3-variant 2017 yil spectrum

@axborotnoma

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Javob: global.

3-variant

1. L nuqta K(–2; 4; 3) va M(10; 16; 15) orasidagi nuqta va KL = 3·LM. L nuqta koordinatalarini toping.

Yechish:

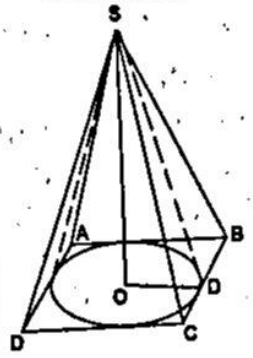
$L(x; y; z)$, $KL = (x + 2; y - 4; z - 3)$
$LM = (10 - x; 16 - y; 15 - z)$
$KL = 3 \cdot LM$
1) $(x + 2) = 3(10 - x)$
$4x = 28$, $x = 7$
2) $y - 4 = 3(16 - y)$
$4y = 52$
$y = 13$
3) $z - 3 = 3(15 - z)$
$4z = 48$, $z = 12$
$L(7; 13; 12)$.

Javob: (7; 13; 12).

2. Piramidaning asosi tomoni $6\sqrt{3}$ va o'tkir burchagi 30° ga teng bo'lgan rombdan iborat. Ushbu piramidaga ichki chizilgan konusning yasovchisi asos tekisligi bilan 60° li burchak tashkil etadi. Konus hajmining piramida hajmiga nisbatini toping.

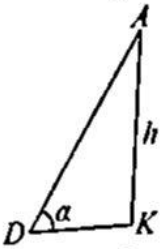
Berilgan:
$SABCD$ – piramida
$ABCD$ – romb
$SO = H$, $AB = 6\sqrt{3}$
$\angle ADC = 30°$
$SD = \ell$ – konus yasovchisi
$\angle SDO = 60°$
$\frac{V_k}{V_p} = ?$

Yechish:



$$V_p = \frac{S_o \cdot H}{3} = \frac{a^2 \cdot \sin 30^\circ}{3} \cdot H$$

$$V_k = \frac{S_o \cdot H}{3} = \frac{\pi R^2 H}{3},\ R = \frac{h}{2}$$



$$\sin\alpha = \frac{h}{AD},$$

$$h = 6\sqrt{3} \cdot \sin 30^\circ = 3\sqrt{3}$$

$$R = \frac{3\sqrt{3}}{2}$$

$$\frac{V_k}{V_p} = \frac{\pi R^2 H}{3} : \frac{a^2 \cdot H \sin 30^\circ}{3} = \frac{\pi R^2}{a^2 \sin 30^\circ} =$$

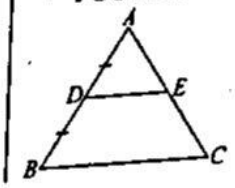
$$= \frac{\pi\left(\frac{3\sqrt{3}}{2}\right)^2}{\left(6\sqrt{3}\right)^2 \cdot \frac{1}{2}} = \frac{27\pi \cdot 2}{36 \cdot 3 \cdot 4} = \frac{\pi}{8}.$$

Javob: $\frac{\pi}{8}$.

3. Teng yonli; uchburchakning asosiga parallel o'rta chizig'i 7 ga, perimetri esa 30 ga teng. Uning yon tomonining asosiga nisbatini toping.

Berilgan:
ABC – teng yonli uchburchak
AB = AC = b, BC = a
DE = o'rta chiziq

Yechish:



$$DE = \frac{BC}{2} = 7,\ BC = 14$$

$$P = 2AB + BC = 30,\ AB = 8$$

$$\frac{AB}{BC} = \frac{b}{a} = \frac{8}{14} = \frac{4}{7}.$$

Javob: $\frac{4}{7}$.

4. Tenglamalar sistemasi nechta yechimga ega $\begin{cases} x^2 + 3xy = 54 \\ 4y^2 + xy = 115 \end{cases}$?

Yechish:

$$+\begin{array}{l} x^2 + 3xy = 54 \\ 4y^2 + xy = 115 \\ \hline x^2 + 4xy + 4y^2 = 169 \end{array}$$

$(x + 2y)^2 = 169,\ x + 2y = \pm 13$.
$x = -2y + 13$ va $x = -2y - 13$.
1) $x = -2y + 13$ da
$4y^2 - 2y^2 + 13y = 115$
$2y^2 + 13y - 115 = 0$ tenglama
$y = 5,\ y = -11,5$ 2 ta yechimga ega.
2) $x = -2y - 13$ da
$2y^2 - 13y - 115 = 0$ tenglama
$y = -5,\ y = 11,5$ 2 ta yechimga ega.
Demak tenglamalar sistemasi 4 ta yechimga ega: (3; 5), (36; –11,5), (–3; –5), (–36; 11,5).

Javob: 4.

5. $y = xe^x$, $y = 0$, $x = 0$, $x = \ln 2$ chiziqlari bilan chegaralangan soha yuzasini toping.

Yechish:
$y = xe^x$, $y = 0$, $x = 0$, $x = \ln 2$ $S = ?$

1) $S = \int_0^{\ln 2} x \cdot e^x dx$ bo'laklab integrallaymiz.

$$\begin{cases} u = x \\ dv = e^x dx \end{cases}, \begin{cases} du = dx \\ v = e^x \end{cases}$$

$$\int xe^x dx = x \cdot e^x - \int e^x dx = x \cdot e^x - e^x$$

2) $\int_0^{\ln 2} x \cdot e^x dx = e^x (x-1)\Big|_0^{\ln 2} =$

$= 2(\ln 2 - 1) - (-1) = 2\ln 2 - 1.$

Javob: $2\ln 2 - 1$.

6. Hisoblang: $(5 + 3\sqrt{2})\sqrt{43 - 5\sqrt{72}}$.

Yechish:

1) $\sqrt{43 - 5\sqrt{72}} = \sqrt{43 - 6 \cdot 5\sqrt{2}} =$

$= \sqrt{43 - 2 \cdot 5 \cdot 3\sqrt{2}} = \sqrt{(5 - 3\sqrt{2})^2} = 5 - 3\sqrt{2}.$

2) $(5 + 3\sqrt{2}) \cdot (5 - 3\sqrt{2}) = 5^2 - (3\sqrt{2})^2 =$
$= 25 - 18 = 7.$

Javob: 7.

7. $2^{2x+1} - 21 \cdot \left(\frac{1}{2}\right)^{2x+3} + 2 \geq 0$ tengsizlikni yeching.

Yechish:
1) daraja xossasiga ko'ra

$$2^{2x+1} - 21 \cdot \left(\frac{1}{2^{2x+1}}\right) + \frac{1}{2^2} + 2 \geq 0.$$

2) $2^{2x+1} = a$ belgilash kiritamiz.

$2^{2x+1} > 0 \Rightarrow a > 0.$

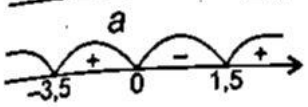
$$a - \frac{21}{4a} + 2 \geq 0$$

$$\frac{4a^2 + 8a - 21}{4a} \geq 0$$

$$a_{1,2} = \frac{-8 \pm \sqrt{64 + 16 \cdot 21}}{8} = \frac{-8 \pm 4 \cdot 5}{8}$$

$$a_1 = \frac{3}{2},\ a_2 = -\frac{7}{2}$$

$$\frac{(2a+7)(2a-3)}{a} \geq 0$$



$3{,}5 \leq a < 0 \quad \varnothing$

$a \geq 1{,}5$

3) $2^{2x+1} \geq \frac{3}{2}$

$\log_2 2^{2x+1} \geq \log_2 \frac{3}{2},\ 2x + 1 \geq \log_2 3 - 1$

$2x \geq \log_2 3 - 2,\ x \geq \frac{1}{2}\log_2 3 - 1.$

Javob: $x \geq \frac{1}{2}\log_2 3 - 1.$

8. Tenglamani yeching: $\frac{3x^{\frac{1}{2}} - 5}{5(x^{\frac{1}{2}} - 3)} = \frac{2x^{\frac{1}{2}} + 3}{4x^{\frac{1}{2}} - 7}$.

Yechish:

$$\frac{3x^{\frac{1}{2}} - 5}{5(x^{\frac{1}{2}} - 3)} = \frac{2x^{\frac{1}{2}} + 3}{4x^{\frac{1}{2}} - 7}$$

1) aniqlanish sohasi $x \geq 0,\ x \neq 9,\ x \neq \frac{49}{16}$.

2) $\frac{3\sqrt{x} - 5}{5(\sqrt{x} - 3)} = \frac{2\sqrt{x} + 3}{4\sqrt{x} - 7}$

$12x - 20\sqrt{x} - 21\sqrt{x} + 35 =$

$= 10x - 30\sqrt{x} + 15\sqrt{x} - 45.$

$2x - 26\sqrt{x} + 80 = 0$

$x - 13\sqrt{x} + 40 = 0,\ \sqrt{x} = 5,\ \sqrt{x} = 8$

$x = 25,\ x = 64.$

Javob: 25; 64.

9. To'rtburchakli muntazam prizma asosining tomoni 15 ga, balandligi 20 ga teng. Asosining tomonidan uni kesib o'tmaydigan prizma diagonaligacha eng qisqa masofani toping.

Berilgan:

$ABCDA_1B_1C_1D_1$ – prizma

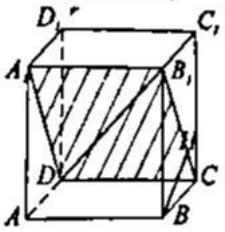
$ABCD$ – kvadrat

$AB = 15$

$AA_1 = 20$

AB dan DB_1 gacha masofa?

Yechish:



1) CDB_1A_1 tekislik o'tkazamiz

$AB \| A_1B_1$ va $A_1B_1 \in (CDB_1A_1)$

$\Rightarrow (CDB_1A_1) \| AB$

2) $BH \perp CB_1$ o'tkazamiz

$BH \perp AB$, chunki $AB \perp (BCB_1)$ va $BH \in (BCB_1)$

3) $BH \perp DCB_1$, chunki $BH \perp CB_1 \cap DC$

$DC \perp (CBC_1)$ va $BH \in (BCB_1) \Rightarrow BH \perp DC$

CB_1 va $DC \in (DCB_1) \Rightarrow BH \perp (CDB_1) \Rightarrow$

$BH \perp DB_1$

Demak, BH – izlanayotgan masofa

4) BCB_1 – to'g'ri burchakli uchburchak.

Pifagor teoremasiga ko'ra:

$CB_1 = \sqrt{BB_1^2 + BC^2} = \sqrt{15^2 + 20^2} =$

$= \sqrt{225 + 400} = \sqrt{625}$

$CB_1 = 25$

$S_{BCB_1} = \frac{1}{2} BH \cdot CB_1 = \frac{1}{2} BB_1 \cdot BC \Rightarrow$

$\Rightarrow 25 \cdot BH = 20 \cdot 15 \Rightarrow BH = \frac{300}{25} = 12.$

Javob: 12.

10. Agar $f(x) = (m-3)x^2 + 24x - m^2 + 9$ funksiya grafigi koordinatalar sistemasi boshidan o'tsa, u holda uning simmetriya o'qi tenglamasini toping.

Yechish:

$f(x) = (m-3)x^2 + 24x - m^2 + 9$

Koordinata boshi $(0; 0)$ $x = 0$ da $y = 0$

$0 = (m-3) \cdot 0 + 24 \cdot 0 - m^2 + 9$

$m^2 = 9,$

$m = \pm 3$

$f(x)$ kvadrat uchhad.

$m-3\neq 0$,
$m\neq 3$
$f(x)$ funksiya grafigi – parabola. Parabola simmetriya o'qi tenglamasi

$$x_0=-\frac{b}{2a};\ b=24,\ a=-6$$

$$x_0=-\frac{24}{2\cdot(-6)}=2$$

$x_0=2$ – simmetriya tenglamasi.

Javob: 2.

11. Qarang: 2-variant 2-savol (12-bet).

12. $y=\frac{x^2+1}{x}$ funksiyaning qiymatlar sohasini toping.

Yechish:

$y=\frac{x^2+1}{x}$ qiymatlar sohasini topamiz.

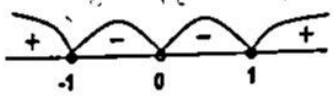
$$y=\frac{x^2+1}{x}=x+\frac{1}{x}$$

1) $D(y)$ – aniqlanish sohasi $x\neq 0$.
$D(y)\in(-\infty;0)\cup(0;\infty)$
2) funksiya hosilasini topamiz.

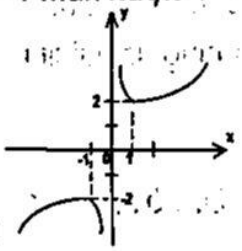
$$y'=\left(x+\frac{1}{x}\right)'=1-\frac{1}{x^2}$$

3) $y'=0$ ni topamiz.

$$1-\frac{1}{x^2}=0,\ x=\pm 1$$

4) 

$x=-1$ min nuqta
$x=1$ max nuqta

5) 

$y(-1)=-2$
$y(1)=2$
qiymatlar sohasi – $(-\infty;-2]\cup[2;\infty)$.

Javob: $(-\infty;-2]\cup[2;\infty)$.

13. Agar $_2x$ $\arcsin(3x^2-4x-1)=\arcsin(x+1)$ tenglamaning ildizi bo'lsa, $3|x|$ ni hisoblang.

Yechish:

$\arcsin(3x^2-4x-1)=\arcsin(x+1)$
$3|x|=?$
1) aniqlanish sohasi

$$\begin{cases}-1\le 3x^2-4x-1\le 1\\ -1\le x+1\le 1\end{cases}\Rightarrow\begin{cases}3x^2-4x\ge 0\\ 3x^2-4x-2\le 0\\ -2\le x\le 0\end{cases}\Rightarrow$$

$$\Rightarrow 2-\sqrt{10}\le x\le 0$$

2) $3x^2-4x-1=x+1$
$3x^2-5x-2=0$

$$x=2,\ x=-\frac{1}{3}$$

3) $x=-\frac{1}{3}$ aniqlanish sohasiga tegishli.

4) $3|x|=3\cdot\left|-\frac{1}{3}\right|=3\cdot\frac{1}{3}=1.$

Javob: 1.

14. Hisoblang: $\frac{\sqrt{2}+1}{\sqrt{2}-1}+\frac{1}{2-\sqrt{2}}+\frac{1}{2}+\ldots.$

Yechish:

$$\frac{\sqrt{2}+1}{\sqrt{2}-1}+\frac{1}{2-\sqrt{2}}+\frac{1}{2}+\ldots.$$

1) $b_1=\frac{\sqrt{2}+1}{\sqrt{2}-1},\ b_2=\frac{1}{2-\sqrt{2}},\ q=\frac{b_2}{b_1}$

$$2)\ q=\frac{1}{\sqrt{2}\left(\sqrt{2}-1\right)}:\frac{\sqrt{2}+1}{\sqrt{2}-1}=$$

$$=\frac{1}{\sqrt{2}\left(\sqrt{2}-1\right)}\cdot\frac{\sqrt{2}-1}{\sqrt{2}+1}=\frac{1}{\sqrt{2}(\sqrt{2}+1)}$$

$$3)\ S=\frac{b_1}{1-q},\ S=\frac{\sqrt{2}+1}{\sqrt{2}-1}:\left(1-\frac{1}{\sqrt{2}(\sqrt{2}+1)}\right)=$$

$$=\frac{\sqrt{2}+1}{\sqrt{2}-1}\cdot\frac{\sqrt{2}(\sqrt{2}+1)}{2+\sqrt{2}-1}=\frac{\sqrt{2}(\sqrt{2}+1)^2}{(\sqrt{2}-1)(\sqrt{2}+1)}$$

$$=\sqrt{2}(3+2\sqrt{2})=3\sqrt{2}+4.$$

Javob: $3\sqrt{2}+4$.

15. $2x-3\sqrt{2x-1}+1=0$ tenglamaning ildizlari ayirmasining modulini toping.

Yechish:

1) $3\sqrt{2x-1}=2x+1$

aniqlanish sohasi $\begin{cases}2x-1\ge 0\\ 2x+1\ge 0\end{cases}\Rightarrow x\ge\frac{1}{2}$

2) $\left(3\sqrt{2x-1}\right)^2=(2x+1)^2$

$18x-9=4x^2+4x+1$

$4x^2-14x+10=0$

$2x^2-7x+5=0$

$x=1,\ x=\frac{5}{2}$

Tenglama ildizlari ayirmasining moduli $|1-2{,}5|=1{,}5$.

Javob: 1,5.

16. $2x+x^3+x^5+4=0$ tenglamani yeching.

Yechish:

$2x+x^3+x^5+4=0$

$x^5+x^3+2x+4=0$

1) yuqori darajali tenglamaning ozod hadi 4 ning bo'luvchilari tenglamaning yechimi bo'la oladi. 4 ning bo'luvchilari ±1, ±2, ±4.

$x=-1$ *da* $(-1)^5+(-1)^3+2\cdot(-1)+4=$

$=-1-1-2+4=0$.

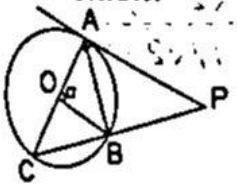
Musbat sonlar 1, 2, 4 tenglamaning yechimi bo'la olmaydi.

$x=-1$ *tenglama yechimi.* emas.

Javob: ~~0~~

17. Markazi O nuqtada bo'lgan aylanadan tashqaridagi P nuqtadan PC kesuvchi va 4 ga teng bo'lgan PA urinma o'tkazilgan. Kesuvchi va aylana kesishishi natijasida hosil bo'lgan vatar uzunligi 6 ga, $\angle AOB=60°$ bo'lsa, urinma va kesuvchi orasidagi burchakni toping.

Yechish:



PA – urinma
PC – kesuvchi
PA = 4
BC = 6
$\angle AOB=60°$
$\angle APC=?$

1) $PA^2=PB\cdot PC.\ \rightarrow PB=x$

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

$x^2+6x-16=0.\ x=2,\ x=-8.$

$x=2,\ PB=2,\ PC=8.$

2) $OA=OB=R.$

$\angle AOB=60°,\ \angle OAB=\angle OBA=60°.$

ΔAOB *teng tomonli* $AO=OB=AB.$

3) $\angle COB=120°,\ \angle OCB=\angle OBC=30°$

bundan $\angle ABC=90°.$

4) *To'rtburchak AOBP da* $\angle OAP=90°,$

$\angle AOB=60°,\ \angle OBP=150°.$

$\angle APC=360°-(90°+60°+150°)=$

$=360°-300°=60°.$

Javob: 60°.

18. Ifodani soddalashtiring:

$$\sqrt{\frac{1}{2}-\frac{1}{2}\sqrt{\frac{1}{2}+\frac{1}{2}\cos\alpha}}\quad(\pi<\alpha<2\pi).$$

Yechish:

1) $\pm\sqrt{\frac{1}{2}+\frac{1}{2}\cos\alpha}=\pm\sqrt{\frac{1+\cos\alpha}{2}}=\cos\frac{\alpha}{2}$

2) $\pi<\alpha<2\pi$ *bo'lganligi sababli:* $-\cos\frac{\alpha}{2}.$

3) $\pm\sqrt{\frac{1}{2}-\frac{1}{2}\cdot\left(-\cos\frac{\alpha}{2}\right)}=\pm\sqrt{\frac{1+\cos\frac{\alpha}{2}}{2}}=$

$=\cos\frac{\alpha}{4}$

4) $\pi<\alpha<2\pi$ *bo'lganligi sababli:* $\cos\frac{\alpha}{4}.$

Javob: $\cos\frac{\alpha}{4}.$

19. $\vec{a}(2;3;4)$ va $\vec{b}(1;3;4)$ vektorlar berilgan. $\vec{c}=2\vec{a}+\vec{b}$ vektorning uzunligini toping.

Yechish:

$\vec{a}(2;3;4),\ \vec{b}(1;3;4),\ \vec{c}=2\vec{a}+\vec{b},\ |\vec{c}|=?$

1) $2\vec{a}=(4;6;8)$

2) $\vec{c}=(4;6;8)+(1;3;4)=(5;9;12)$

3) $|\vec{c}|=\sqrt{5^2+9^2+12^2}=\sqrt{25+81+144}=\sqrt{250}$

Javob: $\sqrt{250}$.

20. ABCD parallelogramm uchta uchining koordinatalari ma'lum A(0; 1), B(1; 3), C(13; 3). ABCD parallelogramm yuzini toping.

Yechish:

ABCD – parallelogramm.
A(0; 1), B(1; 3), C(13; 3)
$S_{ABCD} = ?$

Parallelogramm yuzi $S_{ABCD} = AD \cdot BE$.
$AD = BC = 12$,
$BE = 2$
$S_{ABCD} = 12 \cdot 2 = 24$.

Javob: 24.

21. $\left|\frac{x^2-5x+4}{x^2-4}\right| \le 1$ tengsizlikni qanoatlantirmaydigan tub sonni toping.

Yechish:

$\left|\frac{x^2-5x+4}{x^2-4}\right| \le 1$ *tengsizlikni yechamiz.*

1) tengsizlikning ikkala qismini kvadratga oshiramiz va qisqa ko'paytirish formulasidan foydalanamiz.

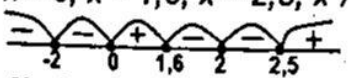
$$\left|\frac{x^2-5x+4}{x^2-4}\right|^2 \le 1^2$$

$$\left(\frac{x^2-5x+4}{x^2-4}-1\right)\left(\frac{x^2-5x+4}{x^2-4}+1\right) \le 0$$

$$\frac{(-5x+8)\cdot(2x^2-5x)}{(x^2-4)^2} \le 0$$

$$\frac{(5x-8)x\cdot(x-2{,}5)}{(x-2)^2(x+2)^2} \ge 0$$

2) oraliqlar usulida yechamiz.
$x = 0,\ x = 1{,}6,\ x = 2{,}5,\ x \ne 2,\ x \ne -2$



$[0; 1{,}6] \cup [2{,}5; +\infty)$
Tengsizlikni qanoatlantirmaydigan tub son bu 2.

Javob: 2.

22. $\frac{5^x}{5^x-4^x} < 5$ tengsizlikning eng katta butun manfiy va eng kichik butun musbat yechimlari yig'indisini toping.

Yechish:

$$\frac{5^x}{5^x-4^x} < 5 \Rightarrow \frac{1}{1-\left(\frac{4}{5}\right)^x} < 5$$

$\left(\frac{4}{5}\right)^x = a$ *desak,* $\frac{1}{1-a} < 5 \Rightarrow \frac{1-5+5a}{1-a} < 0$

$$\frac{5a-4}{1-a} < 0 \Rightarrow \frac{5a-4}{a-1} > 0$$

$a < \frac{4}{5},\ a > 1$

$a < \frac{4}{5}$ *da* $\left(\frac{4}{5}\right)^x < \frac{4}{5},\ x > 1$

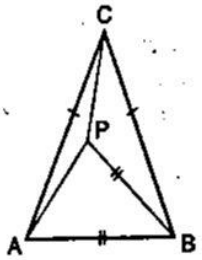
$a > 1$ *da* $\left(\frac{4}{5}\right)^x > 1,\ x < 0$

Tengsizlikning yechimi: $(-\infty; 0) \cup (1; \infty)$.
Eng katta butun manfiy son –1, eng kichik butun musbat yechim 2.
$2 + (-1) = 1$.

Javob: 1.

23. P nuqta ABC uchburchak ichidagi nuqta. |AC| = |BC|, |BA| = |BP|, ∠PBC = 15°, ∠ACB = 10° bo'lsa, ∠CAP ni toping.

Yechish:



|AC| = |BC| bo'lganligi uchun ΔABC teng yonli $\angle A = \angle B$. *ΔAPB da* $\angle A = \angle P$ *chunki* |BA| = |BD|
ΔABC da $\angle ACB = 10°$
bundan $\angle A = \angle B = 85°$

$\angle PBC = 15°$,
$\angle PBA = 70°$,

$$\angle PAB = \angle BPA = \frac{180° - 70}{2} = 55°$$

$$\angle CAP = \angle CAB - \angle PAB = 85° - 55° = 30°.$$

Javob: 30°.

24. 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 o'g'irligi esa 50 kg ligi ma'lum. Agar guruh a'zolarining 36 nafari qizlar bo'lsa, o'g'il bolalar sonini aniqlang.

Yechish:

$\frac{a_1+a_2+\ldots+a_n}{n}$ = 35 – qiz bolalarning o'rtacha og'irligi.

$\frac{b_1+b_2+\ldots+b_m}{m}$ = 50 – o'g'il bolalarning o'rtacha og'irligi.

$\frac{a_1+a_2+\ldots+a_n+b_1+b_2+\ldots+b_m}{n+m}$ = 40 – guruh o'quvchilari o'rtacha og'irligi.

$n = 36$ – qizlar soni, $m = ?$

m – o'g'il bolalar soni.

$a_1 + a_2 + \ldots + a_n = 35 \cdot 36$

$b_1 + b_2 + \ldots + b_m = 50 \cdot m$

$35 \cdot 36 + 50 \cdot m = 40(36 + m)$

$35 \cdot 36 + 50m = 40 \cdot 36 + 40m$

$10m = 5 \cdot 36,\ m = 18$

O'g'il bolalar soni 18 nafar.

Javob: 18.

25. $f(x) = x^3 - 7{,}5x^2 + 18x + \cos\frac{\pi}{3} + \sqrt{3+\cos^2 x+\sin^2 x}$ funksiyaning $\left[0;\frac{5}{2}\right]$ kesmadagi eng katta qiymatini toping.

Yechish:

1) $f(x)$ funksiyani soddalashtirib olamiz.

$$f(x) = x^3 - 7{,}5x^2 + 18x + \frac{1}{2} + \sqrt{3+1} =$$

$$= x^3 - 7{,}5x^2 + 18x + 2\frac{1}{2}.$$

2) $f(x)$ funksiyaning $\left[0;\frac{5}{2}\right]$ dagi qiymatlarini topamiz.

$x = 0$ da,

$$f(0) = 0 - 7{,}5 \cdot 0 + 18 \cdot 0 + 2\frac{1}{2} = 2\frac{1}{2}.$$

$x = \frac{5}{2}$ da,

$$f(x) = \left(\frac{5}{2}\right)^3 - 7{,}5 \cdot \left(\frac{5}{2}\right)^2 + 18 \cdot \frac{5}{2} + 2\frac{1}{2} =$$

$$= \frac{65}{4} = 16\frac{1}{4} = 16{,}25.$$

3) funksiya hosilasini topamiz:

$f'(x) = 3x^2 - 15x + 18.$

Statsionar nuqtalarni topamiz.

$3x^2 - 15x + 18 = 0,\ x^2 - 5x + 6 = 0,$

$x = 2,\ x = 3.$

4) $\left[0;\frac{5}{2}\right]$ oraliqqa bitta statsionar nuqta $x = 2$ tegishli.

$$f(2) = 2^3 - 7{,}5 \cdot 2^2 + 18 \cdot 2 + 2\frac{1}{2} = 16\frac{1}{2}\ 16{,}5.$$

5) 2,5; 16,25; 16,5 so'nlar orasida eng katta qiymat 16,5.

Javob: 16,5.

26. $y = x \cdot \cos^2 2x + \sqrt{x}$ funksiya hosilasini toping.

Yechish:

$y = x \cdot \cos^2 2x + \sqrt{x}$,

hosilani hisoblaymiz

$y' = (x \cdot \cos^2 2x + \sqrt{x})' =$

$= (x)' \cdot \cos^2 2x + x(\cos^2 2x)' + (\sqrt{x})' =$

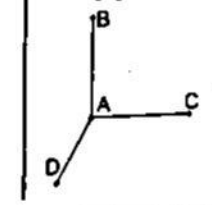
$$= \cos^2 2x + 2\cos 2x \cdot (-\sin 2x) \cdot x \cdot 2 + \frac{1}{2\sqrt{x}} =$$

$$= \cos^2 2x - 2x \cdot \sin 4x + \frac{1}{2\sqrt{x}}.$$

Javob: $\cos^2 2x - 2x\sin 4x + \frac{1}{2\sqrt{x}}$.

27. AB, AC, AD chiziqlar o'zaro perpendikulyar. $AB = \sqrt{18}$, $AC = \sqrt{18}$, $AD = \sqrt{7}$ bo'lsa, BCD uchburchak yuzini toping.

Yechish:



$BA \perp AC \perp AD$

$\Delta BAC,\ \Delta BAD,\ \Delta DAC$ to'g'ri burchakli.

$AB = \sqrt{18},\ AC = \sqrt{18},$

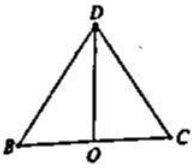
$AD = \sqrt{7}$

$BC^2 = AB^2 + AC^2$

$BC = \sqrt{18+18} = 6$

$BD^2 = AB^2 + AD^2$, $BD = \sqrt{18+7} = 5$

$CD^2 = AC^2 + AD^2$, $CD = \sqrt{18+7} = 5$



ΔBDC teng yonli, chunki $BD = CD = 5$

$$OD = \sqrt{CD^2 - \left(\frac{BC}{2}\right)^2} = \sqrt{5^2 - 3^2} = 4$$

$$S_{BCD} = \frac{BC \cdot OD}{2} = \frac{6 \cdot 4}{2} = 12.$$

Javob: 12.

28. $m = 16$, $n = \frac{10}{176}$ bo'lsa,

$$\left(\frac{(m+n)^2 + 2n^2}{m^3 - n^3} - \frac{1}{m-n} + \frac{m+n}{m^2+mn+n^2}\right) \cdot \left(\frac{1}{n} - \frac{1}{m}\right)$$

ifodaning qiymatini toping.

Yechish:

$$\left(\frac{(m+n)^2 + 2n^2}{m^3 - n^3} - \frac{1}{m-n} + \frac{m+n}{m^2+mn+n^2}\right) \cdot \left(\frac{1}{n} - \frac{1}{m}\right) =>$$

$$= \frac{m^2 + 2mn + n^2 + 2n^2 - m^2 - mn - n^2 + m^2 - n^2}{(m-n)(m^2+mn+n^2)} \cdot$$

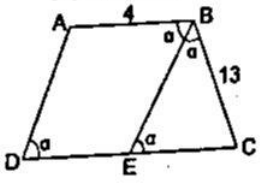
$$\cdot \frac{m-n}{mn} = \frac{(m^2+mn+n^2)\cdot(m-n)}{(m-n)(m^2+mn+n^2)\cdot mn} = \frac{1}{mn}.$$

$m = 16$, $n = \frac{10}{176}$ da $\frac{1}{mn} = \frac{1}{16 \cdot \frac{10}{176}} = \frac{11}{10} = 1{,}1.$

Javob: 1,1.

29. ABCD trapetsiyada AB||DC. $\angle ABC = 2 \cdot \angle ADC$, $|AB| = 4$, $|BC| = 13$. $|DC|$ asos uzunligini toping.

Yechish:



ABCD trapetsiya
$\angle ADC = \alpha$,
$\angle ABC = 2\alpha$
$|AB| = 4$,
$|BC| = 13$

1) $AD||BE$ bundan $AB = DE = 4$
2) ΔBCE teng yonli $BC = CE = 13$
3) $DC = DE + CE = 4 + 13 = 17$.

Javob: 17.

30. $4\sqrt{3 - \frac{1}{x}} - \sqrt{\frac{x}{3x-1}} = 3$ tenglamaning ildizlari yig'indisini toping.

Yechish:

1) $4\sqrt{3 - \frac{1}{x}} - \sqrt{\frac{x}{3x-1}} = 3$.

$\sqrt{\frac{3x-1}{x}} = a$ belgilash kiritamiz.

$4a - \frac{1}{a} = 3$, $4a^2 - 3a - 1 = 0$.

$a = 1$, $a = -\frac{1}{4}$

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

$3x - 1 = x$,

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

$\sqrt{\frac{3x-1}{x}} = -\frac{1}{4} \to \varnothing$.

Javob: $\frac{1}{2}$.

31. HTML-hujjatda <Framest COLS= "25%, 70%">teglari nimani anglatadi?

Yechish:

Brauzer oynasini qismlarga ajratishingiz mumkin, <Frameset> tegida satrlar ROWS va ustunlar COLS, shuningdek ularning o'lchamlari va joylashuvi beriladi.

<Framest COLS="25%,70%> HTML-hujjatda brauzer oynasini 2 ta ustunga ajratadi.

Javob: brauzer oynasini ikkita ustunga bo'ladi.

32. user_name@inbox.ru elektron pochta adresi berilgan. Bu yerda foydalanuvchi nomini aniqlang.

Yechish:

user_name@inbox.ru
elektron pochta adresining birinchi qismi user_name ixtiyoriy tarzda berilib. foydalanuvchi tomonidan pochta qutisini registratsiya qilish vaqtida tanlanadi. Ikkinchi qismi inbox.ru esa Internet pochta serverining nomidir.

Javob: user_name.

33. Quyidagi Paskal dasturi lavhasi bajarilishi natijasida qora fonli ekranda qanday shakl aks etadi: Setcolor(15); Circle(100,50,25); Setcolor(14); Circle(100,50,25)

Yechish:

Setcolor(15) – 15-chi, ya'ni oq rangni tanlaydi. Circle(100,50,25) – Markazi ekranning 100-satri va 50-ustunida bo'lgan, radiusi 25 ga teng aylana chizadi.
Setcolor(14) – 14-chi, ya'ni sariq rangni tanlaydi. Circle(100,50,25) – Markazi ekranning 100-satri va 50-ustunida bo'lgan, radiusi 25 ga teng aylana chizadi.
Boshqacha qilib aytganda oq aylana ustidan sariq aylanani chizadi.

Javob: aylana.

34. MS Excel 2003 dasturida Formula bajarilishi natijasida #Знач xatoligi sodir bo'lsa, bu xatolik turini aniqlang.

Yechish:

Agar Excel dasturida formula bilan ishlanganda son o'rniga matn ishlatilgan bo'lsa #ЗНАЧ xatoligi yuz beradi.
Masalan:
A1 yacheykaga c harfini kiritamiz/ A2 yacheykaga
=КОРЕНЬ(A1) formula kiritib Enter tugmachasini bossak, u holda A2 yacheykada #ЗНАЧ xatoligi yuz beradi.

Javob: argument sifatida sonning o'rnida matn turibdi.

35. Lokal tarmoqdagi bosh kompyuterni ko'rsating.

Yechish:

Lokal tarmoqda barcha kompyuterlar rangi (martabasi) bir xil bo'lsa, ya'ni ularning imkoniyatlari teng bo'lsa, unday tarmoqdagi har bir kompyuter "ishchi stansiya" deb ataladi. Agar bosh kompyuter ajratilgan bo'lsa, u server, qolgan kompyuterlar esa – kliyent deb ataladi.

Javob: server.

36. Quyidagi HTML-hujjat kodi yozilishi bo'yicha kataklar ketma-ket sanalganda ikkinchi katakda qanday shriftdagi ro'yxat qo'llanilgan?

<table> <tr> <td>   test </td> <td colspan = 3> <i> test <li> test </td> </tr> <tr> <td colspan=2>   test </td> <td>   test </td> <td>   test </td> </tr> </table>

Yechish:

<table> va </table> – teglar jadvalini butunligicha o'z ichiga oladi. Ma'lumot chiqarilishini boshqa bir teglar ketma-ketligi aniqlaydi

<td> va </td> – bu teglar juftligi jadvalning har bir yacheykasi uchun matn ajratadi;
* – kursiv*
* – raqamlangan ro'yxatni yaratish uchun (inglizcha «Ordered List») foydalaniladi.*
colspan – bitta katakcha egallagan ustunlar sonini ko'rsatadi.
Ro'yxat elementl ıri <li> teglari orasida belgilanadi (inglizcha «List Item» – ro'yxat elementi).
1-katak: <tr> <td>   test </td>
2-katak: <td colspan = 3>   test </td> </tr>
3-katak: <tr> <td colspan=2>   test </td>
4-katak: <td>   test </td> <td>   test </td> </tr>

Javob: og'ma shriftli tartiblangan ro'yxat.

4-variant