraliqdagi eng kichik qiymatini toping.

Yechish:

$y = (x + 2)^2e^{-4-x}$, [–4; 1]

1) $y' = ((x + 2)^2 \cdot e^{-4-x})' = 2(x + 2) \cdot e^{-4-x} -$
$-(x + 2)^2 \cdot e^{-4-x} = (x + 2) \cdot e^{-4-x}(2 - x - 2) =$
$= -x \cdot (x + 2) \cdot e^{-4-x}$

2) $y' = 0$. $-x \cdot (x + 2) \cdot e^{-4-x} = 0$
$x = 0$, $x = -2$, $e^{-4-x} > 0$.

3)

$x = -2$ min $x = 0$ max

4) $-2 \in [-4; 1]$
$0 \in [-4; 1]$

5) $y(-4) = (-4 + 2)^2 \cdot e^{-4-(-4)} = 4 \cdot e^0 = 4$
$y(-2) = (-2 + 2) \cdot e^{-4-(-2)} = 0$
$y(0) = 2^2 \cdot e^{-4} = 4 \cdot e^{-4}$
$y(1) = (1 + 2)^2 \cdot e^{-4-1} = 9 \cdot e^{-5}$

6) [–4; 1] kesmadagi eng kichik qiymati 0.

Javob: 0.

2. $a_1, a_3, \ldots, a_8$ ketma-ketlikda ixtiyoriy uchta ketma-ket hadining yig'indisi 30 ga teng. Agar ketma-ketlikning uchinchi hadi 5 ga teng bo'lsa, birinchi va sakkizinchi hadlarining yig'indisi nechaga teng?

Yechish:

$a_1, a_2, a_3, \ldots, a_8$. $a_1 + a_8 = ?$
$a_1 + a_2 + a_3 = a_2 + a_3 + a_4 =$
$= a_3 + a_4 + a_5 = \ldots = a_6 + a_7 + a_8 = 30$
$a_3 = 5$, $a_1 + a_2 = 25$, $a_2 + a_4 = 25$
$a_4 + a_5 = 25$, $a_1 + a_8 = a_4 + a_5 = 25$.

Javob: 25.

3. $y = x^2 - 6x + 7$ va $y = -x^2 - 4x - 5$ parabola uchlari orasidagi masofani toping.

Yechish:

$y = x^2 - 6x + 7$, $y = -x^2 - 4x - 5$

1) $y = x^2 - 6x + 7$,

$$x_0 = -\frac{b}{2a} = \frac{6}{2} = 3$$

$y_0 = 9 - 18 + 7 = -2$. $A(3; -2)$

2) $y = -x^2 - 4x - 5$

$$x_0 = \frac{-b}{2a} = \frac{-4}{2} = -2,$$

$y_0 = -4 + 8 - 5 = -1$. $B(-2; -1)$

3) A va B nuqtalar orasidagi masofa.

$$|AB| = \sqrt{(3-(-2))^2 + (-2-(-1))^2} =$$
$$= \sqrt{5^2 + 1^2} = \sqrt{26}.$$

Javob: $\sqrt{26}$.

4. 1, 2, 3, ..., 9 raqamlaridan nechta har xil to'rt xonali son tuzish mumkin (bu yerda to'rt xonali turli raqamlardan tashkil topgan)?

Yechish:

1, 2, 3, ..., 9 raqamlardan nechta har xil to'rt xonali son tuzish mumkin?
O'rinlashtirishga asosan:

$$A_n^k = \frac{n!}{(n-k)!}$$

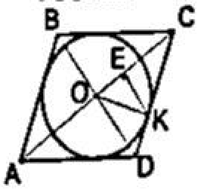
$$A_9^4 = \frac{9!}{(9-4)!} = \frac{9!}{5!} = \frac{5! \cdot 6 \cdot 7 \cdot 8 \cdot 9}{5!} =$$

$= 6 \cdot 7 \cdot 8 \cdot 9 = 3024$.

Javob: 3024.

5. Diagonallari 6 va 8 ga teng bo'lgan rombga ichki aylana chizilgan. Aylananing romb tomoni bilan urinish nuqtasidan katta diagonalgacha bo'lgan masofani toping.

Yechish:



ABCD romb
$AC \perp BD$
$AC = 8$
$BD = 6$
$OK = ?$
$KE = ?$

1) ΔCOD to'g'ri burchakli.
OK, COD uchburchakning CD gipotenuzasiga tushirilgan balandlik.

$$OK = \frac{OC \cdot OD}{CD}$$

$$2)\ OC = \frac{AC}{2} = \frac{8}{2} = 4$$

$$OD = \frac{BD}{2} = \frac{6}{2} = 3$$

$CD^2 = OC^2 + OD^2 = 4^2 + 3^2 = 5^2$, $CD = 5$.

3) $OK = \frac{3\cdot 4}{5} = \frac{12}{5} = 2,4.$

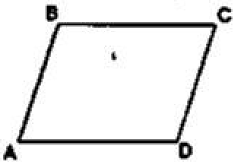
4) $CK = \frac{OC^2}{CD} = \frac{4^2}{5} = \frac{16}{5} = 3,2$

5) $KE = \frac{OK\cdot CK}{OC} = \frac{2,4\cdot 3,2}{4} = 1,92.$

Javob: 1,92.

6. Parallelogrammning o'tkir burchagi 60° ga teng. Diagonallarning kvadratlari nisbati $\frac{19}{7}$ ga teng bo'lsa, tomonlar nisbatini toping.

Yechish:



ABCD – parallelogramm.
$\angle A = \angle C = 60°$,
$AD > AB$.

$\frac{AC^2}{BD^2} = \frac{19}{7}$ $\frac{AD}{AB} = ?$

1) Kosinuslar teoremasiga ko'ra $AC = d_1$, $BD = d_2$, $AB = a$, $AD = b$.

$d_1^2 = a^2 + b^2 - 2ab\cdot\cos 120° = a^2 + b^2 + ab$

$d_2^2 = a^2 + b^2 - 2ab\cdot\cos 60° = a^2 + b^2 - ab$

2) $\frac{d_1^2}{d_2^2} = \frac{19}{7} = \frac{a^2+b^2+ab}{a^2+b^2-ab}$

$19(a^2 + b^2 - ab) = 7(a^2 + b^2 + ab)$

$12a^2 + 12b^2 - 26ab = 0,$

$6a^2 - 13ab + 6b^2 = 0.$

$2a = 3b$ *va* $3a = 2b$.

$a = 1,5b$ *va* $a = \frac{2}{3}b.$

3) $\frac{a}{b} = \frac{3}{2}, \frac{b}{a} = \frac{2}{3}$ *va* $\frac{b}{a} = \frac{3}{2}$.

Javob: 3:2.

7. $(x^2 + 1)^2 + 5(x^4 - 1) - 6(x^2 - 1)^2 = 0$ tenglamaning ildizlari yig'indisini toping.

Yechish:

$(x^2 + 1)^2 + 5(x^4 - 1) - 6(x^2 - 1)^2 = 0$

tenglamadagi $x^4 - 1$ *ifodani ko'paybuvchilarga ajratamiz:*

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

Berilgan tenglamaning har bir hadini shu ifodaga bo'lamiz.

Bu yerda $x^2 + 1 \neq 0$ *va* $x^2 - 1 \neq 0$, *chunki* $x = \pm 1$ *tenglama ildizlari bo'la olmaydi.*

$$\frac{(x^2+1)^2}{(x^2+1)(x^2-1)} + 5\frac{(x^2-1)(x^2+1)}{(x^2+1)(x^2-1)} - 6\frac{(x^2-1)^2}{(x^2+1)(x^2-1)} = 0$$

Berilgan tenglamagi teng kuchli bo'lgan tenglama hosil bo'ldi.

$\frac{x^2+1}{x^2-1} + 5 - 6\frac{x^2-1}{x^2+1} = 0$

Yangi o'zgaruvchi kiritamiz: $\frac{x^2+1}{x^2-1} = t$

$t + 5 - \frac{1}{t} = 0$

Viyet teoremasiga ko'ra, bu kvadrat tenglamaning ildizlaru $t_1 = -6$, $t_2 = 1$.

1) $\frac{x^2+1}{x^2-1} = -6 \Rightarrow x^2 + 1 = -6x^2 + 6$

$\Rightarrow x^2 = \frac{5}{7} \Rightarrow x_1 = \sqrt{\frac{5}{7}}; x_2 = -\sqrt{\frac{5}{7}}.$

2) $\frac{x^2+1}{x^2-1} = 1 \Rightarrow x^2 + 1 = x^2 - 1$ – *tenglama yechimga ega emas. Ikkita* $x_1 + x_2$ *ildizlari yig'indisi:* $\sqrt{\frac{5}{7}} - \sqrt{\frac{5}{7}} = 0.$

Javob: 0.

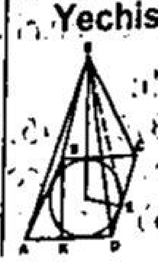
8. Qarang: 6-variant 28-savol (50-bet).

9. Piramidaning asosi tomoni 4 va o'tkir burchagi 60° ga teng bo'lgan rombdan iborat. Ushbu piramidaga ichki chizilgan konusni yasovchining asos tekisligi bilan 45° li burchak tashkil etadi. Konusning hajmini toping.

Berilgan:

SABCD – piramida
ABCD – romb
$AB = 4$
$\angle BAD = 60°$
$SO = H$

Yechish:



$OE = r$
$\angle SEO = 45°$
$V_k = ?$
$V_k = \frac{1}{3}\pi r^2 H$

1) ΔSOE to'g'ri burchakli.
$\angle SEO = 45°$, bundan $H = r$.

2) $\sin 60° = \frac{BK}{AB} = \frac{2r}{4} = \frac{r}{2}$

$r = \sqrt{3}$, $H = \sqrt{3}$

3) $V_k = \frac{1}{3}\pi \cdot 3 \cdot \sqrt{3} = \sqrt{3}\pi$.

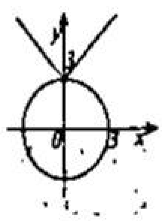
Javob: $\sqrt{3}\pi$.

10. a ning qanday qiymatida $\begin{cases} x^2 + y^2 = 9 \\ y - |x| = a \end{cases}$ tenglamalar sistemasi bitta yechimga ega bo'ladi?

Yechish:

$\begin{cases} x^2 + y^2 = 9 \\ y - |x| = a \end{cases}$ *tenglamalar sistemasini grafik usulida yechamiz*

$x^2 + y^2 = 9$ – markazi O(0; 0) nuqtada, radiusi r = 3 ga teng bo'lgan aylana tenglamasidir $y - |x| = a$ tenglamani $y = |x| + a$ ko'rinishga yozib olamiz. Ikkala grafiklarni bitta grafikda chizib olamiz.



Grafiklar bitta holdagina bitta umumiy nuqtaga ega bo'ladi: a = 3.

Javob: 3.

11. 12345123451234512345123451234 5 sonida 10 ta raqam shunday o'chirilganki, hosil bo'lgan son eng katta bo'ladi. Shu sonning 3-raqamini toping.

Yechish:
1234512345123451234512345 sonida 10 ta raqamni o'chirib eng katta sonni hosil qilamiz.
~~1~~~~2~~~~3~~~~4~~5~~1~~~~2~~~~3~~~~4~~5~~1~~~~2~~ 3451234512345

553451234512345 sonning 3-raqami 3 ga teng.

Javob: 3.

12. $\int \frac{1}{x^2} e^{\frac{1}{x}} dx$ integralni hisoblang.

Yechish:

1) $\frac{1}{x} = t$ belgilash kiritamiz

2) tenglikning ikkala qismini differensiyallaymiz

$d(\frac{1}{x}) = dt$

$-\frac{1}{x^2}dx = dt$, $dx = -x^2 dt$

3) $\int \frac{1}{x^2} e^{\frac{1}{x}} dx = \int \frac{1}{x^2} e^t \cdot (-x^2)dt = -\int e^t dt =$

$= -e^t + c = -e^{\frac{1}{x}} + c$.

Javob: $-e^{\frac{1}{x}} + c$.

13. $\arccos\frac{3}{2-x} < \frac{\pi}{2}$ tengsizlikni yeching.

Yechish:

$\arccos\frac{3}{2-x} < \frac{\pi}{2}$

1) tengsizlikning ikkala qismini kosinuslaymiz. $y = \arccos x$ kamayuvchi bo'lganligi sababli

$\cos(\arccos\frac{3}{2-x}) < \cos\frac{\pi}{2}$

$\frac{3}{2-x} > 0$, $x < 2$

2) aniqlanish sohasi $-1 \le \frac{3}{2-x} \le 1$,

$\frac{3}{2-x} > 0$ bo'lganligi sababli

$0 < \frac{3}{2-x} \le 1$, $\frac{3}{2-x} \le 1$, $\frac{x+1}{2-x} \le 0$; $\frac{x+1}{x-2} \ge 0$

$x \in (-\infty; -1]$.

Javob: $(-\infty; -1]$.

14. $\log_2|tgx| + \log_4 \frac{\cos x}{2\cos x + \sin x} = 0$

tenglamaning $[\frac{9}{4}; 3]$ kesmaga tegishli bo'lgan barcha yechimlarini toping.

Yechish:

$\log_2|tgx| + \log_4 \frac{\cos x}{2\cos x + \sin x} = 0,$

$[\frac{9}{4}; 3]$

1) aniqlanish sohasi

$$\begin{cases} tgx \neq 0, \cos x \neq 0 \\ \frac{\cos x}{2\cos x + \sin x} > 0 \end{cases} \Rightarrow x \neq \frac{\pi n}{2} n \in Z$$

2) $\log_2|tgx| = -\log_4 \frac{\cos x}{2\cos x + \sin x}$

$2\log_2|tgx| = -\log_2 \frac{\cos x}{2\cos x + \sin x}$

$tg^2x = \frac{2\cos x + \sin x}{\cos x} = 2 + tgx$

$tg^2x - tgx - 2 = 0,\ tgx = -1,\ tgx = 2.$

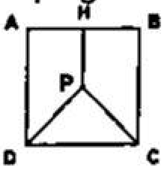
$x = -\frac{\pi}{4} + \pi n,\ n = 0,\ x = -\frac{\pi}{4} \notin [\frac{9}{4}; 3]$

$n = 1,\ x = \frac{3\pi}{4} \in [\frac{9}{4}; 3]$

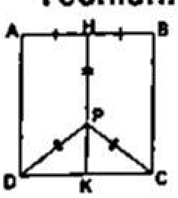
$x = arctg2 + \pi k \notin [\frac{9}{4}; 3].$

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

15. ABCD kvadratda AH = HB, HP = PD = PC = 5 sm bo'lsa, perimetrini toping.



Yechish:



ABCD kvadrat,
$AH = HB = x,\ AB = 2x,$
$HP = PD = PC = 5$ sm,
$P = 8x = ?$

$PK = KH - HP = 2x - 5$
ΔPCD da $PC^2 = PK^2 + KC^2$
$5^2 = (2x - 5)^2 + x^2$
$25 = 4x^2 - 20x + 25 + x^2,$
$5x^2 - 20x = 0$
$5x(x - 4) = 0$
$x = 4$
$P = 8x = 8 \cdot 4 = 32$ sm.

Javob: 32 sm.

16. q ning qanday qiymatlarida $4x^2 - (3 + 2q)x + 2 = 0$ tenglama ildizlari nisbati 8 ga teng bo'ladi?

Yechish:

$4x^2 - (3 + 2q)x + 2 = 0$

Viyet teoremasiga ko'ra $\begin{cases} x_1 + x_2 = \frac{3+2q}{4} \\ x_1 \cdot x_2 = \frac{2}{4} \end{cases}$

Demak $\begin{cases} x_1 + x_2 = \frac{3+2q}{4} \\ x_1 \cdot x_2 = \frac{1}{2} \\ \frac{x_1}{x_2} = 8 \end{cases}$

$x_1 = 8x_2,\ 8x_2 \cdot x_2 = \frac{1}{2},\ x_2^2 = \frac{1}{16},\ x_2 = \pm\frac{1}{4}$

$x_1 = \pm 2$

1) $x_1 = 2,$

$x_2 = \frac{1}{4}$ bo'lganda $2 + \frac{1}{4} = \frac{3+2q}{4},\ 9 = 3 + 2q,$

$q = 3$

2) $x_1 = -2,\ x_2 = -\frac{1}{4}$ bo'lganda

$-2 - \frac{1}{4} = \frac{3+2q}{4},\ -9 = 3 + 2q,$

$q = -6.$

Javob: 3 va –6.

17. Tenglamani yeching:
$2 \cdot 4^{2x} - 17 \cdot 4^x + 8 = 0.$

Yechish:

$2 \cdot 4^{2x} - 17 \cdot 4^x + 8 = 0.$

1) $4^x = a$

$2a^2 - 17a + 8 = 0$

$$a_{1,2} = \frac{17 \pm \sqrt{17^2 - 4\cdot 2\cdot 8}}{2\cdot 2} = \frac{17 \pm 15}{4}$$

$a_1 = 8$

$a_2 = \frac{1}{2}$

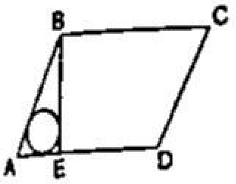
2) $4^x = 8$, $2^{2x} = 2^3$, $2x = 3$, $x = 1,5$

$4^x = \frac{1}{2}$, $4^{2x} = 2^{-1}$, $2x = -1$, $x = -0,5$.

Javob: $\frac{3}{2}; -\frac{1}{2}$.

18. Parallelogrammning o'tmas burchakdan tushirilgan balandlikning uzunligi 9 ga teng. Hosil bo'lgan uchburchakka ichki aylana chizilgan. O'tkir burchakning sinusi $\frac{3}{5}$ ga teng bo'lsa, shu doiraning yuzasini toping.

Yechish:



ABCD parallelogramm
BE = H = 9
ΔAEB to'g'ri burchakli
$\angle BAE = \alpha$, $\sin\alpha = \frac{3}{5}$
$S_d = ?$

1) *ΔAEB to'g'ri burchakli* $AB = c$, $BE = a$, $AE = b$.

$$r = \frac{a + b - c}{2}$$

2) $\sin\alpha = \frac{9}{c} = \frac{3}{5}$, $c = 15$, $a = 9$, $b = 12$.

3) $r = \frac{9 + 12 - 15}{2} = 3$

4) $S_d = \pi r^2 = 3^2\pi = 9\pi$.

Javob: 9π.

19. Qarang: 5-variant 15-savol (40-bet).

20. Hisoblang: $0,(2) + \frac{1}{1,(9) + 2\frac{1}{2}}$.

Yechish:

$0,(2) = \frac{2}{9}$, $1,(9) = 1\frac{9}{9} = 2$

$$\frac{2}{9} + \frac{1}{2 + 2\frac{1}{2}} = \frac{2}{9} + \frac{2}{9} = \frac{4}{9}.$$

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

21. x ning qanday qiymatlarida $\bar{a}(-1; 1; 2)$ va $\bar{b}(x^2; x - 2; x^2 - 12)$ vektorlar parallel bo'ladi.

Yechish:

$\bar{a} \parallel \bar{b}$, *agar vektorlar uchun quyidagi shart bajarilsa:*

$\bar{a}(a_1; a_2; a_3)$; $\bar{b}(b_1; b_2; b_3)$

$$\frac{a_1}{b_1} = \frac{a_2}{b_2} = \frac{a_3}{b_3}$$

$$\frac{-1}{x^2} = \frac{1}{x-2} = \frac{2}{x^2-12} \quad -x + 2 = x^2 \Rightarrow$$

$x^2 + x - 2 = 0 \Rightarrow x_1 -2; x_2 = 1$

$$\frac{-1}{x^2} = \frac{2}{x^2 - 12} \Rightarrow$$

$-x^2 + 12 = 2x^2$

$3x^2 = 12 \Rightarrow x^2 = \pm 2$

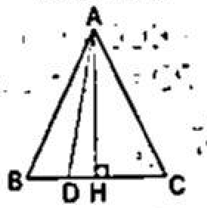
Bir vaqtda ikkala tenglik o'rinli bo'ladi, agar: $x = -2$ *ga teng bo'lsa.*

Javob: -2.

22. ABC teng yonli uchburchakning BC asosida D nuqta olingan. $|BD| = 2$ sm, $|DC| = 4$ sm bo'lsa, AD kesma uzunligini toping.

Berilgan:
ΔABC teng tomonli
$|AB| = |AC| = |BC| = 6$,
$|BD| = 2$, $|DC| = 4$.
AH – balandlik
$AD = x = ?$

Yechish:



$$CH = \frac{BC}{2}$$

$AH^2 = AC^2 - CH^2$

$CH = \frac{6}{2} = 3$. $AC = 6$

$AH^2 = 6^2 - 3^2 = 36 - 9 = 27$

$AH = 3\sqrt{3}$

$AD^2 = AH^2 + DH^2$

$DH = BH - BD = 3 - 2 = 1$

$AD^2 = \left(3\sqrt{3}\right)^2 + 1^2 = 27 + 1 = 28$

$AD = \sqrt{28} = 2\sqrt{7}.$

Javob: $2\sqrt{7}$.

23. $\dfrac{3x}{4x - \dfrac{0,25+x}{3x + \dfrac{4-2x}{4}}} = 1$ tenglamani yeching.

Yechish:

$$\frac{3x}{4x - \dfrac{0,25+x}{3x + \dfrac{4-2x}{4}}} = 1$$

$$3x = 4x - \frac{0,25+x}{3x + \dfrac{4-2x}{4}}$$

$$\frac{0,25+x}{3x + \dfrac{4-2x}{4}} = x$$

$$0,25 + x = x\cdot\left(3x + \frac{2-x}{2}\right)$$

$0,5 + 2x = x(5x + 2)$

$0,5 + 2x = 5x^2 + 2x$

$$x^2 = 0,1 = \frac{1}{10},\ x = \pm\frac{1}{\sqrt{10}} = \pm\frac{\sqrt{10}}{10}.$$

Javob: $\pm\dfrac{\sqrt{10}}{10}$.

24. $0,\left(8\overline{a}\right)$ davriy kasrning qiymati $\dfrac{28}{33}$ ga teng bo'lsa, a ning qiymatini toping (bu yerda $\overline{8a}$ ikki xonali son).

Yechish:

$$0,\left(8\overline{a}\right) = \frac{28}{33}$$

$$\frac{\overline{8a}}{99} = \frac{28}{33},\quad \frac{\overline{8a}}{99} = \frac{84}{99},\quad \overline{8a} = 84,\ a = 4.$$

Javob: 4.

25. Tengsizlikni yeching:
$4\sin^4 2x + 7\cos 4x \le 1$.

Yechish:

$4\sin^4 2x + 7\cos 4x \le 1.$

1) $\cos 4x = 1 - 2\sin^2 2x$

2) $4\sin^4 2x + 7(1 - 2\sin^2 2x) \le 1$

$\sin^2 2x = a$

$4a^2 + 7(1 - 2a) \le 1$

$4a^2 - 14a + 6 \le 0,\ 2a^2 - 7a + 3 \le 0$

$(a - 3)(2a - 1) \le 0$

$$\frac{1}{2} \le a \le 3$$

$$\frac{1}{2} \le \sin^2 2x \le 3$$

3) $\sin^2 2x \ge \dfrac{1}{2},\ \sin^2 2x \le 3.$

$$\frac{1 - \cos 4x}{2} \ge \frac{1}{2}$$

$\cos 4x \le 0$

$$\frac{\pi}{2} + 2\pi n \le 4x \le \frac{3\pi}{2} + 2\pi n$$

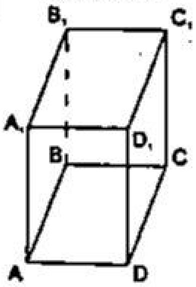
$$\frac{\pi}{8} + \frac{\pi n}{2} \le x \le \frac{3\pi}{8} + \frac{\pi n}{2},\ n \in Z.$$

$\sin^2 2x \le 3\ x \in R.$

Javob: $\dfrac{\pi}{8} + \dfrac{\pi n}{2} \le x \le \dfrac{3\pi}{8} + \dfrac{\pi n}{2},\ n \in Z.$

26. Prizmaning asosi diagonallari 9 va 12 ga teng bo'lgan romb yon qirrasi 6 ga teng. Ushbu prizma yon sirtini toping.

Yechish:



$ABCDA_1B_1C_1D_1$ – prizma.

$ABCD$ – romb.

$AC = 12$

$BD = 9$

$AA_1 = 6$

$S_{yon} = ?$

$S_{to'la} = ?$

$S_{yon} = P\cdot H$

$P = 4a.\ d_1 = 12,\ d_2 = 9,\ H = AA_1 = 6.$

$d_1^2 + d_2^2 = 4a^2$

$12^2 + 9^2 = 4a^2,$

$4a^2 = 15^2,$

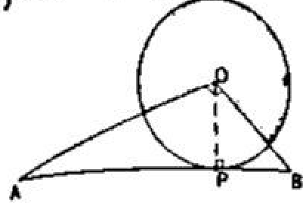
$a=\dfrac{15}{2}$

$S_{yon}=4\cdot a\cdot H=4\cdot\dfrac{15}{2}\cdot 6=180$

$S_{to'la}=2\cdot S_{asos}+S_{yon}=2\cdot\dfrac{9\cdot 12}{2}+180=288.$

Javob: 288.

27. AB aylanaga urinma. $\angle AOB=90^\circ$, $|AP|=4$, $|PB|=1$ bo'lsa, bo'yalgan soha yuzini toping.



Yechish:

$\angle AOB=90^\circ$, $|AP|=4$, $|PB|=1$

$AB\perp OP$, $OP=R$

1) ΔAOB to'g'ri burchakli

$|OP|^2=AP\cdot PB$

$|OP|^2=1\cdot 4$, $|OP|=2$

$R=2$

2) bo'yalgan soha yuzi

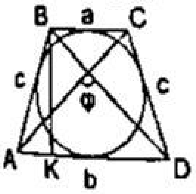
$S=\dfrac{\pi R^2\alpha}{360^\circ}$, $\alpha=270^\circ$

$S=\dfrac{\pi\cdot 2^2\cdot 270^\circ}{360^\circ}=\dfrac{4\pi\cdot 3}{4}=3\pi.$

Javob: 3π.

28. Aylanaga tashqi chizilgan, yuzasi 98 ga teng bo'lgan teng yonli trapetsiya berilgan. Asosidagi burchak 30° ga teng bo'lsa, diagonallar orasidagi burchakni toping.

Yechish:



$S=98$.

$\angle BAD=30^\circ$

$\varphi=?$

1) $S=\dfrac{a+b}{2}\cdot h=\dfrac{d_1\cdot d_2}{2}\cdot\sin\varphi=\dfrac{d^2}{2}\sin\varphi.$

2) $a+b=2c$,

$\sin 30^\circ=\dfrac{h}{c}$, $h=\dfrac{c}{2}$.

3) $S=c\cdot\dfrac{c}{2}=\dfrac{c^2}{2}=98,$

$c^2=196\Rightarrow c=14.$

4) $BD^2=BK^2+KD^2$

$KD=\dfrac{a+b}{2}=c=14.$

$BK=h=\dfrac{c}{2}=7.$

$BD^2=d^2=7^2+14^2=49+196=245$

5) $98=\dfrac{d^2}{2}\cdot\sin\varphi$

$\sin\varphi=\dfrac{2\cdot 98}{d^2}=\dfrac{4\cdot 49}{245}=\dfrac{4}{5}$

$\varphi=\arcsin\dfrac{4}{5}.$

Javob: $\arcsin\dfrac{4}{5}$.

29. Agar $f(3x)=6x^3+4x^2+2x+1$ bo'lsa, $f'(3)-f(3)$ ni toping.

Yechish:

1) $x=1$ da $f(3)=6\cdot 1+4\cdot 1+2\cdot 1+1=13$

2) $3x=a$, $x=\dfrac{a}{3}$

$f(a)=\dfrac{2a^3}{9}+\dfrac{4a^2}{9}+\dfrac{2a}{3}+1$

3) $f'(a)=\dfrac{2}{3}a^2+\dfrac{8a}{9}+\dfrac{2}{3}$

$f'(3)=\dfrac{2}{3}\cdot 9+\dfrac{8\cdot 3}{9}+\dfrac{2}{3}=6+\dfrac{10}{3}=9\dfrac{1}{3}$

4) $9\dfrac{1}{3}-13=-3\dfrac{2}{3}.$

Javob: $-3\dfrac{2}{3}$

30. Tenglama ildizlari ko'paytmasini toping: $\lg x-\lg\dfrac{1}{x-1}=\lg 2+3\lg\sqrt[3]{x+2}$.

Yechish:

Aniqlanish sohasi $\begin{cases}x>0\\ x-1>0\\ x+2>0\end{cases}\Rightarrow x>1$

$$lgx - lg\frac{1}{x-1} = lg2 + 3lg\sqrt[3]{x+2}$$

$$lgx = lg\frac{1}{x-1} + lg2 + lg\left(\sqrt[3]{x+2}\right)^3$$

$$lgx = lg\frac{2}{x-1}\cdot(x+2)$$

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

$x^2 - 3x - 4 = 0$, $x = -1$, $x = 4$

$x > 1$ *bo'lganligi uchun* $x = 4$ *tenglama ildizi bo'ladi. Demak ildizlari ko'paytmasi 4 ga teng.*

Javob: 4.

31. Rost mulohazalarga mos sonlar yig'indisini Rim sanoq sistemasida aniqlang:
CXXIX = "Vaqt uzlukli axborotdir"
XCVII = "Insonga uzluksiz ta'sir etib turuvchi axborotlar diskret axborotlar deb ataladi"
XLIX = "Axborot xususiyatlariga quyidagilar kiradi: qimmatlilik, ishonchlilik, to'liqlik"

Yechish:
Rim raqamlarini 10-lik sanoq sistemasiga o'tkazib, rost mulohazalarni aniqlaymiz:
CXXIX = 129 = "Vaqt uzlukli axborotdir" – yo'lg'on;
XCVII = 97 = "Insonga uzluksiz ta'sir etib turuvchi axborotlar diskret axborotlar deb ataladi" – yolg'on;
XLIX = 49 = "Axborot xususiyatlariga quyidagilar kiradi: qimmatlilik, ishonchlilik, to'liqlik" – rost.

Javob: XLIX.

32. Ali sakkizlik sanoq sistemasida (65; 101) oraliqdagi barcha butun sonlarni yozib chiqdi. Vali esa shu sonlardan 7 raqami qatnashgan barcha sonlarni o'chirib tashladi. Qolgan sonlar yig'indisini sakkizlik sanoq sistemasida aniqlang va o'n birlik sanoq sistemasiga o'tkazing.

Yechish:
Ali yozgan sonlar: 66, 67, 70, 71, 72, 73, 74, 75, 76, 77, 100. Vali shu sonlardan 7 raqami qatnashgan barcha sonlarni o'chirganidan keyin 66, 100 sonlar qoladi. Ularning sakkizlik sanoq sistemasidagi yig'indisini hisoblaymiz: $66_8+100_8=166_8$. *Endi bu sonni avval 10-lik sanoq sistemasiga, keyin 11-likka o'tkazamiz.*

$$166_8 = 1\cdot8^2 + 6\cdot8^1 + 6\cdot8^0 = 64 + 48 + 6 = 118_{10}$$

$$\begin{array}{r|l} -118 & 11 \\ \underline{11} & 10 \\ 8 & \end{array}$$

11-lik sanoq sistemasida 10=A. Demak, $118_8=A8_{11}$ *ekan.*

Javob: A8.

33. O'zbekistonda qachondan boshlab Internet Provayderlar xizmat ko'rsata boshladi?

Yechish:
1990-yillar boshi. UUCP ma'lumotlar uzatish tizimida elektron pochta orqali ma'lumot almashish imkoni paydo bo'ldi. Foydalanuvchilar analog modemlar yordamida Moskvaga yoki boshqa shaharlararo qo'ng'iroqni amalga oshira boshladilar. Ma'lumotlar uzatish tezligi 1200–2400 bod (bit/s)ni tashkil qilgan.
1992–1995-yillarda UUCP mahalliy provayderi faoliyatini boshlagan. U tomonidan ko'rsatilayotgan xizmatlar tezligi 9600–14400 bod (bit/s)ni tashkil qilgan. Shunday so'ng

BCC (Biznes Aloqalar Markazi), CCC va PERDCA (Silk.org) provayderlari tashkil etilgan. Sonet elektron tijorat tarmoqlariga ulanish boshlangan.

FidoNet matnli ma'lumotlarni jo'natish global tarmog'i ishga tushdi. Relcom – ilk elektron pochta tarmog'i ishga tushdi. Ma'lumot uzatish tezligi 9600 dan 14400 bodgacha bo'lgan analog modemlar orqali internet tarmog'iga ulanish imkoniyati tug'ilgan. Mazkur xizmatlar Naytov, BCC hamda Silknet (PERDCA) provayderlari tomonidan ko'rsatilgan.

1995-yil 29 aprelda «UZ»domeniga asos solindi. O'zbekiston Respublikasi Markaziy Bankining ma'lumotlarini banklararo uzatish tarmog'iga asos solindi.

1996-yil. O'zbekiston Respublikasi Vazirlar Mahkamasi huzurida BTMning O'zbekistonda internetni rivojlantirish loyihasi tashkil etildi. Keyinchalik bu UzNET nomi bilan tanilgan. Telekommunikasiya bozorida UzPAK kompaniyasi faoliyatini boshladi.

1997–1999-yillar internetning misli ko'rilmagan rivojlanish davri. Har bir provayder xalqaro internet tarmog'ida o'zining mustaqil kanaliga ega bo'ldi. Dastlab Naytov (http://WWW.naytov.com), Uznet (http://WWW.uznet.net) yoki Eastlink (http://WWW.eastlink.uz) kabi provayder-kompaniyalar faoliyat boshladi (1999).

Javob: 1997.

34. Paskal. Dastur natijasini aniqlang.

```
Var k: byte; s, N:string; X:array[1..11] of byte;
Begin Randomize: S:='INFORMATIKA';N:='';
x[1]:=Random(Random(2))+1;
For k:=2 To 5 Do X[k]:=X[k-1]+k;
For k:=1 To 5 Do N:=N+s[X[k] mod 4];
Write(N); Readln; End.
```

Yechish:

Dasturda k – 0..255 diapazondagi butun o'zgaruvchi; s, N – satrlar va X – 11 ta 0..255 diapazondagi butun sondan iborat massivdan foydalanilgan.

Randomize – tasodifiy sonlar generatori.

s:='INFORMATIKA'; N:='' – bo'sh satr.

X[1]:=Random(Random(2))+1; {random(2) [0; 2) oraliqdan, ya'ni 0 yoki 1 qiymatlarni, random(random(2)) esa 0 qiymatni qabul qiladi. Demak, X[1]=1 bo'ladi}

For k:=2 To 5 Do X[k]:=X[k-1]+k;

k:=2 dan 5 gacha ketma-ket o'zgarganda har bir k uchun X[k-1] ga k ni qo'shib, qiymatini X[k] ta'minlaydi.

K	X[k]
1	1
2	3
3	6
4	10
5	15

For k:=1 To 5 Do N:=N+s[X[k] mod 4];

X[k] mod 4 – bu X[k] ni 4 ga bo'lgandagi qoldiqni hisoblaydi.

k:=1 dan 5 gacha ketma-ket o'zgarganda har bir k uchun N satrga s satrning (X[k] mod 4)-pozitsiyasidagi belgini qo'shadi.

K	B[k]	X[k] mod 4	N
1	1	1	I
2	3	3	IF
3	6	2	IFN
4	10	2	IFNN
5	15	3	IFNNF

Write (N) – {N ning qiymatini ekranda aks ettiradi}

Javob: IFNNF.

35. Qarang: 5-variant 32-savol (43-bet).

36. MS Excel. A1 = 10; B1 = 14; B2 = 6 bo'lsa, =СУММ(A1-B2; A2-B1) funksiyaning javobi 5 ga teng bo'lishi uchun A2 katakda qanday son bo'lishi kerak?

Yechish:
Argumentlar A1 = 10; B1 = 14; B2 = 6 ga teng. =СУММ(A1-B2; A2-B1) funksiyani 5 ga tenglashtirib, noma'lumni topamiz:
=(A1-B2)+(A2-B1)=5
(10-6)+(A2-14)=5
A2-10=5
A2=15.

Javob: 15.