

2015-2016-o'quv yili matematikadan 9-sinf imtihon biletleri yechimlari

1-bilet

1. $\frac{(1,12-1,87) \cdot 1,2+0,9}{140:1-50} = \frac{-0,75 \cdot 1,2+0,9}{90} = \frac{-0,9+0,9}{90} = 0;$

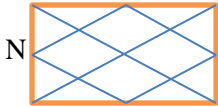
2. $\frac{2}{x+1} + \frac{2}{x-1} = 1 \frac{1}{2};$ $2(x-1) + 2(x+1) = 1,5(x-1)(x+1);$ $4x-4+4x+4=3x^2-3;$ $3x^2-8x-3=0;$ $D = (-8)^2 - 4 \cdot 3 \cdot (-3) = 100$

$X_{1,2} = \frac{8 \pm 10}{6};$ $x_1 = \frac{8-10}{6} = -\frac{1}{3};$ $x_2 = \frac{8+10}{6} = 3;$ Javob: 3 km/soat

3. $(x-1)(x+1) \geq x^2+3x-4;$ $x^2-1 \geq x^2+3x-4;$ $3x \leq 3;$ $x \leq 1;$ Javob: $x \leq 1.$

4. A E B Berilgan E,F,N,M to'g'ri to'rtburchak tomonlarining o'rtalari.

NEMF -parallelogram



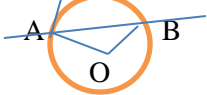
Isbot: ABD uchburchakda NE o'rta chiziq, NE BD ga parallel va $NE = \frac{BD}{2};$

CBD uchburchakda FM o'rta chiziq va FM BD ga parallel va $FM = \frac{BD}{2}$

D F C Huddi shunigdek, ABC da EM o'rta chiziq va $EM = \frac{AC}{2},$ ADC da NF o'rta chiziq va $NF = \frac{AC}{2}$

Shundan NEMF-parallelogram ekanligi kelib chiqadi.

5. C AB vatar. $\angle AOB = 146^\circ,$ $\angle CAB = ?$



Yechish: $\widehat{AB} = 146^\circ,$ $\angle CAB = \frac{\widehat{AB}}{2} = \frac{146}{2} = 73;$ Javob: $\angle CAB = 73^\circ$

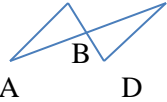
2-bilet

1. $1,6:0,8 + (-1,5)^3 \cdot 0,8 = 2 - 3,375 \cdot 0,8 = 2 - 2,7 = -0,7;$

2. $\frac{x}{100} \cdot 4,3 \leq y \leq \frac{x}{100} \cdot 5,8;$ $0,043x \leq y \leq 0,058x;$ $43 \leq 1000y \leq 53;$ Javob: 1000 ta

3. $\begin{cases} x+y=1, & x=1-y, & x_1=1-(-1)=2; & x_2=1-2=-1; \\ xy=-2, & (1-y)y=-2, & y-y^2+2=0, & y^2-y-2=0; & y_1=-1; & y_2=2; \end{cases}$ Javob: $x_1=2; y_1=-1; x_2=-1; y_2=2.$

4. C K AK va CD kesmalar B nuqtada o'rtasidan kesishadi. ABC va KBD uchburchaklarning

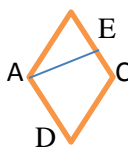


Tengligini isbotlash kerak.

Isbot: ABC va KBD uchburchaklarda $BC=BD,$ $AB=BK,$ B uchidagi burchaklar vertical.

Uchburchaklar tengligining TBT alomatiga ko'ra $\triangle ABC = \triangle KBD.$

5. Berilgan: ABCD romb. $AB=20;$ $\angle B = \angle D = 60^\circ,$ $h=AE,$ $\angle E = 90^\circ;$ BE va EC = ?

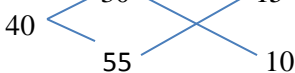


Yechish: $\triangle ABE$ da $\angle A = 90-60 = 30;$ Bundan $BE = \frac{AB}{2} = \frac{20}{2} = 10;$ $EC = BC - BE = 20 - 10 = 10$

3-bilet

1. $\frac{0,4(1,6-1)}{((1,4-2,6)(1,4+2,6))} = \frac{0,4 \cdot 0,6}{-1,2 \cdot 4} = \frac{0,4}{-8} = -0,05;$

2. $40 \begin{cases} 30 \\ 15 \end{cases} \begin{cases} 15 \\ 10 \end{cases}$ $15:10=3:2$



Javob: 2:3 nisbarda olinadi.

3. $5x-8x+4 \geq 4x-10;$ $-3x-4x \geq -14;$ $-7x \geq -14;$ $x \leq 2;$



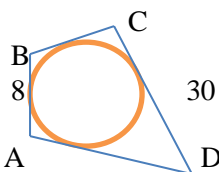
4. $BD_h = BD_m,$ $\triangle ABC$ - teng yonli.



Isbot: BD mediana $AD=DC$ To'g'ri burchakli uchburchaklar tengligining KK alomatiga ko'ra

$\triangle ABD = \triangle CBD,$ Bundan $AB=BC$ yani ABC uchburchak teng yonli ekanligi kelib chiqadi.

5. ABCD aylanaga tashqi chizilgan. $AB=8;$ $CD=30;$ $P_{ABCD} = ?$



Yechish: $AB+CD = BC+AD;$ $8+30 = 38 = BC+AD;$ $P = 2 \cdot 38 = 76;$

Javob: $P = 76$ birlik

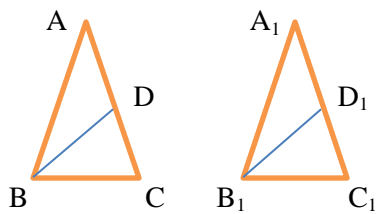
4-bilet

1. $(3^4)^{0,25} - 1 - 1,5 + 32 = 3 - 1 - 1,5 + 32 = 32,5;$

2. $\frac{30\%+70\%}{2} = 50\%;$ Javob: 50%

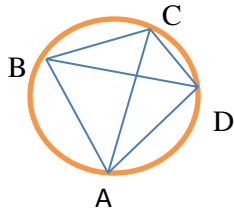
3. $\begin{cases} 2x-2+2-2 > x, & \begin{cases} 2x > 4, & x > 2 \\ 3x-1 < 0, & \begin{cases} 3x < 1, & x < \frac{1}{3} \end{cases} \end{cases} \end{cases}$ Javob: \emptyset

4. $\triangle ABC = \triangle A_1B_1C_1;$ BD va B_1D_1 - mos bissektrisalar. $BD = B_1D_1$ ekankigini isbotlash kerak.



Isbot: $\triangle BDC = \triangle B_1D_1C_1$ Bularda berilganga kora $BD = B_1C_1$; $\frac{B}{2} = \frac{B_1}{2}$;
 $CD = C_1D_1$. Bundan $BD = B_1D_1$ kelib chiqadi

5. ABCD to'rtburchak aylanaga ichki chizilgan. $\angle ABC = 48^\circ$, $\angle CAD = 38^\circ$;
 Topish kerak. $\angle ABD = ?$



Yechish. $\angle ABC = \frac{\widehat{AC}}{2}$; $\widehat{AC} = 2 \cdot \angle ABC = 2 \cdot 48 = 96$; $\angle CAD = \frac{\widehat{CD}}{2}$; $\widehat{CD} = 2 \cdot 38 = 76$;
 $\angle ABD = \frac{\widehat{AD}}{2}$; $\widehat{AD} = \widehat{AC} - \widehat{CD} = 96 - 76 = 20$; $\angle ABD = \frac{20}{2} = 10$; J: $\angle ABD = 10^\circ$

5-bilet

$$1. \frac{a+a^{0,5}}{1+a^{0,5}} + \frac{a-1}{1+a^{0,5}} = \frac{a+a^{0,5}+a-1}{1+a^{0,5}} = \frac{2a+a^{0,5}-1}{1+a^{0,5}} = \frac{a^{2 \cdot 0,5} + a^{0,5} + a^{2 \cdot 0,5} - 1}{1+a^{0,5}} = \frac{a^{0,5}(a^{0,5}+1) + (a^{0,5}-1)(a^{0,5}+1)}{1+a^{0,5}} = \frac{(a^{0,5}+1)(a^{0,5}+a^{0,5}-1)}{(1+a^{0,5})} = 2a^{0,5} - 1;$$

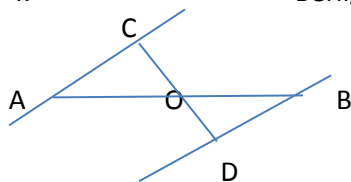
$$2. n(1 + \frac{22,5}{100}) = 9\,450\,000; n(1+1,1) = 9\,450\,000; 2,1n = 9\,450\,000; n = 9\,450\,000 : 2,1; n = 4\,500\,000;$$

Javob: 4 500 000 so'm.

$$3. \frac{5+x+90-(5-x)(4-x)}{25-x^2} = 0; \frac{5+x+90-20+5x+4x-x^2}{25-x^2} = 0; -x^2+10x+75=0; x^2-10x-75=0; D = (-10)^2 - 4 \cdot (-75) = 400;$$

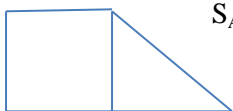
$$X = \frac{10+20}{2} = 15; \text{ Javob: } x = 15;$$

4. Berilgan: AB va CD kesmalar o'rtalarida kesishadi. $AO = OB$; $CO = OD$;
 Isbot qilish kerak AC parallel BD



Isbot: $\triangle ACO = \triangle BDO$ bunda O uchidagi burchak vertical, $AO = OB$; $CO = OD$
 Uchburchaklar tengligining TBT alomatiga ko'ra bu uchburchaklar teng. Bundan
 $\angle CAB = \angle DBA$ va $\angle ACD = \angle BDC$ kelib chiqadi bu degani .Ikkita to'g'ri chiziqni
 kesuvchi bilan kesganda hosil bo'lgan ichki alamashinuvchi burchaklar teng bo'lsa, AC parallel BD ekanligi kelib
 chiqadi.

5. C D Berilgan ABCD to'g'ri burchakli trapetsiya. $\angle A = 45^\circ$; $AB = 8\text{sm}$; $AD = 4\sqrt{2}\text{sm}$;
 $S_{ABCD} = ?$



Yechish: DE balandlik tushiramiz. $\triangle AED$ teng tomonli to'g'ri burchakli uchburchak.

B E A Bunga Pifagor teoremasini qo'llasak, $2DE^2 = AD^2$; $DE = \frac{\sqrt{AD^2}}{2} = \frac{\sqrt{(4\sqrt{2})^2}}{2} = \frac{\sqrt{16 \cdot 2}}{2} = 2\sqrt{2}$;
 $CD = BE = 8 - AE = 8 - 2\sqrt{2}$; $S_{ABCD} = \frac{8 - 2\sqrt{2} + 8}{2} \cdot 2\sqrt{2} = 16\sqrt{2} - 4$; Javob: $S_{ABCD} = 16\sqrt{2} - 4$ kv.birlik

6-bilet

$$1. \frac{m^{0,5}}{m^{0,5}+5} + \frac{5m^{0,5}}{(m^{0,5})^2-5^2} = \frac{m^{0,5}(m^{0,5}-5)+5m^{0,5}}{m-25} = \frac{m-5m^{0,5}+5m^{0,5}}{m-25} = \frac{m}{m-25};$$

$$\frac{25}{4} : \left(\frac{25}{4} - 25\right) = \frac{25}{4} : \left(-\frac{75}{4}\right) = \frac{25}{4} \cdot \left(-\frac{4}{75}\right) = -\frac{1}{3};$$

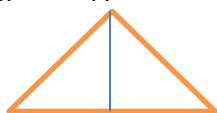
$$2. 120\,000 + \frac{120000 \cdot p}{100} \cdot 3 = 141600; 120\,000 + 3600p = 141600; p = \frac{141600 - 120000}{3600} = 6; \text{ Javob: } 6\%$$

$$3. b_1 \cdot b_2 = 27; b_1 = \frac{27}{b_2} = \frac{27}{b_1 \cdot q}; b_2 = b_1 \cdot q; b_3 = b_1 q^2; b_4 = b_1 q^3;$$

$$\frac{27}{b_1 q} \cdot q^2 \cdot \frac{27}{b_1 q} \cdot q^3 = \frac{1}{3}; \frac{27^2 q^3}{b_1^2} = \frac{1}{3}; \frac{27^2 q^3}{27} = \frac{1}{3}; 27q^4 = \frac{1}{3}; q = \sqrt[4]{\frac{1}{81}} = \frac{1}{3}; b_1 = \sqrt{\frac{27}{\frac{1}{3}}} = 9; b_2 = \frac{27}{9} = 3; b_3 = 9 \cdot \left(\frac{1}{3}\right)^2 = 1;$$

$$b_4 = 9 \cdot \left(\frac{1}{3}\right)^3 = 9 \cdot \frac{1}{27} = \frac{1}{3}; \text{ Javob: } b_1 = 9; b_2 = 3; b_3 = 1; b_4 = \frac{1}{3}.$$

4. A ABC uchburchakda AD-mediana BCni yarmiga teng. ABC ni to'g'ri burchakli ekanini isbot
 qiling.



Isbot: $AD = \frac{BC}{2}$ ekanligidan $AD = CD = DB$. U holda $\triangle ACD$ va $\triangle ABD$ lar teng yonli

uchburchaklar. Teng yonli uchburchaklarni asosidagi burchaklari teng, demak $\angle B = 45^\circ$,
 $\angle C = 45^\circ$. Bundan $\angle A = 180 - (45 + 45) = 90$. ABC to'g'ri burchakli

5. B C Berilgan ABCD parallelogram. $\angle BAC = 30^\circ$, $\angle DAC = 29^\circ$. $\angle B = \angle D = ?$



Yechish: $\angle A = 30 + 29 = 59$; $\angle C = 59^\circ$; $x + x + 2 \cdot 59 = 360$; $2x = 360 - 118$; $x = 121$; J: $\angle B = \angle D = 121^\circ$

A D

7-bilet

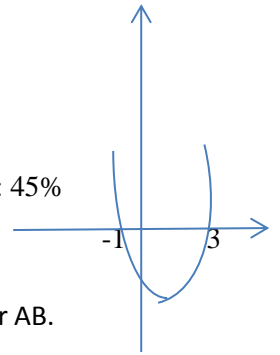
1. $\frac{-x-4+16+2x-8}{(x-4)(x+4)} \cdot (x-4)^2 = \frac{x+4}{x+4} \cdot (x-4) = x-4$;

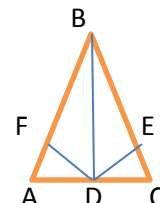
2. $10\ 000 - 5\ 500 = 4\ 500$; $10\ 000$ _____ 100%
 $4\ 500$ _____ $x\%$; $x = \frac{4500 \cdot 100}{10000} = 45$;

3. $y = x^2 - 2x - 3$; $a = 1, b = -2, c = -3$; $x_0 = \frac{-(-2)}{2 \cdot 1} = 1$; $y_0 = 1^2 - 2 \cdot 1 - 3 = -4$; $y = (x-1)^2 - 4$

$x_1 = -1$; $x_2 = 3$ J: $-1 < x < 3$.

J: 45%



4.  ABC teng yonli uchburchak. D AC asos o'rtasi. DE perpendikulyar BC, DF per-r AB. AD=DC. DF=DE ekanligini isbot qilish kerak.

Isbot. BD mediana tushiramiz. Bu ham bissektisa ham balandlik bo'ladi. $\triangle BFD$ va $\triangle BDE$ lar to'g'ri burchakli uchburchaklar. Bundan tashqari $\triangle BFD = \triangle BDE$ chunki bularda BD umumiy B uchidagi burchaklar teng. to'g'ri burchakli uchburchaklar tengligining GB alomatiga ko'ra. Bundan DF=DE ekanligi kelib chiqadi.

5.  Berilgan ABCD trapetsiya. EF= 11, BC=5, AD ni toppish kerak.

Yechish: $EF = (BC+AD)/2$; $AD = 2EF - BC = 2 \cdot 11 - 5 = 17$; JAVOB: AD= 17.

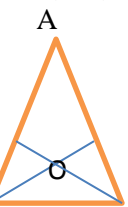
8-bilet

1. $\frac{a^2-1+1}{a-1} \cdot \frac{(a-1)^2}{a^2} = a-1$;

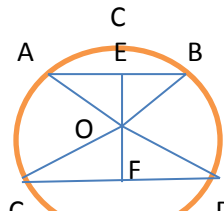
2. $\frac{1}{x} + \frac{1}{x+16} = \frac{1}{15}$; $\frac{x+16+x}{x(x+16)} = \frac{1}{15}$; $(2x+16) \cdot 15 = x^2 + 16x$; $30x+240 = x^2 + 16x$; $x^2 + 16x - 30x - 240 = 0$;
 $x^2 - 14x - 240 = 0$; $D = (-14)^2 - 4 \cdot (-240) = 196 + 960 = 1156 > 0$;

$x_1 = \frac{14-34}{2} = -20$; $x_2 = \frac{14+34}{2} = 24$; $24+16=40$; Javob: 40 soat

3. $x^2 - 5x = 16 - 5x$; $x^2 = 16$; $x = \pm 4$; $x_1 = -4$; $x_2 = 4$; $y_1 = 16 - 5 \cdot (-4) = 16 + 20 = 36$; $y_2 = 16 - 5 \cdot 4 = 16 - 20 = -4$;
 J: (-4;36); (4;-4)

4.  ABC teng yonli uchburchak. BO va CO $\angle B$ va $\angle C$ larni bissektrisalari. $\angle BOC = \angle B_1$

Isbot: $\angle BOC = 180 - (\frac{\angle B}{2} + \frac{\angle C}{2}) = 180 - 2 \cdot \frac{\angle B}{2} = 180 - \angle B$; $\angle B_1 = 180^\circ - \angle B$;

5.  AB va CD vatarlar. OE perpendikulyar AB, OF perpendikulyar CD; AB= 8; OE= 3, OF=4. CD=?

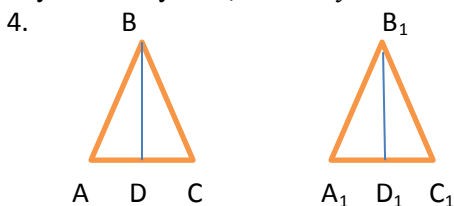
Yechish: $AE = AB/2 = 8/2 = 4$; AEO to'g'ri burchakli uchburchakdan $AO = \sqrt{AE^2 + OE^2} = \sqrt{4^2 + 3^2} = \sqrt{25} = 5$; AO=OD Demak, OD= 5; DFO to'g'ri burchakli uchburchakdan $DF = \sqrt{OD^2 - OF^2} = \sqrt{5^2 - 4^2} = \sqrt{9} = 3$; U holda $CD = 2DF = 2 \cdot 3 = 6$; Javob: CD= 6.

9-bilet

1. $\sqrt{100 \cdot \frac{2}{5}} - \sqrt{0,25 \cdot 160} + \sqrt{9 \cdot \frac{10}{9}} = \sqrt{40} - \sqrt{40} + \sqrt{10} = \sqrt{10}$;

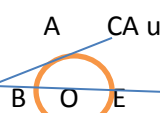
2. $\frac{1}{x} + \frac{1}{x+3} = \frac{1}{2}$; $2(x+3+x) = x(x+3)$; $4x+6 = x^2+3x$; $x^2+3x-4x-6=0$; $x^2-x-6=0$; $x_1 = -2$; $x_2 = 3$; Javob: 3 soatda

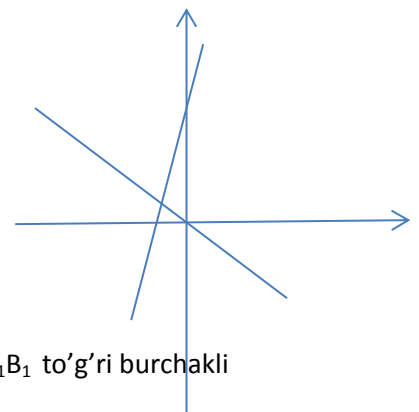
3. $y = 4x+4$; $y = -x$; Javob: $y = 4x+4$ o'suvchi



$\triangle ABC = \triangle A_1B_1C_1$; Isbot qilish kerak $BD = B_1D_1$;

Isbot: BD va B_1D_1 balandliklar. $AB = A_1B_1$; $\angle A = \angle A_1$; $\angle D = \angle D_1$; Bundan $\triangle ADB = \triangle A_1D_1B_1$ to'g'ri burchakli uchburchaklar tengligining GB alomatiga ko'ra. Demak, $BD = B_1D_1$


5.  CA urinma. O markaz. $\widehat{AB} = 35^\circ$; $\angle ACO = ?$ Yechish: $\widehat{BE} = 180^\circ$; $\widehat{AE} = 180 - \widehat{AB} = 180 - 35 = 135$
 $\angle ACO = (135-35)/2 = 100/2 = 55$; Javob: $\angle ACO = 55^\circ$

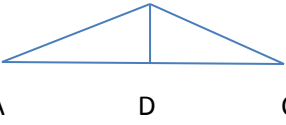


10-bilet

1. $\left(\frac{2}{(a-2)^2} - \frac{a}{(2-a)(2+a)}\right) \cdot \frac{4+a^2}{4-a^2} + \frac{2}{a-2} = \frac{2a+4-2a+a^2}{(4-a^2)((2-a)^2)} \cdot \frac{4-a^2}{4+a^2} + \frac{2}{a-2} = \frac{(4+a^2)(4-a^2)}{(4-a^2)(2-a)^2(4+a^2)} + \frac{2}{a-2} = \frac{1}{(a-2)^2} + \frac{a}{a-2} =$
 $= \frac{1+a^2-2a}{(a-2)^2} = \frac{(1-a)^2}{(a-2)^2}; \frac{(1-2,5)^2}{(2,5-2)^2} = \frac{(-1,5)^2}{0,5^2} = (-\frac{1,5}{0,5})^2 = (-3)^2 = 9;$
2. $\frac{48}{x-4} - \frac{48}{x} = \frac{1}{6}; 6 \cdot 48x - 6(x-4) \cdot 48 = x(x-4); 288x - 288x + 1152 = x^2 - 4x; x^2 - 4x - 1152 = 0; x_1 = -32; x_2 = 36; 36 - 4 = 32;$
 Javob: 36km/soat; 32 km/soat


3. $-2 < 3x - 5 < 2; 5 - 2 < 3x < 2 + 5; 3 < 3x < 7; 1 < x < 2\frac{1}{3};$ Javob: $1 < x < 2\frac{1}{3};$

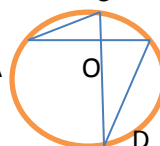
4.  ABCD parallelogram. BE va DF balandliklar. Isbot qilish kerak: $\triangle ABE = \triangle DCF$
 Isbot: $AB=CD, BE=DF.$ To'g'ri burchakli uchburchaklar tengligining GK alomatiga ko'ra $\triangle ABE = \triangle DCF$

5.  ABC teng yonli uchburchak. $\angle B = 120^\circ; AB = BC = 4;$
 $AC = ?$
 Yechish: BD balandlikni tushiramiz. U holda BD ham mediana, ham bissektrisa. Bundan $\angle B/2 = 60^\circ; ABD$ to'g'ri burchakli uchburchakda $\angle A = 30^\circ;$ U holda
 $AD = \sqrt{AB^2 - BD^2} = \sqrt{4^2 - 2^2} = \sqrt{12} = 2\sqrt{3}; AC = 2AD = 2 \cdot 2\sqrt{3} = 4\sqrt{3};$
 Javob: $AC = 4\sqrt{3}.$

11-bilet

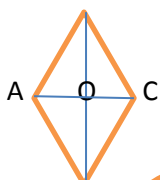
1. $\frac{6x+5}{10} \cdot \frac{3}{5} - \frac{5}{8} = \frac{13}{15} \cdot \frac{8}{5}; \frac{6x+5}{10} \cdot \frac{3}{5} - \frac{5}{8} = \frac{13}{15} \cdot \frac{8}{5}; \frac{6x+5}{6} = \frac{13}{24} + \frac{5}{8}; \frac{6x+5}{6} = \frac{28}{24}; (6x+5) \cdot 6 = 42; 6x+5=7; 6x=2; x=\frac{1}{3};$
2. $\frac{x+24}{6} + \frac{x}{4} = \frac{2x+24}{5\frac{1}{4}}; \frac{x+24}{6} + \frac{x}{4} = \frac{8x+96}{21}; \frac{2x+48+3x}{12} = \frac{8x+96}{21}; \frac{5x+48}{12} = \frac{8x+96}{21}; 7(5x+48) = 4(8x+96); 35x+336 =$
 $= 32x+384; 35x-32x = 384-336; 3x = 48; x = 16; 16+24+16=56;$ Javob: 56 km
3. $S = 10 + 11 + 12 + \dots + 97 + 98 + 99; a_1 = 10; a_{90} = 99; n = 90; S_{90} = ?$
 Yechish: $S_{90} = \frac{10+99}{2} \cdot 90 = 109 \cdot 45 = 4905;$ Javob: $S = 4905.$

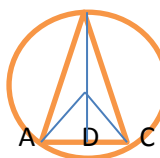
4.  ABCD to'g'ri to'rtburchak. $AC=BD$ ni ABD va ABC uchburchaklar orqali isbotlang.
 Isbot: $\triangle ABD = \triangle ABC;$ Bularda $AB=AB; AD=BC$ to'g'ri burchakli uchburchaklar tengligining GK alomatiga ko'ra. Bundan $BD=AC$ kelib chiqadi.

5.  AB perpendikulyar CD. $\angle ACD = 55^\circ; \angle BDC = ?$
 Yechish: AOC to'g'ri burchakli uchburchak. $\angle CAB = 90 - 55 = 35;$ Bundan $\overset{\frown}{BC} = 2\angle CAB = 2 \cdot 35 = 70; \angle BDC$ ham $\overset{\frown}{BC}$ ga tiralgan. Demak, $\angle BDC = \overset{\frown}{BC} / 2 = 70 / 2 = 35.$ J: $\angle BDC = 35^\circ$

12-bilet

1. $a = \sqrt{26} + \sqrt{6}; b = \sqrt{13} + \sqrt{17}$ a va b ni taqqoslang.
 $\sqrt{25+1} = \sqrt{25} + \frac{1}{2\sqrt{25}} = 5 + \frac{1}{10} = 5,1; \sqrt{4+2} = \sqrt{4} + \frac{2}{2\sqrt{4}} = 2 + \frac{1}{2} = 2,5; 5,1 + 2,5 = 7,6 = 7\frac{6}{10};$
 $\sqrt{13} = \sqrt{9+4} = \sqrt{9} + \frac{4}{2\sqrt{9}} = 3 + \frac{2}{3} = 3\frac{2}{3}; \sqrt{16+1} = \sqrt{16} + \frac{1}{2\sqrt{16}} = 4 + \frac{1}{8} = 4\frac{1}{8}; 3\frac{2}{3} + 4\frac{1}{8} = 7\frac{19}{24};$
 $\frac{6}{10}$ va $\frac{19}{24}; \frac{72}{120}$ va $\frac{95}{120}; \frac{72}{120} < \frac{95}{120};$ Javob: $a < b$
2. $\begin{cases} x:y=3,5:3; \\ x-y=600\ 000 \end{cases} \begin{cases} 3x=3,5y; \\ x=600\ 000+y; \end{cases} \begin{cases} 3(600\ 000+y)=3,5y; \\ x=600\ 000+3 \cdot 600\ 000=4\ 200\ 000; \end{cases}$ Javob: 4 200 000 KW; 3 600 000 kW.
3. $a_1+a_2+a_3=0; a_1+a_2+a_3+a_4=1; S_{10}=?$
 Yechish: $a_1+a_1+d+a_1+2d=0; 3a_1=-3d; a_1=-d; (2a_1+3d)/2 \cdot 4 = 1; (-2d+3d) \cdot 2 = 1; d=0,5; a_1=-0,5$
 $S_{10} = \frac{2 \cdot (-0,5) + 0,5 \cdot 9}{2} \cdot 10 = (-1+4,5) \cdot 5 = 3,5 \cdot 5 = 17,5;$ Javob: $S_{10} = 17,5.$

4.  ABCD parallelogram. AC BD ga perpendikulyar. ABCD-romb ekanligini isbotlang.
 Isbot: $\triangle ABO = \triangle CBO.$ Chunki BO umumiy $AB=BC.$ To'g'ri burchakli uchburchaklar tengligining GK alomatiga ko'ra. Ya'ni $AB=BC, CD=AB$ $AB=Bc=CD=DA.$ Demak ABCD romb

5.  $R = 17, BD = 25; S_{ABC} = ?$ Yechish: $R = \frac{a^2}{2h_c}; a = \sqrt{R \cdot 2h_c} = \sqrt{17 \cdot 2 \cdot 25} = 5\sqrt{34}$
 $CD = \sqrt{BC^2 - BD^2} = \sqrt{(5\sqrt{34})^2 - 25^2} = \sqrt{25 \cdot 34 - 625} = \sqrt{225} = 15;$
 $S = (BD \cdot CD) / 2 = 25 \cdot 15 / 2 = 187,5;$ Javob: $S = 187,5$ kv.birlik

13-bilet

1. $(\frac{97}{18} - \frac{143}{30}) : (1 \frac{12}{100} \cdot \frac{10}{9}) = x : (3,2 + 0,8 \cdot 2,25); \frac{485-429}{90} : \frac{112}{100} \cdot \frac{10}{9} = x : (3,2 + 1,8); \frac{56}{90} : \frac{56}{45} = x : 4; 0,5 = x : 4;$

$x = 4 \cdot 0,5 = 2;$ Javob: $x = 2$

2. I-kuni 15%; II-kuni qolganini 20%. Necha % sotilmay qoldi?

Yechish: $x - 0,15x = 0,85x; 0,85x \cdot 0,20 = 0,17x; 0,17x + 0,15x = 0,32x; x - 0,32x = 0,64x;$ Javob: 64%

3. $y_3 = 3; y_4 = 2,25; y_2 \cdot y_5 = ?$ Yechish: $q = y_4 : y_3 = 2,25 : 3 = 0,75; y_3 : y_2 = 0,75; y_2 = 3 : 0,75 = 4; y_5 = 2,25 \cdot 0,75 = 1,6875;$

$y_2 \cdot y_5 = 4 \cdot 1,6875 = 6,75;$ Javob: $y_2 \cdot y_5 = 6,75$

4. B C ABCD teng yonli trapetsiya. $\angle A = \angle D$ ekanini isbotlang.

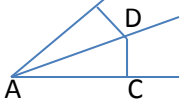


Isbot: $BE = CF$ balandliklar tushiramiz. $\triangle ABF = \triangle DCF.$ $BE = CF, AB = CD, AE = FD.$ To'g'ri burchakli

Uchburchaklar tengligining GK alomatiga ko'ra. Demak, $\angle A = \angle D$

A E F D

5. B Berilgan: $\angle BAC = 20^\circ; AD$ -bissektrisa. $AB = AD = AC.$ $\angle BDC = ?$



Yechish: $\triangle ADB = \triangle CDA,$ AD-umumiy. $AB = AC$ Uchburchaklar tengligining TBT alomatiga ko'ra. Bundan $\triangle CAD$ - teng yonli.

$10 + 2x = 180; 2x = 170; x = 85;$ Bundan: $\angle D = 2 \cdot 85 = 170;$ Javob: $\angle BDC = 170^\circ$

14-bilet

1. $\frac{4+a^2-4}{a^2(a-2)} : \frac{a^2+4a+4-a^2+4a-4+16}{a^2-4} = \frac{1}{a-2} \cdot \frac{(a-2)(a+2)}{8a+16} = \frac{(a+2)}{8(a+2)} = \frac{1}{8};$

2. 4 L 18% li 6 L 8% li $x = \frac{18 \cdot 4 + 8 \cdot 6}{4+6} = \frac{120}{10} = 12;$ Javob: 12 L

3. $b_1 > 0; b_1 \cdot b_2 = 27; b_3 \cdot b_4 = \frac{1}{3}; b_1, b_2, b_3, b_4 = ?$

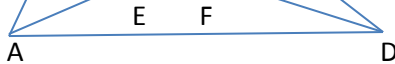
$b_1 \cdot b_1 q = 27; b_1 = \sqrt{\frac{27}{q}}$

$b_1 q^2 \cdot b_1 q^3 = \frac{1}{3}; \frac{27}{q} \cdot q^5 = \frac{1}{3}; q^4 = \frac{1}{3} : 27 = \frac{1}{81}; q = \sqrt[4]{\frac{1}{81}} = \frac{1}{3}; b_1 = \sqrt{\frac{27}{\frac{1}{3}}} = \sqrt{81} = 9; b_2 = 9 \cdot \frac{1}{3} = 3; b_3 = 3 \cdot \frac{1}{3} = 1; b_4 = 1 \cdot \frac{1}{3} = \frac{1}{3};$

Javob: $b_1 = 9; b_2 = 3; b_3 = 1; b_4 = \frac{1}{3}.$

4. ABCD trapetsiya. BC parallel AD. MN o'rta chiziq. $EF = \frac{AD-BC}{2}$ bo'lishini isbotlang.

Isbot: $MN = \frac{BC+AD}{2}; ME = FN = \frac{BC}{2}; EF = \frac{AD+BC}{2} - 2 \cdot \frac{BC}{2} = \frac{AD+BC-2BC}{2} = \frac{AD-BC}{2}$



5. B AB=52, $\cos \angle A = \frac{12}{13}; AC = ?$



Yechish: $\cos \angle A = \frac{AC}{AB}; AC = AB \cos \angle A = 52 \cdot \frac{12}{13} = 48;$ Javob: $AC = 48$

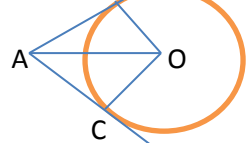
15-bilet

1. $\frac{b}{a(a-b)} \cdot \frac{(a-b)(a+b)}{b^2} = \frac{a+b}{ab}; \frac{\sqrt{5}+1+\sqrt{5}-1}{(\sqrt{5}+1)(\sqrt{5}-1)} = \frac{2\sqrt{5}}{5-1} = \frac{\sqrt{5}}{2};$

2. $560 \cdot \frac{1}{10} = 56; 560 - 56 = 504; 504 \cdot \frac{1}{3} = 168; 504 - 168 = 336; 0,26x + 0,16x = 336; 0,42x = 336; x = 800;$
 $0,26 \cdot 800 = 208; 0,16 \cdot 800 = 128.$ Javob: 208 sr; 128 sr.

3. $S = 2(\sqrt{2} + 1), q = \frac{1}{\sqrt{2}}; b_1 = ? b_1 = S(1-q) = 2(\sqrt{2} + 1) \cdot (1 - \frac{1}{\sqrt{2}}) = 2(\sqrt{2} + 1) \cdot \frac{\sqrt{2}-1}{\sqrt{2}} = 2 \cdot \frac{2-1}{\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2};$
 $b_1 = \sqrt{2}.$

4. B, AC urinma. $AB = AC$ ekanligini isbotlash kerak.



Isbot: $OB = OC$ aylana radiusini chiqaramiz. A ni O bilan tutashtiramiz. $\triangle AOB = \triangle AOC$

Bularda AO - umumiy, $OB = OC.$ To'g'ri burchakli uchburchaklar tengligining KK alomatiga ko'ra demak, $AB = AC$

5. B C Berilgan: ABCD teng yonli trapetsiya. BE ADga tushirilgan balandlik. $AE = 18, ED = 28$
 MN = ?



Yechish: $FD = AE = 18, AD = AE + ED = 18 + 28 = 46, EF = AD - 2AE = 46 - 2 \cdot 18 = 10;$

$MN = \frac{BC+AD}{2} = \frac{10+46}{2} = 28;$

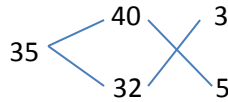
Javob: $MN = 28$

16-bilet

$$1. \left(\frac{(\sqrt{a}+1)^2 - (\sqrt{a}-1)^2}{a-1} + 4\sqrt{a} \right) \cdot \frac{a-1}{\sqrt{a}} = \left(\frac{a+2\sqrt{a}+1-a+2\sqrt{a}-1}{a-1} + 4\sqrt{a} \right) \cdot \frac{a-1}{\sqrt{a}} = \left(\frac{4\sqrt{a}}{a-1} + 4\sqrt{a} \right) \cdot \frac{a-1}{\sqrt{a}} = \frac{4\sqrt{a}}{\sqrt{a}} + 4(a-1) = 4+4a-4=4a;$$

2. I da 40%;

II da 32%; 35% 8kg

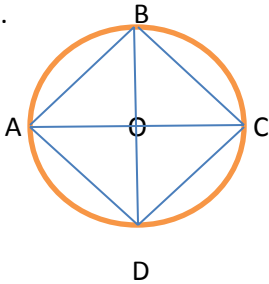


$$3x+5y=8; x=1; \text{ Javob: } 3\text{kg}; 5 \text{ kg}$$

$$3. q = \frac{1}{4}\sqrt{2}; S = \frac{16(4+\sqrt{2})}{7}; b_3 = ? \text{ Yechish: } b_1 = S(1-q) = \frac{16(4+\sqrt{2})}{7} \left(1 - \frac{1}{4}\sqrt{2}\right) = \frac{16(4+\sqrt{2})}{7} \left(\frac{4-\sqrt{2}}{4}\right) = \frac{16(16-2)}{28} = 8;$$

$$b_2 = b_1q = 8 \cdot \frac{1}{4}\sqrt{2} = 2\sqrt{2}; b_3 = b_2q = 2\sqrt{2} \cdot \frac{1}{4}\sqrt{2} = 1; \text{ Javob: } b_3 = 1.$$

4.



Berilgan: AC va BD o'zaro perpendikulyar diametrlar. ABCD to'rtburchak kvadrat ekanligini isbotlash kerak.

$$\text{Isbot: } OB=OD, OC=OA; BC = \sqrt{OB^2 + OC^2}; AD = \sqrt{OA^2 + OD^2}$$

$$CD = \sqrt{OD^2 + OC^2}; AB = \sqrt{OB^2 + OA^2}$$

5. $a=24; d=25; S=?$

Yechish: $b = \sqrt{d^2 - a^2} = \sqrt{25^2 - 24^2} = \sqrt{(25-24)(25+24)} = \sqrt{49} = 7; S = ab = 24 \cdot 7 = 168; J: S = 168 \text{ kv.bir}$

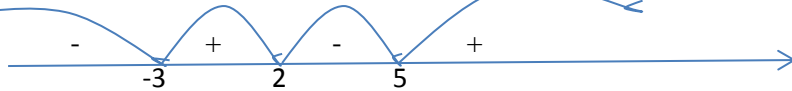
17-bilet

$$1. 1^{-\frac{2}{3}} - 7,5 \cdot 2^{2 \cdot (-1,5)} - \frac{1}{(-2)^4} + 3^{4 \cdot 0,25} = 1 - 7,5 \cdot 2^{-3} - \frac{1}{16} + 3 = 4 - 7,5 \cdot \frac{1}{8} - \frac{1}{16} = 4 - \frac{15}{2} \cdot \frac{1}{8} - \frac{1}{16} = \frac{64-15-1}{16} = \frac{48}{16} = 3;$$

$$2. \frac{60}{x} - \frac{60}{x+3} = 1; 60(x+3) - 60x = x(x+3); 60x+180-60x = x^2+3x; x^2+3x-180=0; x_1 = -15; x_2 = 12;$$

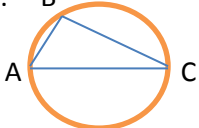
Javob: 12 km/soat; 15 km/soat

3. $x_1 = 2; x_2 = 5; x_3 = -3$



Javob: $x < -3; 2 < x < 5$

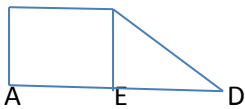
4. B



$\triangle ABC$ ichki chizilgan burchak. AC diametr. $\angle ABC$ -to'g'ri burchak ekanligini isbotlang.

Isbot: $\angle ABC = \frac{\widehat{AC}}{2} = \frac{180}{2} = 90^\circ$; Demak $\angle ABC = 90^\circ$

5. B C



Berilgan: ABCD to'g'ri burchakli trapetsiya. $BC=5; AD=11; \angle D=45^\circ; S=?$

Yechish: CE balandlik tushiramiz. Bunda $\angle DCE = 45^\circ$; Demak, $\triangle DEC$ teng yonli to'g'ri burchakli uchburchak. $ED = AD - AE = 11 - 5 = 6$; U holda $CE = 6$; $S = \frac{BC+AD}{2} \cdot CE = \frac{5+11}{2} \cdot 6 = 48$;

Javob: $S = 48 \text{ kv.bir}$

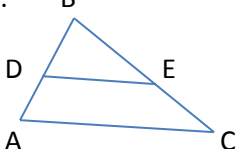
18-bilet

$$1. (3,24 - 2,3 \cdot 1,8) : \frac{18}{7} = (3,24 - 4,14) \cdot \frac{7}{18} = -0,9 \cdot \frac{7}{18} = -\frac{9}{10} \cdot \frac{7}{18} = -\frac{7}{20};$$

$$2. \begin{cases} x+y=150; & y=150-x; & y=150-50=100; \\ 0,8x+1,2y=160; & 0,8x+1,2 \cdot (150-x)=160; & 0,8x+180-1,2x=160; & -0,4x=-20; & x=50; & J: 50 \text{ ta}; & 100 \text{ ta} \end{cases}$$

$$3. -\sin\left(\frac{3\pi}{2} - \alpha\right) \cdot \cos \alpha - \sin \alpha \cdot (-\sin \alpha) = -(-\cos \alpha) \cdot \cos \alpha + \sin^2 \alpha = \cos^2 \alpha + \sin^2 \alpha = 1;$$

4. B



Berilgan ABC uchburchak. DE-o'rta chizig'i. BDE uchburchak o'xshash BAC ekanligini isbotlang.

Isbot: $\angle A = \angle D, \angle C = \angle E; DE = AC/2$; Bundan uchburchaklar o'xshashligining 2-alomatiga ko'ra $\triangle BDE \approx \triangle BAC$

5.




Kvadrat perimetri 10 sm. $R=?$

Yechish: $a = \frac{p}{4} = \frac{10}{4} = 2,5; R = \frac{a}{2} = \frac{2,5}{2} = 1,25; \text{ Javob: } R = 1,25 \text{ sm}$

19-bilet

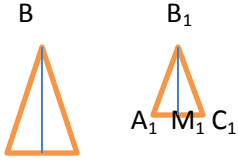
$$1. y^{10} \cdot \sqrt{y^2 \cdot y^3} = y^{10} \cdot \sqrt{y^5} = y^{10} \cdot y^{\frac{5}{2}} = y^{10+\frac{5}{2}} = y^{12,5};$$

2. $(x+4)(x+30)-x(x+25)=300$; $x^2+30x+4x+120-x^2-25x=300$; $9x=180$; $x=20$; $20+4=24$;
 $X+4$  $20+30=50$; $S=50 \cdot 24=1200$; Javob: $S=1200 \text{ m}^2$
 $X+25+5$

3. $++=+$; $+-=-$ Javob: “-“

4. $\frac{AB}{A_1B_1} = \frac{AC}{A_1C_1} = \frac{BM}{B_1M_1}$ bo'lsa, ABC ni $A_1B_1C_1$ uchburchakka o'xshashligini isbotlang.

Isbot: $AC=AM+MC$; $A_1C_1=A_1M_1+M_1C_1$; ABM uchburchak $A_1B_1M_1$ uchburchakka o'xshash. Bundan ABC ni $A_1B_1C_1$ uchburchakka o'xshashligi kelib chiqadi.



A M C

5. $1:100 \frac{S_1}{S_2} = \left(\frac{1}{100}\right)^2 = \frac{1}{10000}$; Javob: 10 000 marta

20-bilet

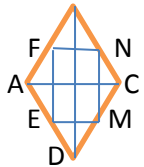
1. $0,6(1-\frac{7}{6}) \cdot \frac{5}{4} + \frac{8}{100} = \frac{6}{10} \cdot \left(-\frac{1}{6}\right) \cdot \frac{4}{5} + \frac{2}{25} = -\frac{2}{25} + \frac{2}{25} = 0$;

2. $160 \cdot \frac{62,5}{100} = 100$; $160-100=60$;

$\frac{100}{x} - \frac{60}{x-20} = \frac{1}{4}$; $4 \cdot 100(x-20) - 60 \cdot 4 \cdot x = x(x-20)$; $400x-8000-240x=x^2-20x$; $x^2-180x+8000=0$;
 $x_1=80$; $x_2=100$; Javob: 100 km/soat; 80 km/soat

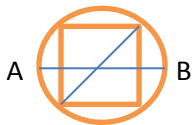
3. $3\cos(150+30)-2\sin(180+3 \cdot 30) + 5tg6 \cdot 30 + 2\sin30 = -3 + 2 + 0 + 2 \cdot 0,5 = -1 + 1 = 0$;

4. B Berilgan ABCD romb. F,N,M,E tomonlarning o'rtalari. FNME-to'g'ri to'rtburchak ekanligini isbotlash kerak.



Isbot: $\triangle ABC$ da FN AC ga parallel, $FN=AC/2$; $\triangle DAC$ da EM AC ga parallel $EM=AC/2$;
 $\triangle ABD$ da FE BD ga parallel $FE=BD/2$; $\triangle CDB$ da NM BD ga parallel $NM=BD/2$; Bundan $FN=EM$;
 $EF=NM$ kelib chiqadi, demak FNME to'g'ri to'rtburchak.

5. $D=20$ bo'lgan. $R=D/2=20/2=10$; $2x^2=400$; $x^2=200$; $x=10\sqrt{2}$; Javob: $10\sqrt{2}$



21-bilet

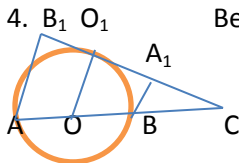
1. $\frac{xy^2+x^2y^2+x^2y}{(x-2y)^2 \cdot \frac{x-8y^2}{4}} = \frac{xy(y+xy+x)}{(x-2y)^2 \cdot \frac{x-8y^2}{4}} = \frac{(x-8y^2)xy(y+xy+x)}{(x-2y)^2} = \frac{(2-8 \cdot 0,0625)2 \cdot 0,25(0,25+2 \cdot 0,25+2)}{(2-2 \cdot 0,25)^2} = \frac{1,5 \cdot 1,375}{2,25} = \frac{2,0625}{2,25} = 0,916666667$

2. $\frac{1}{x} + \frac{1}{x-5} = \frac{1}{6}$; $6(x-5) + 6x = x(x-5)$; $6x-30 + 6x = x^2-5x$; $x^2-5x-12x+30=0$; $x^2-17x+30=0$; $x_1=2$; $x_2=15$; $15-5=10$;

Javob: 15 soat; 10 soat

3. $\frac{tg\alpha}{1-tg^2\alpha} \cdot \frac{ctg^2\alpha}{ctg\alpha} = \frac{tg^2\alpha}{1-tg^2\alpha} \cdot \frac{1-tg^2\alpha}{tg^2\alpha} = 1$;

4. $B_1 O_1$ Berilgan aylana AB –diamter. A_1B_1 AB ga perpendikulyar bolmagan urinma. AA_1 va BB_1 A_1B_1 urinmaga perpendikulyar. O_1 nuqta A_1B_1 kesmani o'rtasi ekanligini isbotlash kerak.
 C AB va A_1B_1 larni kesishguncha davom ettirsak ACA_1 burchak hosil bo'ladi. Falesga ko'ra O_1 nuqta A_1B_1 kesmani o'rtasi boladi.



5. c-gipotenuza, α -o'tkir burchak, $c=25 \text{ sm}$, $\alpha=30^\circ$;
 Ikkinchi o'tkir burchak va katetlarni c va α orqali ifodalang.

Yechish: $\beta = 90 - \alpha$; $x = c \sin \alpha = 24 \cdot \sin 30^\circ = 24 \cdot 0,5 = 12$;

$Y = c \cos \alpha = 24 \cdot \cos 30^\circ = 24 \cdot \frac{\sqrt{3}}{2} = 12\sqrt{2}$; Javob: 12; $12\sqrt{3}$.



Y

22-bilet

$$1. -\frac{2}{5} : \frac{9}{10} = -\frac{2}{5} \cdot \frac{10}{9} = -\frac{4}{9} = -\frac{16}{36}; \quad -\frac{2}{3} \cdot \frac{7}{8} = -\frac{7}{12} = -\frac{21}{36}; \quad \frac{1}{2} - \frac{5}{6} = \frac{3-5}{6} = -\frac{2}{6} = -\frac{12}{36}$$

Javob: $\frac{21}{36}, \frac{16}{36}, \frac{12}{36}$

2. $2(x+x+15)=210; 2x+15=105; 2x=90; x=45; 45+15=60; S=45 \cdot 60=2700;$ Javob: $S=2700 \text{ m}^2$

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

$= \cos x \sin x; \sin x = -\sqrt{1 - (-0,6)^2} = -\sqrt{1 - 0,36} = -\sqrt{0,64} = -0,8;$

$-0,6 \cdot (-0,8) = 0,48;$

4. B C ABCD-parallelogramm. $S = AB \cdot AD \cdot \sin A$ ekanligini isbotlash kerak.



Isbot: $S = S_{ABC} + S_{ACD} = \frac{BA \cdot BC \sin B}{2} + \frac{DA \cdot DC \sin D}{2} = BA \cdot BC \sin B;$

5. 1:2:3 a+c=7,2 ; C=?

Yechish: $x+2x+3x=180; x=30; 30^0; 60^0; 90^0; x+2x=7,2; 3x=7,2; x=2,4; 2,4 \cdot 2=4,8;$ Javob: $c=4,8 \text{ sm}.$

23-bilet

1. $(1,68:1,6-1,5) \cdot \left(-\frac{5}{3}\right) : (-0,09) = 1,05 \cdot \left(-\frac{5}{3}\right) : \left(-\frac{9}{100}\right) = \frac{105}{100} \cdot \left(-\frac{5}{3}\right) \cdot \left(-\frac{100}{9}\right) = \frac{35}{9} = 3\frac{8}{9};$

2. $x+y=18; y=18-x;$

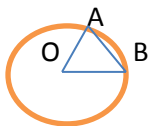
$x-0,4x=y-0,25y; 0,6x=0,75y; 0,6x=0,75 \cdot (18-x); 0,6x+0,75x=13,5; 1,35x=13,5; x=10; y=18-10=8;$

Javob: 10 kg; 8 kg.

3. $\cos \alpha = -\sqrt{1 - 0,8^2} = -\sqrt{0,36} = -0,6;$

$\cos \alpha \cos \frac{\pi}{4} + \sin \alpha \sin \frac{\pi}{4} = -0,6 \cdot \frac{\sqrt{2}}{2} + 0,8 \cdot \frac{\sqrt{2}}{2} = \frac{2}{10} \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{5};$

4. $\angle O = 60^0; AB = OA = OB$ ekanligini isbotlash kerak.



Isbot: $\triangle AOB$ teng yonli uchburchak. $OA = OB;$ Bundan AB asos demak, $\angle A = \angle B$

$60+2x=180; 2x=120; x=60;$ Bundan $\triangle AOB$ teng tomonli uchburchak. Bundan $AB = OA$ ekanligi kelib chiqadi

5. $x+57+x+57=360; 2x=360-114; 2x=246; x=123;$ Javob: $123^0; 123^0.$

24-bilet

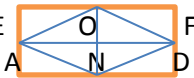
1. $\frac{(x^{\frac{1}{2}})^2 - (y^{\frac{1}{2}})^2}{x^{\frac{1}{2}} - y^{\frac{1}{2}}} - \frac{1}{x^{\frac{1}{2}} + (x^{\frac{1}{2}})^2} = \frac{(x^{\frac{1}{2}} + y^{\frac{1}{2}})(x^{\frac{1}{2}} - y^{\frac{1}{2}})}{x^{\frac{1}{2}} - y^{\frac{1}{2}}} - \frac{x^{\frac{1}{2}}(1+x^{\frac{1}{2}})}{x^{\frac{1}{2}}} = \sqrt{x} + \sqrt{y} - 1 - \sqrt{x} = \sqrt{y} - 1;$

$\sqrt{y} - 1 = \sqrt{25} - 1 = 5 - 1 = 4;$

2. $\frac{36}{x+2} = \frac{20}{x-2}; 36(x-2) = 20(x+2); 36x-72 = 20x+40; 36x-20x = 40+72; 16x = 112; x = 7;$ Javob: 7 km/soat

3. $(x-\sqrt{12})(x+\sqrt{3}) = 0; x^2 + \sqrt{3}x - \sqrt{12}x - \sqrt{12} \cdot \sqrt{3} = 0; x^2 + (\sqrt{3} - \sqrt{12})x - 6 = 0;$

4. B M C To'g'ri to'rtburchak tomonlari o'rtalarini tutashtirishdan hosil bo'lgan to'rtburchak romb E N F ekanligini isbotlang.



Isbot: EF va MN larni o'tkazamiz. $MN = CD = AB; EF = BC = AD; EOM$ va EON uchburchaklarda EO umumiy $OM = ON$ bu uchburchaklar KK alomatga ko'ra teng. FOM va FON uchburchaklar ham teng, bularda OF umumiy $ON = OM$ KK alomatga ko'ra teng. Bundan $EMFN$ -romb ekanligi kelib chiqadi.

5. asos x bo'lsin u holda yon tomonlar x-2 dan bo'ladi;

$x-2+x > x-2; x > 0;$

$x-2+x-2 > x; x > 4; 5; 5; 7$

25-bilet

1. $\frac{8a^6 b^9 \cdot 0,25a^2 b^4}{81a^8 b^{12}} = \frac{2a^8 b^{13}}{81a^8 b^{12}} = \frac{2}{81} b; \frac{2}{81} \cdot \frac{27}{4} = \frac{1}{6};$

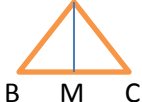
2. $x-y=4; x=4+y;$

$xy=96 (4+y)y=96; 4y+y^2=96; y^2+4y-96=0; y_1=-12; y_2=8; 4+8=12;$ Javob: 12; 8.

3. $8x=5y; 8x=5(44-16x); 8x=220-80x; 8x+80x=220; 88x=220; x=2,5;$

$16x+y=44; y=44-16x; y=44-16 \cdot 2,5=44-40=4;$ Javob: $x=2,5; y=4.$

4. A ABC uchburchak. AM mediana. $AM = BC/2;$ ABC to'g'ri burchakli uchburchak ekanini isbotlang.



Isbot: $AM = BM = MC. \triangle AMB$ teng yonli uchburchak. Bundan $\angle MAB = \angle MBA; \triangle AMC$ ham teng yonli Uchburchak. $\angle ACM = \angle CAM.$ Bundan $\angle B = \angle C$ u holda ABC teng yonli to'g'ri burchakli uchburchak.

5. $a = 9 \text{ sm}, b = 12 \text{ sm}; r = ?$

Yechish: $c = \sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$; $r = \frac{a+b-c}{2} = \frac{9+12-15}{2} = 3$; Javob: $r = 3$ sm.

26-bilet

1. EKUK(32,36,48) ning EKUB(32,36,48) ga nisbatini toping.

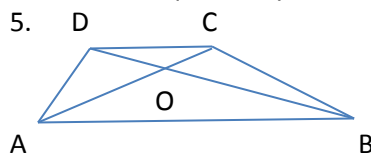
$32 = 2^5$; $36 = 2^2 \cdot 3^2$; $48 = 2^4 \cdot 3$; . EKUK(32,36,48) = $2^5 \cdot 3^2 = 32 \cdot 9 = 288$; EKUB(32,36,48) = $2^2 \cdot 3 = 4 \cdot 3 = 12$;
 $288:12 = 24$; Javob: 24.

2. $n = 720$ 850 so'm; $p = 8\%$; $k = 3,5$ yil;

$720850(1 + \frac{8 \cdot 3,5}{100}) = 720850(1 + 0,28) = 922688$; $922688 - 720850 = 201838$; Javob: 201838 so'm

3. $(x-3)(x+1) + 2x \cdot 2(x+3) = 9(x+5)$; $x^2 + x - 3x - 3 + 4x^2 + 12x = 9x + 45$; $5x^2 + x - 48 = 0$; $x_1 = -3,2$; $x_2 = 3$; Javob: $x = -3,2$.

4. Asosdagi burchaklar otmas va to'g'ri burchak bola olmaydi. O'tmas burchak bo'lsa 2 ta 90° dan kata burchaklar yig'indisi 180° dan kata, bu esa mumkin emas. Xuddi shungdek 90° dan ham bo'la olmaydi. Demak asosdagi burchaklar faqat o'ttir ya'ni 90° dan kichik bo'ladi.



Berilgan: ABCD trapetsiya; O –diagonallar kesishgan nuqta. $AB = 9,6$ dm = 96 sm; $DC = 24$ sm; $AC = 15$ sm; $AO = ?$

Yechish: $\frac{DC}{AB} = \frac{24}{96} = \frac{1}{4}$; $\frac{AC}{AO} = \frac{15}{AO} = \frac{1}{4}$; $AO = 60$; Javob: $AO = 60$ sm.

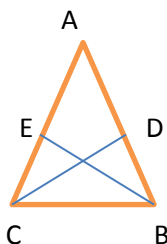
27-bilet

1. $1 - 7,5 \cdot \frac{1}{4^{\frac{3}{2}}} - \frac{1}{(-2)^4} + 3^{4 \cdot 0,25} = 1 - \frac{15}{2} \cdot \frac{1}{2^{\frac{3}{2}}} - \frac{1}{16} + 3 = 1 - \frac{15}{2} \cdot \frac{1}{8} - \frac{1}{16} + 3 = 4 - 1 = 3$;

2. $160 \cdot \frac{3}{5} = 96$; $160 - 96 = 64$; $64 \cdot \frac{7}{8} = 56$; $160 - (64 + 56) = 50$; Javob: 50 m

3. $\sin \alpha = -\sqrt{1 - 0,8^2} = -\sqrt{0,36} = -0,6$; $-0,6 - 0,8 : (-0,6) = \frac{-6}{10} + \frac{4}{3} = -\frac{3}{5} + \frac{4}{3} = \frac{-9 + 20}{15} = \frac{11}{15}$; +

4. ABC teng yonli uchburchak. $AC = AB$. $CD = BE$ ekanligini isbotlang.

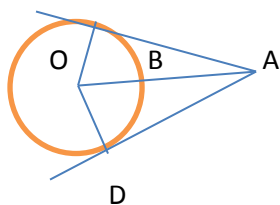


Isbot: $\triangle ACD = \triangle ABE$; chunki $\angle C = \angle B$; $AC = AB$ $\angle A = \angle A$; Uchburchaklar tengligining BTB Alomatiga ko'ra teng, demak, $BE = CD$.

5. $OB = R = 4,5$ sm; $OA = 9$ sm; AE va AD urinmalar. $\angle A = ?$

Yechish: $\triangle AOD$ va $\triangle AOE$ to'g'ri burchakli uchburchak. OD va OE OB radiusga teng demak bularning har biri OA gipotenuzaning yarmiga teng bo'lsa $\angle A/2 = 30^\circ$;

Bundan $\angle A = 60^\circ$; Javob: $\angle A = 60^\circ$



28-bilet

1. $(\frac{a\sqrt{a+b}}{\sqrt{a}\sqrt{a+b}} - \frac{\sqrt{a}\sqrt{a}}{\sqrt{a}\sqrt{a+b}}) \cdot \frac{\sqrt{a+b}}{\sqrt{a}} = \frac{a\sqrt{a+b}-a}{\sqrt{a}\sqrt{a+b}} \cdot \frac{\sqrt{a+b}}{\sqrt{a}} = \frac{a(\sqrt{a+b}-1)}{a} = \sqrt{a+b} - 1$; $\sqrt{4+5} - 1 = \sqrt{9} - 1 = 3 - 1 = 2$;

2. $\frac{200}{x} - \frac{200}{x+5} = 2$; $200(x+5) - 200x = 2(x+5)x$; $200x + 1000 - 200x = 2x^2 + 10x$; $2x^2 + 10x - 1000 = 0$;
 $x^2 + 5x - 500 = 0$; $x_1 = -25$; $x_2 = 20$; $20 + 5 = 25$; $200:25 = 8$; Javob: 8 kun.

3. $-3 \leq 1 - 2x \leq 4$; $-3 - 1 \leq -2x \leq 4 - 1$; $-4 \leq -2x \leq 3$; $2 \geq x \geq -1,5$; Javob: $-1,5 \leq x \leq 2$.

4. B Berilgan ABC uchburchak. BD –balandlik. $\angle ABC$ ni teng ikkiga bo'ladi. ABC-uchburchakni teng yonli ekanligini isbotlash kerak.

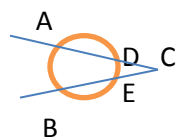


A D C

Isbot: $\triangle ADB$ va $\triangle CDB$ to'g'ri burchakli uchburchaklarda BD –umumiy, $AB = BC$; B uchidagi burchaklari teng bo'lganligidan to'g'ri burchakli uchburchaklar tengligining GK alomatiga ko'ra bular teng. Demak, ABC teng yonli uchburchak.

5. Berilgan : aylana va ikki kesuvchi. $\widehat{AB} = 150^\circ$; $\widehat{DE} = 62^\circ$; $\angle ACB = ?$

Yechish: $\angle ACB = (\widehat{AB} - \widehat{DE}) : 2 = (150 - 62) : 2 = 44$; Javob: $\angle ACB = 44^\circ$



B

29-bilet

1. $\frac{(x^2 - 4y^2)(x^2 + 4y^2) \cdot 3(2y - x)}{(2y - x)^2(x^2 + 4y^2)} = \frac{3(x^2 - 4y^2)}{2y - x} = \frac{3(x - 2y)(x + 2y)}{-(x - 2y)} = -3(x + 2y)$;

$-3 \cdot (-4 + 2 \cdot (-3,5)) = -3 \cdot (-4 - 7) = 33$.

2. $x+y=2 \cdot 22,5$; $x+y=45$; $x+y=45$; $y=45-x$; $y=45-25=20$;

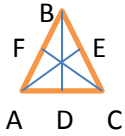
$(x-y) \cdot \frac{1}{3} = 1 \frac{2}{3}$; $x-y=3 \cdot \frac{5}{3}$; $x-y=5$; $2x=50$; $x=25$; Javob: 25.

3. $9x^4-37x^2+4=0$; $x^2=y$; $9y^2-37y+4=0$; $D=(-37)^2-4 \cdot 9 \cdot 4 = 1369 - 144 = 1225$;

$y_{1,2} = \frac{37 \pm 35}{18}$; $y_1 = \frac{37-35}{18} = \frac{2}{18} = \frac{1}{9}$; $y_2 = \frac{37+35}{18} = \frac{72}{18} = 4$; $x_{1,2} = \pm \sqrt{\frac{1}{9}} = \pm \frac{1}{3}$; $x_{3,4} = \pm \sqrt{4} = \pm 2$;

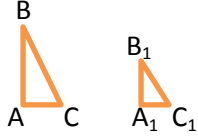
Javob: 0.

4. Berilgan: ABC teng tomonli uchburchak. BD, AE va CF-balandliklar. $BD=AE=CF$ ekanligini isbotlash kerak.



Isbot: $\triangle AEC = \triangle BDC = \triangle CFA$; Bularda $AC=AB=BC$; $\angle E=\angle D$. Togri burchakli uchburchaklar Tengligining KK alomatiga ko'ra. Bundan $BD=AE=CF$ ekanligi kelib chiqadi.

5. Berilgan: $AC=37,6$ m; $A_1B_1=3,8$ m; $A_1C_1=3,04$ m; $AB=?$



Yechish: $A_1B_1:A_1C_1=3,8:3,04=1,25$; $37,6 \cdot 1,25 = 47$; Javob: 47 m

30-bilet

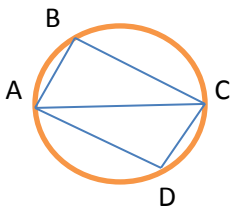
1. $2a^{-6}b^6 \cdot (3a^4b^{-2})^2 = 2a^{-6}b^6 \cdot 9a^8b^{-4} = 18a^2b^2$; $18 \cdot (-\frac{1}{3})^2 \cdot 2^2 = 18 \cdot \frac{1}{9} \cdot 4 = 2 \cdot 4 = 8$;

2. I- x ; II- $x + \frac{1}{5}x$; III- $\frac{6}{5}x + 1$; $x + \frac{6}{5}x + 1 + \frac{6}{5}x = 6,1$; $10x+12x+10+12x=61$; $34x=51$; $x=1,5$;

I-1,5; II-1,2; $1,5 = 1,8$; III- $1,8+1=2,8$; Javob: 1,5; 1,8; 2,8.

3. $2 \cdot \frac{\sin^2 x}{\cos^2 x} \cdot \cos^2 x = 2 - \sin^2 x$; $2 - (0,2)^2 = 2 - 0,04 = 1,96$.

4. Berilgan: AC-aylana diametri. BC va AD o'zaro parallel vatarlar. $BC=AD$ ekanligini isbotlash kerak.



Isbot: $\triangle ABC = \triangle ADC$; AC-umumiy, $\angle BAC = \angle CAD$; $\angle ABC$ va $\angle ADC$ diametrga tiralgan va 90° dan bo'lgani uchun teng. To'g'ri burchakli uchburchaklar tengligining BG alomatiga kora bular teng. Demak, $BC=AD$.

5. Berilgan: ABCD trapetsiya; $BC=5$ sm; $AD=8$ sm; $AB=3,6$ sm; $CD=3,9$ sm; $MC=?$; $MB=?$

Yechish: $5:8 = x:(3,6+x)$; $5(3,6+x) = 8x$; $18+5x=8x$; $3x=18$; $x=6$;

$5:8 = y:(y+3,9)$; $5(y+3,9) = 8y$; $5y+19,5=8y$; $3y=19,5$; $y=6,5$.

Javob: $MB=6$ sm; $MC=6,5$ sm.

