2022-2023-O‘QUV YILIDA O‘RTA TA’LIM MAKTABLARINING 9-SINF O‘QUVCHILAR UCHUN MATEMATIKA FANIDAN MUSTAQIL SHUG‘ULLANISH UCHUN

IMTIHON JAVOBLARI

2023

ESLATIB O`TAMIZ, MAZKUR JAVOBLAR SIZNI VAQTINGIZNI TEJASHGA VA IMTIHONLARGA ESA KO`PROQ TAYYORLANISH UCHUN YORDAM BERADI. IMTIHON JAVOBLARINI TIJORIY MAQSADLARDA FOYDALANISH MUMKIN EMAS. VAQTNI QO`LDAN BOY BERMANG, TAYYORGARLIKNI HOZIRDAN BOSHLANG!

@USTOZ

9-SINF MATEMATIKA
1-VARIANT

1. Ifodaning qiymatini toping: $\frac{2023}{17}:\frac{2023}{119}-3\frac{505}{506}\cdot\frac{2024}{2023}$

(1). $\frac{2023}{17}:\frac{2023}{119}-3\frac{505}{506}\cdot\frac{2024}{2023}$

$\frac{2023}{17}\cdot\frac{119}{2023}-\frac{2023}{506}\cdot\frac{2024}{2023}=17-4=13.$

Javob: 13.

2. Ifodani soddalashtiring: $\frac{a^2+ab}{a^2-b^2}$

(2) $\frac{a^2+ab}{a^2-b^2}=\frac{a(a+b)}{(a-b)(a+b)}=\frac{a}{a-b}.$

Javob: $\frac{a}{a-b}$

3. Poyezd jadval bo'yicha belgilangan manzilga yetib olishi uchun o'rtacha 60 km/h tezlik bilan harakat qilishi kerak edi. Lekin u o'rtacha 70 km/h tezlik bilan harakat qilib, manzilga jadvaldagidan 0,5 soat ilgari yetib bordi. Poyezd manzilgacha qancha masofani bosib o'tgan?

(3). *Berilgan:*

$v_0=60$ km/t

$v=70$ km/t

$t=t_0-0,5$ t

$S-?$

Yechish:

$S=vt_0$

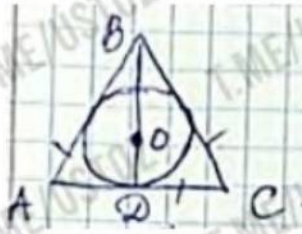
$S=vt=v(t_0-0,5).$

$\begin{cases}S=60t_0 \\ S=70(t_0-0,5)\end{cases}\rightarrow t_0=\frac{S}{60}$

$S=\frac{7}{6}S-35 \rightarrow \frac{1}{6}S=35 \rightarrow S=210$ km

Javob: $S=210$ km.

4. Muntazam uchburchakning medianasi 24 ga teng. Unga ichki chizilgan doiraning yuzini toping.

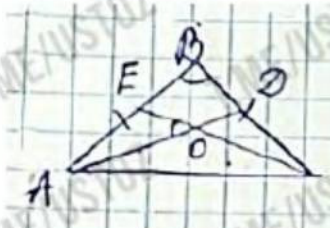


ABC - muntazam.
$BD=24$
$S_d-?$

$OD=\frac{1}{3}BD=\frac{24}{3}=8=2_d$

$S_d=\pi R^2=8^2\pi=64\pi$ (kv. birlik)

5. Teng yonli uchburchakning uchidagi burchagi 112°, asosidagi burchaklarining bissektrisalari kesishishidan hosil bo'lgan o'tkir burchagini toping.



$\angle B=112°$.
$AB=BC$.
AD, CE - bissektrisa.
$\angle AOE-?$

$\angle A=\angle C=\frac{180°-112°}{2}=34°.$

$\angle DAC=\angle ECA=\frac{34°}{2}=17°$

$\angle AOE=17°+17°=34°.$

6. Tenglamalarni yeching.

a) $2x^2+7x+3=0$ b) $\frac{3x+4}{x-6}=\frac{x-2}{4x+3}$ c) $|x^2-8x|=8x-x^2$

a) $2x^2+7x+3=0$ $D=49-4\cdot2\cdot3=5^2$

$x_1=\frac{-7+5}{4}=-\frac{1}{2}$; $x_2=\frac{-7-5}{4}=-3$. *Javob:* $-0,5;-3$.

b) $\frac{3x+4}{x-6}=\frac{x-2}{4x+3}$ $x\neq6$ $x\neq-\frac{3}{4}$

$x^2-8x+12=4x^2+25x+12 \rightarrow 11x^2+33x=0$ $x(x+3)$

$x_1=0$; $x_2=-3$

Javob: $x_1=0$; $x_2=-3$

c) $|x^2-8x|=8x-x^2 \rightarrow |x^2-8x|=-(x^2-8x)$.

$x^2-8x\leq0 \rightarrow x(x-8)\leq0$ $x\in[0;8]$.

Javob: $x\in[0;8]$.

7. Tengsizlikni yeching: $\frac{4}{x-2023}\geq0$

$\frac{4}{x-2023}>0 \rightarrow x-2023>0 \rightarrow x>2023$.

Javob: $x\in(2023;+\infty)$.

8. Agar geometrik progressiyada $b_2 = -82$, $S_2 = 164$ bo‘lsa, u cheksiz kamayuvchi ekanini ko‘rsating.

$b_2=-82$

$S_2=164$.

$|q|<1$ isbotlash.

$S_2=b_1+b_2$.

$b_1=S_2-b_1=164-(-82)=246$.

$q=\frac{b_2}{b_1}=\frac{-82}{246}=-\frac{41}{123}=-\frac{1}{3}$

$\left|-\frac{1}{3}\right|<1$ demak cheksiz kamayuvchi

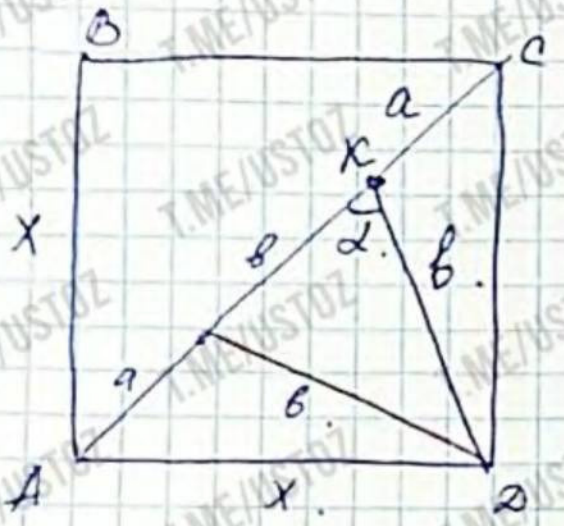
9. Ayniyatni isbotlang: $\frac{2023}{1+tg^2\alpha}+\frac{2023}{1+ctg^2\alpha}=2023$

$\frac{2023}{1+tg^2\alpha}+\frac{2023}{1+ctg^2\alpha}=2023$

$\frac{1}{1+tg^2\alpha}+\frac{1}{1+ctg^2\alpha}=1 \rightarrow \frac{1}{\frac{1}{\cos^2\alpha}}+\frac{1}{\frac{1}{\sin^2\alpha}}=1 \rightarrow$

$\rightarrow \sin^2\alpha+\cos^2\alpha=1$ to‘g‘ri.

10. Kvadratda $a + b = c$ bo'lsa, noma'lum burchakni toping.



$a + b = c$.

$ABCD$ - kvadrat.

α - ?

$$x^2 = b^2 + c^2 - 2bc\cos\alpha.$$

$$x^2 = a^2 + b^2 + 2ab\cos\alpha.$$

$$b^2 + c^2 - 2bc\cos\alpha = a^2 + b^2 + 2ab\cos\alpha.$$

$$c^2 - a^2 = 2bc\cos\alpha + 2ab\cos\alpha$$

$$2b\cos\alpha \cdot (a+c) = (c-a)(c+a)$$

$$2b\cos\alpha = c - a$$

$$\cos\alpha = \frac{c-a}{2b} \qquad \cos\alpha = \frac{c-a}{2(c-a)}$$

$$\cos\alpha = \frac{1}{2} \qquad \alpha = 60^\circ.$$

2-VARIANT

1. Ifodaning qiymatini toping: $\left(4\frac{1}{10}-3\frac{4}{15}\right)\cdot\frac{5}{6}+4\frac{1}{10}:1\frac{1}{5}$

(1) $\left(4\frac{1}{10}-3\frac{4}{15}\right)\cdot\frac{5}{6}+4\frac{1}{10}:1\frac{1}{5}$

$\left(4-3+\frac{1}{10}-\frac{4}{15}\right)\cdot\frac{5}{6}+\frac{41}{10}\cdot\frac{5}{6}=\left(1+\frac{3-8}{30}\right)\frac{5}{6}+\frac{41}{12}$

$\frac{25}{30}\cdot\frac{5}{6}+\frac{41}{12}=\frac{25}{36}+\frac{123}{36}=\frac{148}{36}=4\frac{4}{9}$

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

2. Ifodani soddalashtiring: $\frac{2023^{4n+3}\cdot 2023^{3n-2}}{2023^{7n+1}}$

(2) $\frac{2023^{4n+3}\cdot 2023^{3n-2}}{2023^{7n+1}}=2023^{4n+3+3n-2-7n-1}$

$=2023^{0}=1.$

Javob: 1.

3. Quyidagi masalani algebraik ifoda ko‘rinishida yozing.

a) 30 cm uzunlikdagi ipdan x ta 7 cm li iplar kesilsa, qolgan ipning uzunligi qancha bo’ladi?

b) Narxi 20 000 so‘m bo‘lgan futbolka a % chegirma bilan sotilmoqda. Futbolkaning sotuv narxini toping.

c) Har biri 2000 so‘mlik x dona daftar va har biri 1500 so‘mlik y dona ruchka sotib olindi. Xaridor 50000 so‘m berdi va qaytim oldi. Olgan qaytimini x va y orqali ifodalang.

(3) a) $\ell = 30 - 7x$ cm.

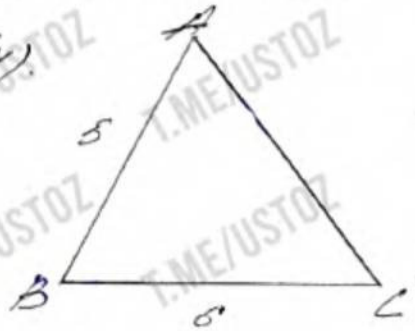
b) $x\cdot(1-a\%) = 20\,000 \Rightarrow x = \frac{20\,000}{1-a\%}$

b) $x = 20\,000(1-a\%)$.

v) *O’zgarish* $50\,000 - 2000x - 1500y$

4. Agar ABC uchburchakda $\sin A = 0{,}4$; $BC = 6$ cm va $AB = 5$ cm bo‘lsa, $\sin C$ ni toping.

(4)



Berilgan $\triangle ABC$.

$BC = 6$ cm $\quad AB = 5$ cm $\quad \sin A = 0{,}4$

Topish: $\sin C$

Yechish

Sinuslar qonuni bilan

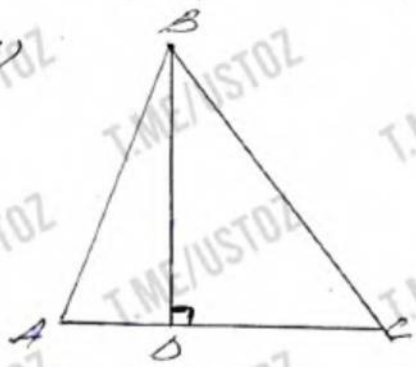
$\frac{AB}{\sin C} = \frac{BC}{\sin A} \rightarrow \sin C = \frac{BC}{AB}\cdot\sin A \rightarrow \sin C = \frac{AB}{BC}\cdot\sin A$

$\sin C = \frac{5}{6}\cdot\frac{2}{5} = \frac{1}{3}$.

Javob: $\sin C = \frac{1}{3}$.

5. Uchburchakning bir balandligi uni perimetrlari 25 cm va 29 cm bo‘lgan uchburchaklarga ajratadi. Agar berilgan uchburchak perimetri 40 cm bo‘lsa, uning balandligini toping.

(5)



Berilgan: $\triangle ABC$

$BD \perp AC$.

$P_{ABD} = 25$ cm.

$P_{BDC} = 29$ cm

$P_{ABC} = 40$ cm.

Topish kerak: $BD - ?$

Yechish:

$$\begin{cases} AB + BD + AD = 25 \\ BC + BD + DC = 29 \\ AB + BC + AC = 40 \end{cases} \rightarrow AB + BC + \underbrace{AD + DC}_{AC} + 2BD = 54 \rightarrow$$

$$\rightarrow P_{ABC} + 2BD = 54$$

$$2BD = 14 \rightarrow BD = 7 \text{ (cm)}.$$

Javob: $BD = 7$ cm.

6. Tenglama va tengsizliklar sistemasini yeching.

a) $\begin{cases} 3x - 2y = 1 \\ 4x - y = -2 \end{cases}$

b) $\begin{cases} 7x + 3 \le 9x - 1 \\ 20 - 3x \ge 4x - 15 \end{cases}$

(6)

a) $\begin{cases} 3x - 2y = 1 \\ 4x - y = -2 \ /\cdot 2 \end{cases} \rightarrow \begin{cases} 3x - 2y = 1 \\ -8x + 2y = 4 \end{cases}$ $-5x = 5$, $x = -1$

$-3 - 2y = 1 \rightarrow -2y = 4 \rightarrow y = -2$

Javob: $(-1; -2)$.

б) $\begin{cases} 7x + 3 \le 9x - 1 \\ 20 - 3x \ge 4x - 15 \end{cases} \rightarrow \begin{cases} 2x \ge 4 \\ 7x \le 35 \end{cases} \rightarrow \begin{cases} x \ge 2 \\ x \le 5 \end{cases}$

Javob: $x \in [2; 5]$.

7. Funksiya grafigini yasang.

a) $y = x^2 - 8x + 7$

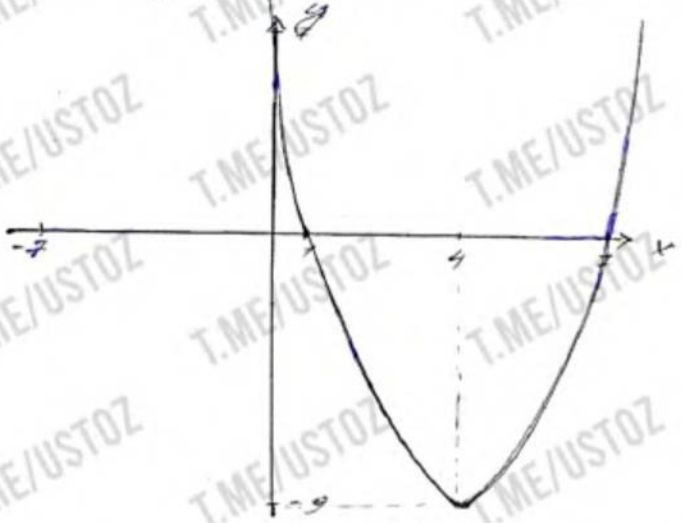
b) $u = -0{,}4x + 1$

(7)

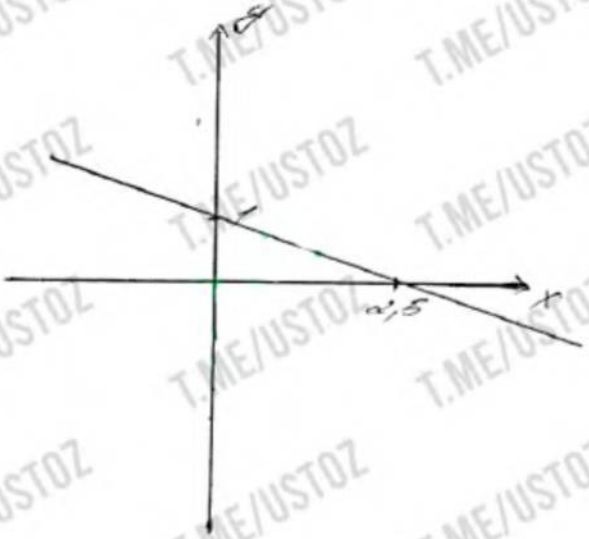
а) $y = x^2 - 8x + 7$ $(x_{1,2} = 7; 1)$

$y = x^2 - 8x + 16 - 9$

$y = (x-4)^2 - 9$



б) $y = -\frac{2}{5}x + 1$



8. Daftarning narxi ketma-ket ikki marta bir xil foizga pasaytirilgandan keyin 3000 so‘mdan 1920 so‘mga tushdi. Daftarning narxi har gal necha foizga pasaytirilgan?

(8) $x_0 = 3000$ $x_0(1-a)^2 = x$.

$x = 1920$ $3000(1-a)^2 = 1920 \to (1-a)^2 = \frac{64}{100}$

$1 - a = 0{,}8 \to a = 0{,}2 = 20\%$

Javob: $a = 20\%$.

9. Agar $a = 1 + 2 + 3 + \ldots + 2023$ ga teng bo‘lsa, $2 + 4 + 6 + 8 + \ldots + 2025$ yig‘indini a orqali ifodalang.

(9) $2 + 4 + 6 + 8 + \ldots + 2025 = x$

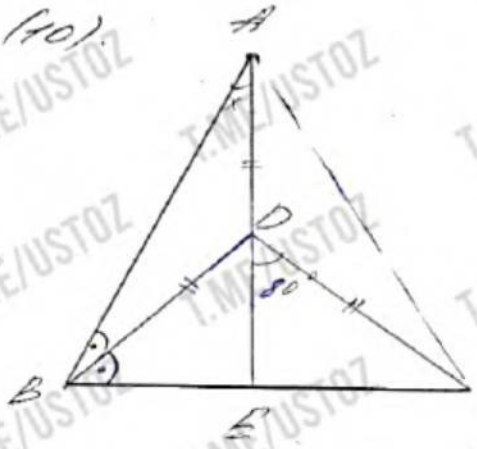
$1 + 2 + 3 + 4 + \ldots + 2023 = a$ $\to \underbrace{1+2+3+4+\ldots}_{0-2023} + a = x - a$

$a - 2023 - a = x - a \to x = a0 - 2021$

Javob: $a0 - 2021$.

10. Noma’lum x burchakni toping.

(10).



Berilgan $\triangle ABC$

$\angle EDC = 80°$

$AD = BD = DC$; $\angle ABD = \angle DBE$.

Topish: $\angle BAE$.

Yechish:

$\angle BAE = \angle ABD = \angle DBE = x$,

$\to \triangle ABD$ – teng yonli.

$\angle DCE = x$, $\to \triangle BDC$ – teng yonli

$\angle AEB = \angle EDC + \angle DCE$, ya'ni $\angle AEB$ – tashqi.

$\angle AEB = 80° + x$

$\angle BAE + \angle ABE + \angle AEB = 180°$

$x + 2x + 80° + x = 180° \rightarrow x = 25°$.

Javob: $x = 25°$.

3-VARIANT

1. Ifodaning qiymatini toping: $\dfrac{2023^2-2022^2}{2023-2022}$

(1) $\dfrac{2023^2-2022^2}{2023-2022} = (2023-2022)(2023+2022) =$

$= 4045.$

Javob: 4045.

2. Hisoblang: $\sqrt[3]{16-\sqrt{64}}$

(2) $\sqrt[3]{16-\sqrt{64}} = \sqrt[3]{16-8} = \sqrt[3]{8} = 2.$

Javob: 2.

3. Muayyan masofani bosib o'tish uchun ketadigan vaqtni 25% ga kamaytirish uchun tezlikni necha foiz orttirish kerak?

(3) $S = v_0(1+x)$ $S = vt$ $S = v_0 t_0$

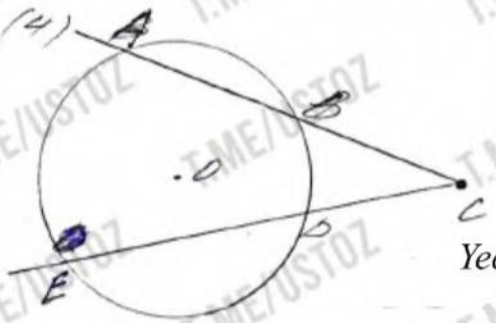
$t = t_0(1-0{,}25)$ $v_0(1+x)\cdot\frac{3}{4}t_0 = v_0 t_0$

$t = \frac{3}{4}t_0$ $1+x = \frac{4}{3} \to x = 33{,}3\%$

Javob: $x = 33{,}3\%$

4. C nuqtadan o'tkazilgan bir kesuvchi aylanani A va B, ikkinchisi esa D va E nuqtalarda kesadi. Agar $CA = 18$ cm, $CB = 8$ cm, $CD = 6$ cm bo'lsa, DE kesma uzunligini toping.

(4)



Berilgan

$CA = 18$ cm, $CB = 8$ cm,

$CD = 6$ cm

Topish: DE - ?

Yechish:

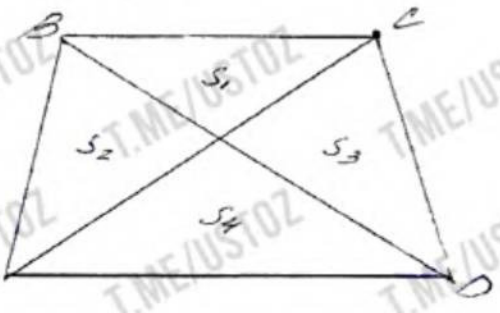
$AC \cdot BC = EC \cdot DC \to EC = \dfrac{AC \cdot BC}{CD} = \dfrac{18 \cdot 8}{6} = 24$ (cm),

$DE = EC - CD = 24 - 6 = 18$ (cm)

Javob: $DE = 18$ cm.

5. AD kesma – $ABCD$ trapetsiyaning katta asosi. ACD va DCB uchburchaklarning yuzlari, mos ravishda, S_1 va S_2 ga teng bo'lsa, trapetsiyaning yuzini toping.

(5)



Berilgan: $ABCD$

$S_{ACD} = S_1$ $S_{DCB} = S_2$

Topish kerak: S_{ABCD}

Yechish:

$S_2 = S_3$.

$S_1 = S_4 + S_3$ → $S_1 + S_2 = S_1 + S_4 + 2S_3 = S_1 + S_4 + S_3 + S_2$.
$S_2 = S_1 + S_3$

Javob: $S_{ABCD} = S_1 + S_2$.

6. Tenglamalarni yeching.

a) $2x^2 - 5x + 1 = 0$ b) $|x-2| + 3x = -6$

(6) a) $2x^2 - 5x + 1 = 0$ $D = 25 - 4 \cdot 2 = 17$.

$x_{1,2} = \frac{5 \pm \sqrt{17}}{4}$. *Javob:* $x_{1,2} = \frac{5 \pm \sqrt{17}}{4}$.

b) $|x-2| = -3x - 6$ O.D.3 $-3x - 6 \geq 0$ $3x + 6 \leq 0$

$2 - x = -3x - 6$ $\boxed{x \leq -2}$

$2x = -8 \rightarrow x = -4$

Javob: $x = -4$.

7. Arifmetik progressiyaning birinchi o‘nta hadi yig‘indisi 140 ga teng bo‘lsa, $a_2 + a_9$ ni aniqlang.

(7) $S_{10} = 140 \rightarrow S_{10} = \frac{a_1 + a_{10}}{2} \cdot 10 = 140 \rightarrow a_1 + a_{10} = 28$

$a_2 + a_9 = ?$ $a_1 + a_9 = a_1 + a_1 + d + a_1 + 8d = a_1 + a_1 + 9d =$

$a_2 + a_9 = a_1 + a_{10} = 28$. $= a_1 + a_{10}$.

Javob: 28.

8. Agar $tg\alpha = \frac{1}{2}$, $0 < \alpha < \frac{\pi}{2}$ bo‘lsa, $\frac{\sin 2\alpha + 2\cos 2\alpha}{\cos 2\alpha}$ ni hisoblang.

(8) $\frac{\sin 2\alpha + 2\cos 2\alpha}{\cos 2\alpha}$

$tg\alpha = \frac{1}{2}$ $\alpha \in (0; \frac{\pi}{2})$.

$tg2\alpha + 2$ $2\alpha \in (0; \pi)$.

$tg2\alpha = \frac{2tg\alpha}{1 - tg^2\alpha}$

$\frac{4}{3} + 2 = 3\frac{1}{3}$ $tg2\alpha = \frac{1}{1 - \frac{1}{4}} = \frac{4}{3}$.

Javob: $3\frac{1}{3}$

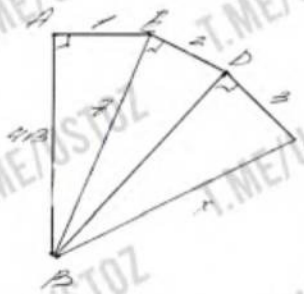
9. $|3x - 7| < 5$ tengsizlikni qanoatlantiradigan natural sonlarning eng kattasini toping.

(9) $|3x - 7| < 5 \rightarrow \begin{cases} 3x - 7 < 5 \\ 3x - 7 > -5 \end{cases} \rightarrow \begin{cases} 3x < 12 \\ 3x > 2 \end{cases} \rightarrow \begin{cases} x < 4 \\ x > \frac{2}{3} \end{cases}$

Javob: $x \in (\frac{2}{3}; 4)$.

10. Noma’lum x tomonni toping.

(10)



Berilgan

$AE = 1$; $ED = 2$; $DC = 3$

$AB = 4\sqrt{3}$

Topish kerak: $BC = ?$

Yechish

$\triangle ABE$ → $BE^2 = AB^2 + AE^2 = 3^2$

$BE = ?$.

$\triangle BED$ → $DB^2 = EB^2 + ED^2 \rightarrow \sqrt{53} = DB$.

$\triangle BDC$ → $BC^2 = DC^2 + DB^2 \Rightarrow BC = \sqrt{62}$.

Javob: $x = \sqrt{62}$.

4-VARIANT

1. Ifodani soddalashtiring: $\dfrac{a}{a+\dfrac{1}{b}} : \dfrac{b}{a+\dfrac{1}{b}}$

1) $\dfrac{a}{a+\frac{1}{b}} : \dfrac{b}{a+\frac{1}{b}} = \dfrac{a}{\frac{ab+1}{b}} \cdot \dfrac{\frac{ab+1}{b}}{b} = \dfrac{ak}{ab+1} \cdot \dfrac{ab+1}{b^2} = \dfrac{a}{b}$

2. Agar $\sqrt{5}=a$ va $\sqrt{8}=b$ bo'lsa, $\sqrt{40}$ ni a va b orqali ifodalang.

2) $\sqrt{40}$ *orqali* a u b, *bo'lsa* $\sqrt{5}=a$ u $\sqrt{8}=b$

$\sqrt{40} = ab = \sqrt{5}\cdot\sqrt{8}$ *Javob:* ab

3. Shaxmat turnirida 21 kishi qatnashmoqda. Har bir o'quvchi boshqalari bilan 2 - martadan o'yin o'ynasa, jami o'ynalgan o'yinlar sonini aniqlang.

3) *Jami:* $= n = 21$

$n\cdot(n-1) = 21\cdot 20 = 420.$

Javob: 420.

4. Tenglamalarni yeching.

a) $(x^2+6x)^2 + 8(x^2+6x)^2 - 9 = 0$ b) $(4-5x^{-1})^{-2} = (-3)^{-4}$

4) a) $(x^2+6x)^2+8(x^2+6x)-9=0$ Dusb $t=x^2+6x$.

$t^2+8t-9=0$ Bo'r. Vieta $t_1=-9$ $t_2=1$.

$\left[\begin{array}{l} x^2+6x=-9 \\ x^2+6x=1 \end{array}\right. \to \left[\begin{array}{l} x^2+6x+9=0 \\ x^2+6x+9=10 \end{array}\right. \to \left[\begin{array}{l} (x+3)^2=0 \\ (x+3)^2=10 \end{array}\right. \to \left[\begin{array}{l} x=-3 \\ x=-3\pm\sqrt{10} \end{array}\right.$

Javob: $-3;\ -3\pm\sqrt{10}$.

b) $(4-5x^{-1})^{-2} = (-3)^{-4} \to (4-5x^{-1}) = \pm 9$

$\left[\begin{array}{l} 4-\frac{5}{x}=9 \\ 4-\frac{5}{x}=-9 \end{array}\right. \to \left[\begin{array}{l} \frac{5}{x}=-5 \\ \frac{5}{x}=13 \end{array}\right. \to \left[\begin{array}{l} x=-1 \\ x=\frac{5}{13} \end{array}\right.$ *Javob:* $-1;\ \frac{5}{13}$.

5. Muntazam ko'pburchakning tashqi burchagi 60° ga teng. Perimetri 48 ga teng. Uning katta diagonalini toping.

5) *Berilgan:* muntazam.

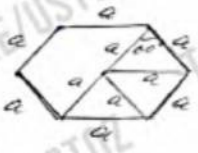
α – tashqi burch. $= 60°$

$P = 48$.

d – katta diag. $= ?$

Yechish:

$n = \frac{360°}{60°} = 6$ tomon



$a = \frac{P}{n} = \frac{48}{6} = 8$

$d = 2a = 16$.

Javob: $d = 16$.

6. $\vec{a}$ (–5; 0) va $\vec{b}$ (8; –4) vektorlar uchun | $\vec{a} + \vec{b}$ | vektorni hisoblang.

Yechish:

(6). $\vec{a}(-5;0)$

$\vec{b}(8;-4)$

$\vec{a}+\vec{b} = (-5+8; 0-4)$

$\vec{a}+\vec{b} = (3;-4)$.

Topish kerak $|\vec{a}+\vec{b}|$

$|\vec{a}+\vec{b}| = \sqrt{3^2+(-4)^2} = 5$.

Javob: 5.

7. Ifodani soddalashtiring:

a) $2\sin\left(\frac{3\pi}{2}+\beta\right)\cdot\sin(\pi-\beta)$

b) $tg^2\alpha+\cos^2(60^0+\alpha)+\sin^2(60^0+\alpha)$

(7). a) $2\sin\left(\frac{3\pi}{2}+\beta\right)\cdot\sin(\pi-\beta) = 2(-\cos\beta)\cdot\sin\beta =$

$= -2\sin\alpha\beta$

Javob: $-2\sin\beta$.

b) $tg^2\alpha+\cos^2(60^0+\alpha)+\sin^2(60^0+\alpha) = tg^2\alpha+1 = \frac{1}{\cos^2\alpha}$.

Javob: $\frac{1}{\cos^2\alpha}$

8. Arifmetik progressiyada $S_n - S_{n-1} = 2023$, $S_{n+1} - S_n = 2024$ bo'lsa, uning hadlari ayirmasini toping.

(8). $\begin{cases} S_n - S_{n-1} = a_n = 2023 \\ S_{n+1} - S_n = a_{n+1} = 2024 \end{cases} \rightarrow a_{n+1} - a_n = 1 = d$.

Javob: $d = 1$.

9. Funksiyalarning grafigini yasang.

a) $y = -2x^2 + 5x$

b) $y = \frac{3}{x} - 2$

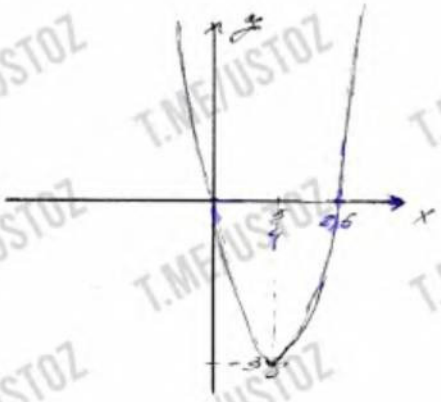
(9). a) $y = -2x^2+5x$.

$x_0 = -\frac{b}{2a} = \frac{5}{4}$.

$y_0(x_0) = -2\cdot\frac{25}{16}+\frac{25}{4} = -\frac{25}{8}+\frac{25}{4} = \frac{25}{8} = 3\frac{1}{8}$

$y=0 \rightarrow -2x^2+5x=0$

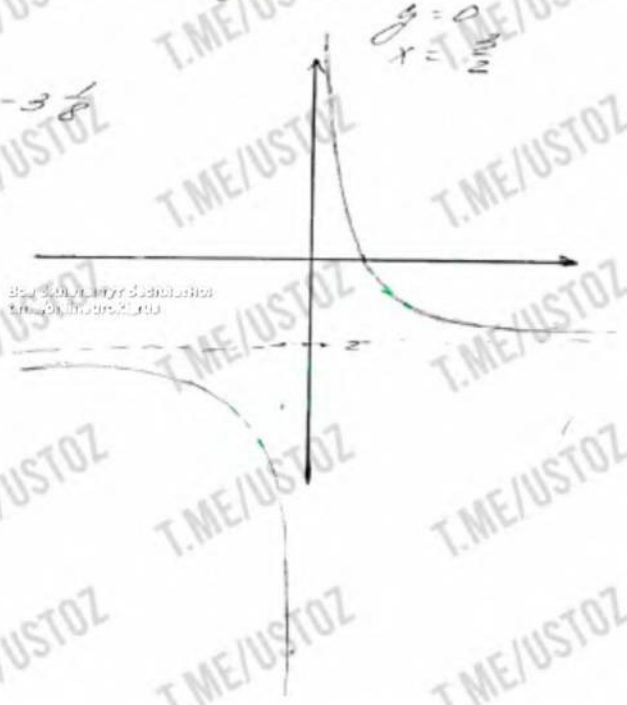
$x=0;\ x=2,5$.



b) $y = \frac{3}{x} - 2$.

$y = 0$

$x = \frac{3}{2}$



10. Noma'lum x ni toping.

Berilgan:

AC - kasatelnaya.

$OD = r = 3 = BO$.

$OC = 2$.

Topish kerak: $x - ?$.

Yechish:

$AO \perp AC$, t.k. $AO = r$, AC - kasatelnaya, tugri $\triangle AOC$ - to'g'ri burchakli. $OC^2 = OA^2 + AC^2 \to AC = 4$.

$\cos \angle C = \frac{4}{5}$

Teorema bo'yicha

$x^2 = KC^2 + AC^2 - 2 \cdot KC \cdot AC \cdot \cos \angle C$

$x^2 = 64 + 16 - 2 \cdot 8 \cdot 4 \cdot \frac{4}{5} = 80 - 51{,}2 = 28{,}8$

$x = \sqrt{28{,}8} = \sqrt{144 \cdot \frac{1}{5}} = \frac{12}{\sqrt{5}}$

Javob: $x = \frac{12}{\sqrt{5}}$.

5-VARIANT

1. Ifodaning qiymatini toping: $\dfrac{(2025^2-2022^2)\cdot(2023^2-2022^2)}{(2024^2-2023^2)\cdot(2024^2-2021^2)}$

1) $\dfrac{(2025^2-2022^2)\cdot(2023^2-2022^2)}{(2024^2-2023^2)\cdot(2024^2-2021^2)}$

$\dfrac{(2025-2022)(2025+2022)(2023-2022)(2023+2022)}{(2024-2023)(2024+2023)(2024-2021)(2024+2021)}$

$=\dfrac{4047\cdot 4045}{4047\cdot 4045}=1$ *Javob:* 1

2. Agar $a>b>c$ bo'lsa, $|a-b|+|c-a|-|b-c|$ ni soddalashtiring.

2) $|a-b|+|c-a|-|b-c|$, если $a>b>c$

$a-b-c+a-b+c=2a-2b=2(a-b)$ *Javob:* $2(a-b)$

3. Tenglama va tenglamalar sistemasini yeching.

a) $\dfrac{2}{3-x}+\dfrac{1}{2}=\dfrac{6}{x(3-x)}$

3) a) $\dfrac{2}{3-x}+\dfrac{1}{2}=\dfrac{6}{x(3-x)}$

$\dfrac{4+3-x}{2(3-x)}=\dfrac{6}{x(3-x)}$

$\dfrac{7-x}{2(3-x)}=\dfrac{6}{x(3-x)}$

$\dfrac{7-x}{2}=\dfrac{6}{x}$

$7x-x^2=12$

$-x^2+7x-12=0$

$x^2-7x+12=0$

$x_1=3 \quad x_2=4$

(посторонний корень)

ОДЗ

$3-x\neq 0$

$x\neq 3$

$x\neq 0$

Javob: $x=4$

b) $\begin{cases}x^2-y^2+2x+4=0\\x-y=0\end{cases}$

b) $\begin{cases}x^2-y^2+2x+4=0\\x-y=0 \Rightarrow x=0+y \Rightarrow x=y\end{cases}$

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

$2x^2+2x+4=0 \mid :2$

$x^2+x+2=0$

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

$2x+4=0$

$2x=-4$

$x=-2$

$y=-2$

Javob: $(x;y)=(-2;-2)$

4. Tengsizlik va tengsizliklar sistemasini yeching.

a) $|x^2+2x|>8$

b) $\begin{cases} 2x-3(x-5)>10-3x \\ x(x+2)-4\le(x-1)^2+7 \end{cases}$

(4) a) $|x^2+2x|>8$

1) $\begin{cases} x^2+2x>0 \\ x^2+2x>8 \end{cases} \Rightarrow x^2+2x>8$

$x^2+2x-8>0$

$(x-2)(x+4)>0$

$x\in(-\infty;-4)\cup(2;+\infty)$

2) $\begin{cases} x^2+2x<0 \\ x^2+2x<-8 \end{cases} \Rightarrow x^2+2x<-8$

$x^2+2x+8<0$

$D=4-4\cdot8=4-32<0$

нет корней

Javob: $x\in(-\infty;-4)\cup(2;+\infty)$

б) $\begin{cases} 2x-3(x-5)>10-3x \\ x(x+2)-4\le(x-1)^2+7 \end{cases} \Rightarrow \begin{cases} 2x-3x+15>10-3x \\ x^2+2x-4\le x^2-2x+1+7 \end{cases} \Rightarrow$

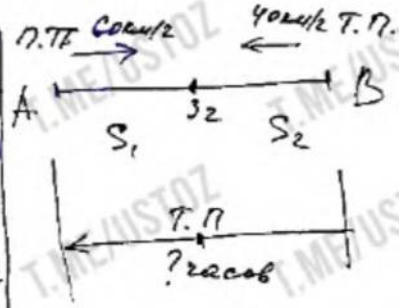
$\Rightarrow \begin{cases} 2x-3x+3x>10-15 \\ x^2-x^2+2x+2x\le1+7+4 \end{cases} \Rightarrow \begin{cases} 2x>-5 \\ 4x\le12 \end{cases} \Rightarrow \begin{cases} x>-2,5 \\ x\le3 \end{cases}$

Javob: $x\in(-2,5;3]$

5. Bir vaqtda *A* va *B* shaharlardan bir-biriga qarab yo‘lovchi va yuk poyezdi yo‘lga tushdi. Yo‘lovchi poyezdining tezligi 60 km/h, yuk poyezdiniki esa 40 km/h ga teng. Poyezdlar 3 soatdan keyin uchrashdi. Uchrashgandan qancha vaqt o‘tib yuk poyezdi *A* shaharga yetib keladi?

(5)

	v	t до встречи	S	t_2
пассажирский поезд	60км/ч	3 ч	? км	
товарный поезд	40км/ч			? ч



1) $S_1 = 60 \cdot 3 = 180$(км) – проехал пасс. поезд до встречи

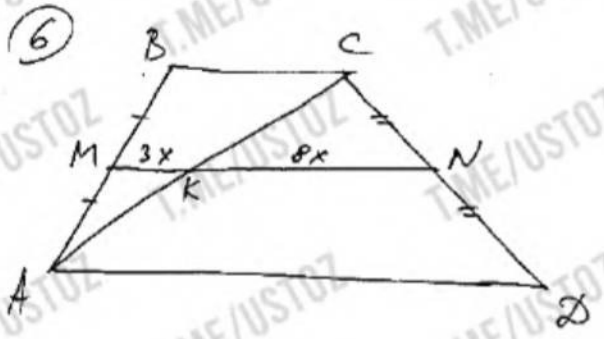
2) $S_2 = 40 \cdot 3 = 120$(км) – проехал товарный поезд до встречи

3) $t_2 = 180 : 40 = 4{,}5$(ч)

Ответ: через 4,5 часа после встречи товарный поезд прибудет в город А.

6. Trapetsiyaning diagonali uning o‘rta chizig‘ini 3 : 8 kabi nisbatda ikki kesmaga ajratadi. O‘rta chiziq kesmalarining ayirmasi 15 cm ga teng. Trapetsiya asoslarini toping.

(6)



Berilgan: ABCD – трапеция

MN – средняя линия

AC – диагональ

$AC \cap MN = (\cdot)K$

$MK : KN = 3 : 8$

$KN - MK = 15$см

Topish kerak: BC, AD – ?

Yechish:

1) Пусть x – коэффициент пропорциональности.

Тогда $MK = 3x$, $KN = 8x$

2) $8x - 3x = 15$

$5x = 15$

$x = 3$

$MK = 3 \cdot 3 = 9$(см)

$KN = 8 \cdot 3 = 24$(см)

3) MK – средняя линия $\triangle ABC$.

Следовательно: $BC = 2 \cdot MK = 2 \cdot 9 = 18$(см)

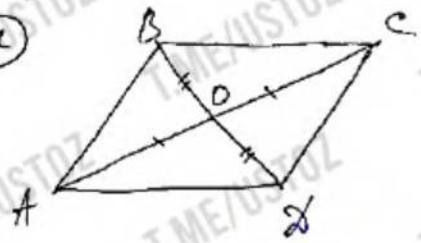
4) KN – средняя линия $\triangle ACD$.

Следовательно: $AD = 2 \cdot 24 = 48$(см)

Javob: BC = 18 см, AD = 48 см.

7. *ABCD* parallelogrammda *C*(5; 8), *O*(4; 5) esa parallelogramm diagonallarining kesishish nuqtasi bo‘lsa, parallelogramm *A* uchining koordinatalarini toping.

(7)



Berilgan: ABCD — параллелограмм

$AC \cap BD = (\cdot)O$

$O(4;5)$, $C(5;8)$

Topish: $A(x;y) = ?$

Yechish:

Nuqtalar ro'yxatidagi parallelogrammaning diagonali ikkiga bo'linganligi sababli, AO = OC bo'ladi

a) $\frac{x+5}{2} = 4$

$x+5 = 8$

$x = 8-5$

$x = 3$

b) $\frac{y+8}{2} = 5$

$y+8 = 10$

$y = 10-8$

$y = 2$

Javob: $A(3;2)$

8. Agar $x = 2024$ va $u = 2023$ bo‘lsa, $x^3 - u^3 - 2u^2 - 3u - 1 + x^2 - 2xu$ ni hisoblang.

(8) $x = 2024$, $y = 2023$

$x^3 - y^3 - 2y^2 - 3y - 1 + x^2 - 2xy = (x-y)(x^2+xy+y^2) - 2y^2 - 3y - 1 +$

$+ (x^2 - 2xy + y^2) - y^2 = x^2 + xy + y^2 - 2y^2 - 3y - 1 + (x-y)^2 - y^2 =$

$= x^2 + xy - 2y^2 - 3y - 1 + 1 = (x^2 + 2xy + y^2) + 3xy - 3y^2 - 3y =$

$= (x-y)^2 + 3y(x-y) - 3y = 1 + 3y - 3y = 1$

Javob: 1

9. Geometrik progressiyaning maxraji 3 ga, dastlabki to‘rtta hadining yig‘indisi 80 ga teng. Birinchi hadining qiymatni toping.

(9) *Berilgan:* b_n — геометрическая прогрессия

$q = 3$

$S_4 = 80$

Topish: $b_1 = ?$

$S_4 = \frac{b_1(1-q^4)}{1-q}$

$$80 = \frac{b_1 \cdot (1-3^4)}{1-3}$$

$$80 = \frac{b_1 \cdot (1-81)}{-2}$$

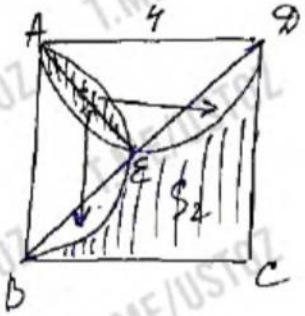
$$80 = \frac{b_1 \cdot (-80)}{-2}$$

$$b_1 = 2$$

Javob: $b_1 = 2$

10. $ABCD$ kvadratda $S_1 + S_2$ ni toping.

(10)



Berilgan: $ABCD$ – квадрат

$AB = AD = 4$

Topish: $S_1 + S_2 - ?$

Yechish:

$S_{ABCD} = 4^2 = 16$

Перенесём части площади S_1 в указанную часть.

Тогда $S_1 + S_2 = S_{\triangle BCD} = \frac{1}{2} S_{ABCD} = \frac{1}{2} \cdot 16 = 8$

Javob: $S_1 + S_2 = 8$

T.ME/USTOZ

T.ME/USTOZ