2022-2023-O‘QUV YILIDA O‘RTA TA’LIM MAKTABLARINING 11-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!

MUALLIF: JALILOVA BARNOXON

11-SINF MATEMATIKA
1-VARIANT

1. Hisoblang: $2{,}8\cdot(2\frac{1}{3}:2{,}8-1)+2\frac{4}{5}$

$2{,}8\cdot\left(2\frac{1}{3}:2{,}8-1\right)+2\frac{4}{5}=2\frac{1}{3}$.

1) $2\frac{1}{3}:2{,}8=\frac{7}{3}\cdot\frac{5}{14_2}=\frac{5}{6}$. 2) $\frac{5}{6}-1=-\frac{1}{6}$.

3) $2{,}8\cdot\left(-\frac{1}{6}\right)=-\frac{14}{5}\cdot\frac{1}{6_3}=-\frac{7}{15}$. 4) $-\frac{7}{15}+2\frac{4}{5}=2\frac{5}{15}=2\frac{1}{3}$

2. Paxtadan 30% tola olinsa, 60 t tola olish uchun necha tonna paxta kerak?

x — 100%
60 t — 30%

$x=\frac{60\cdot100}{30}=200$ t J: 200 t.

3. Agar $x>y>z$ bo‘lsa, $|x-y|-|z-y|-|z-x|$ ni soddalashtiring.

$|x-y|-|z-y|-|z-x|=x-y-y+z-x+z=2z-2y$

4. $\sqrt{x}+\sqrt[4]{x}=12$ tenglamani yeching.

$\sqrt{x}+\sqrt[4]{x}=12$ $\sqrt[4]{x}=t$.

$t^2+t-12=0$ $t_1=\frac{-1+\sqrt{1^2+4\cdot12}}{2}=\frac{-1+7}{2}=3$ $t_2=\frac{-1-7}{2}=-4$

$\begin{cases}\sqrt[4]{x}=3 & x=81\\ \sqrt[4]{x}=-4 & \text{Haq yech yo‘q.}\end{cases}$

J: $x=81$.

5. $y=2x+5$ va $6x-3y=2$ to‘g‘ri chiziqlar Oxy tekisligining qaysi choragida kesishadi?

$\begin{cases}y=2x+5\\ 6x-3y=2\end{cases}$ 1-usul $y=2x+5$.

$6x-6x+15=2$

$\begin{cases}y=2x+5 & y_1=2x+5\\ 3y=6x-2. & y_2=2x-\frac{2}{3}\end{cases}$ y_2 to‘g‘ri chiziq y_1 ni ch. // ko‘chirish natijasida hosil bo‘lgan $y_1\parallel y_2$, demak kesishmaydi.

6. $3^1\cdot3^2\cdot3^3\cdot\ldots\cdot3^x=\frac{1}{9^{-33}}$ tenglamani yeching.

$3^1 \cdot 3^2 \cdot 3^3 \cdot \ldots \cdot 3^x = \frac{1}{9^{-33}}$

$3^{\frac{1+x}{2} \cdot x} = 3^{66}$

$\frac{x^2+x}{2} = 66$

$x^2+x-132=0$

$D = 1 + 4 \cdot 132 = 529$

$x_1 = \frac{-1+23}{2} = 11 \quad x_2 = \frac{-1-23}{2} = -12$

Javob $x = 11$.

7. $\left(\frac{\sin 100^\circ + \sin 20^\circ}{\sin 50^\circ}\right)^2$ ni hisoblang.

$\left(\frac{\sin 100^\circ + \sin 20^\circ}{\sin 50^\circ}\right)^2 = \left(\frac{2 \sin 60^\circ \cos 40^\circ}{\sin 50^\circ}\right)^2 = \left(\frac{2 \cdot \frac{\sqrt{3}}{2} \cos 40}{\sin 50}\right)^2 =$

$\left(\frac{\sqrt{3} \cos 40^\circ}{\cos 40^\circ}\right)^2 = (\sqrt{3})^2 = 3$

8. $\log_2 \lg 100$ ni hisoblang.

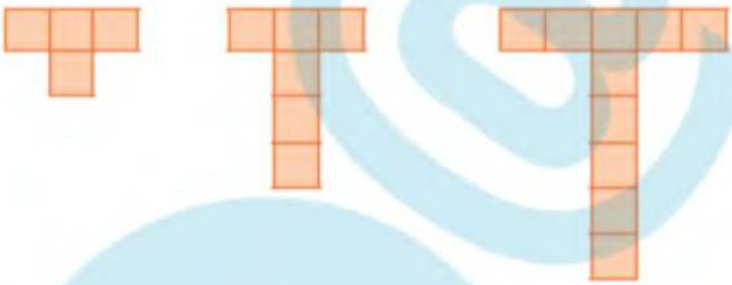
Javob: $\log_2 \lg 100 = \log_2 2 = 1$

9. $f(x) = 1 - \frac{1}{\cos^2 3x}$ funksiyaning boshlang‘ich funksiyasini toping.

$f(x) = 1 - \frac{1}{\cos^2 3x}$ $\int \left(1 - \frac{1}{\cos^2 3x}\right) dx = x - \frac{1}{3} tg\, 3x + c$

10. Rasmda ketma-ketliklar berilgan.

1-rasm *2-rasm* *3-rasm*



a) ushbu ketma-ketlik asosida quyidagi jadvalni to‘ldiring.

Rasm tartib raqami	1	2	3	4	5	6	7
Kvadratchalar soni	4	6	10	18	34	66	130

b) n*-rasmdagi kvadratlar sonini aniqlovchi ifoda tuzing.*

$a_n = 2 + 2^n$

c) 35-rasmda kvadratlar soni nechta bo‘ladi?

a35 = 2 + 235 = 34359738370

11. Ikki to‘g‘ri chiziqning kesishishidan hosil bo‘lgan qo‘shni burchaklar 5:7 nisbatda bo‘lsa, shu burchaklarni toping.

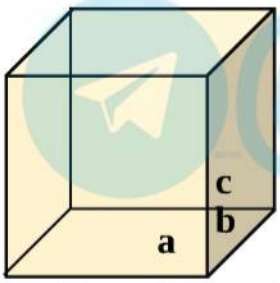
$\angle 1 : \angle 2 = 5 : 7.$ $5x + 7x = 180.$

$12x = 180.$

$x = 15.$

$\angle 1 = 5 \cdot 15 = 75°$ $\angle 2 = 7 \cdot 15 = 105°$

12. Zalning uzunligi, eni va balandligining nisbati 5:3:1 kabi. Zalning uzunligi uning enidan 8 m ko‘p. Zalning hajmini toping.



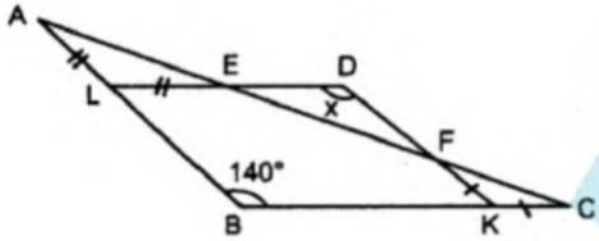
$a : b : c = 5 : 3 : 1$

$a = b + 8.$ $5x = 3 + 8$ $x = 4$

$a = 4 \cdot 5 = 20$ $b = 3 \cdot 4 = 12$

$c = 4 \cdot 1 = 4$ $\mathbf{V = 20 \cdot 12 \cdot 4 = 960 m^3}$

13. Noma’lum *x* burchakni toping.



$\triangle ALE$ da $AL = LE$ dan $\angle A = \angle E$

$\angle LEA = \angle DEF$, chunki vertikal.

$\triangle FKC$ dan $KF = KC$

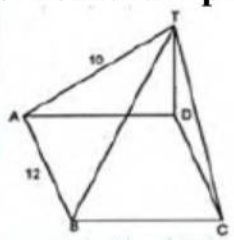
$\angle C = \angle KFC$ ga

$\angle CFK = \angle DFF$ chunki vertikal.

bundan $\triangle ABC \sim \triangle DEF$ ga

$\angle D = \angle B = 140°$ $x = 140°$

14. Muntazam piramidaning hajmini toping



$ABCD$ - muntazam $S_{asos} = 12^2 = 144.$

$AB = 12$

$AT = 10.$

$V_{piz} - ?$

$AO = \frac{1}{2} AC = \frac{1}{2} \cdot 12\sqrt{2} = 6\sqrt{2}.$

$OT = \sqrt{10^2 - (6\sqrt{2})^2} = \sqrt{100 - 72} =$

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

$V = \frac{1}{3} S_a \cdot H = \frac{1}{3} \cdot 144 \cdot 2\sqrt{7} =$

$= 96\sqrt{7}$ (kub birlik)

15. Har qanday uchtasi bir to‘g‘ri chiziqda yotmaydigan 6 ta nuqta berilgan. Shu 6 ta nuqta orqalinechta turlicha to‘g‘ri chiziq o‘tkazish mumkin?

$\frac{n \cdot (n-1)}{2}$ formulaga asosan

$\frac{6 \cdot 5}{2} = 15$ ta.

2-VARIANT

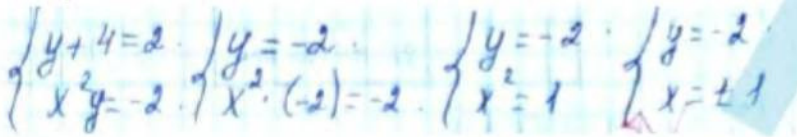
1. Hisoblang: $0{,}8^2 - 12{,}2^2$

$0{,}8^2 - 12{,}2^2 = (0{,}8 - 12{,}2)(0{,}8 + 12{,}2) = -11{,}4 \cdot 13 = -148{,}2$

2. Xaritada ikki shahar orasidagi masofa 4,5 cmga teng. Xaritadagi masshtab 1:2000000 bo‘lsa, shaharlar orasidagi haqiqiy masofa necha (km) bo‘ladi?

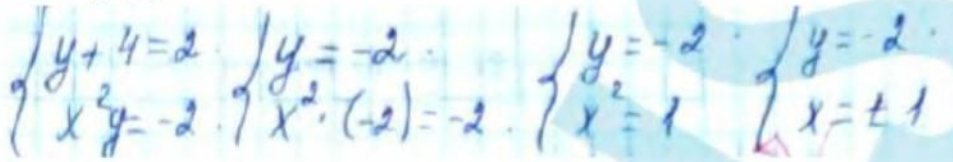
$\frac{4{,}5}{x} = \frac{1}{2000000}$ $\quad x = 4{,}5 \cdot 2000000 = 9000000$ cm $= 90$ km

3. $\begin{cases} y+4=2 \\ x^2y=-2 \end{cases}$ tenglamalar sistemasini yeching.

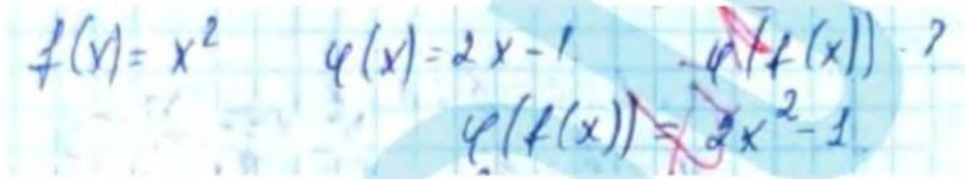


Javob: (-1; -2) (1; -2)

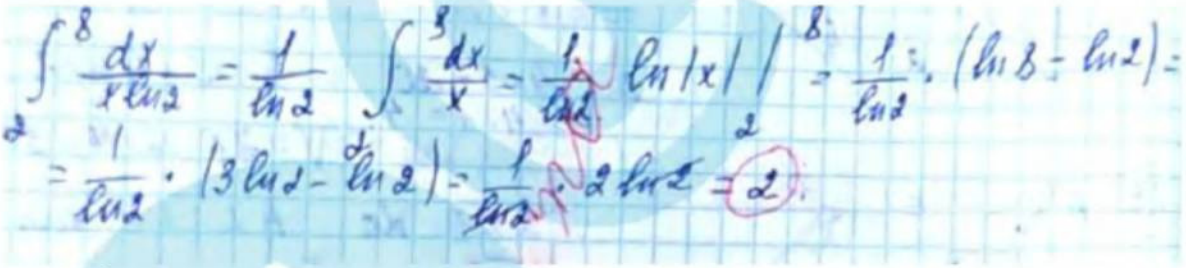
4. $\frac{x^2(x-1)}{x+3} \geq 0$ tengsizlikni yeching.



5. Agar $f(x) = x^2$ va $\varphi(x) = 2x - 1$ bo‘lsa, $\varphi(f(x))$ ni toping.



6. $\int_2^8 \frac{dx}{x \ln 2}$ integralini hisoblang.



7. Arifmetik progressiyaning to‘rtinchi va oltinchi hadlari mos ravishda 16 va 19 ga teng bo‘lsa, birinchi hadini toping.

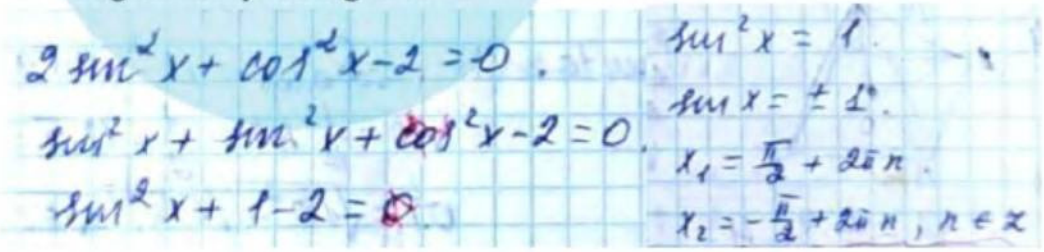
$a_4 = 16$ $\quad a_1 + 3d = 16$ $\quad a_1 = 16 - 3d$

$a_6 = 19$ $\quad a_1 + 5d = 19$ $\quad a_1 = 16 - 3 \cdot 1{,}5 = 11{,}5$

$a_1 = ?$ $\quad 2d = 3$

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

8. Tenglamani yeching: $2\sin^2 x + \cos^2 x - 2 = 0$



9. Qutida 100 ta lampochka bo‘lib, ularning 10 tasi yaroqsiz. Tavakkaliga 4 ta lampochka olinganda, ulardan 2 tasi yaroqsiz bo‘lish ehtimolligini toping.

$100-10=90$

$P(A)=\frac{C_{90}^{2}\cdot C_{10}^{2}}{C_{100}^{4}}=\frac{90!\cdot 10!\cdot 4!\cdot 96!}{88!\cdot 2!\cdot 8!\cdot 2!\cdot 100!}=\frac{180225}{3921225}=0,4596$

$\approx P(A)\approx 0,46$

10. Uchlari A (–2; 4) va B (8; –1) nuqtada bo‘lgan AB kesmani P nuqta 3 : 2 nisbatda ajratadi.

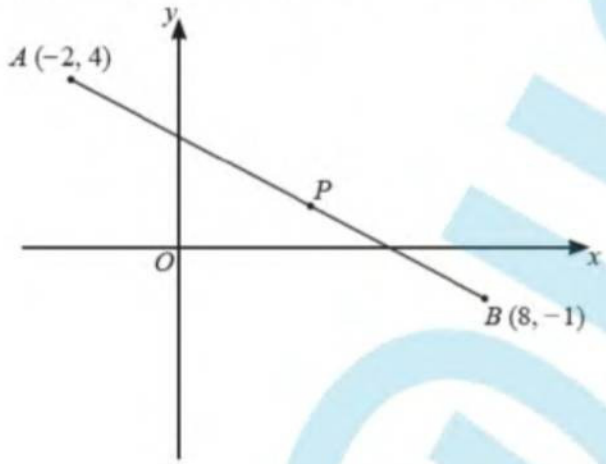
a) P nuqtaning koordinatalari (4; 1) ekanligini ko‘rsating.

b) AB ga perpendikulyar va P orqali o‘tuvchi L to‘g‘ri chiziq tenglamasini toping.

c) $C(6; 5)$ koordinataga ega bo‘lgan C nuqta L chiziqda yotishini ko‘rsating.

d) Chizmada AB masofa nimaga teng?

e) ABC uchburchak yuzini hisoblang.



A) (-2; 4) B(8; -1) AD: PB = 3:2

a) $\frac{AD}{PB}=\frac{3}{2}$ $\frac{x-(-2)}{8-x}=\frac{3}{2}$ $2x + 4 = 24 - 3x$

$5x = 20$

$x = 4$

$\frac{y-4}{-1-y}=\frac{3}{2}$ $2y - 8 = -3 - 3y$ $5y = 5$ $y=1$ Demak D(4,1)

B) AB(10; -5) P(4,1) D(x; y)

PD (x-4; y-1) $AB \cdot PD = 0$ $10(x-4) - 5(y-1) = 0$

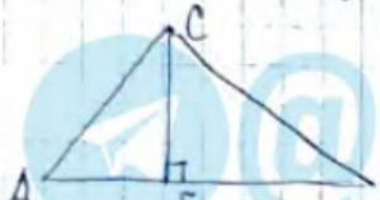
$2x - 8 - y + 1 = 0$ $y = 2x - 7$

C) $2 : y = 2x - 7$ c(6; 5) $5 = 2 \cdot 6 - 7$ $5 = 5$

D) $|AB| = \sqrt{(8+2)^2 + (-1-4)^2} = \sqrt{125} = 5\sqrt{5}$

E) A(-2; 4) B(8; -1) C(6;5)

$\frac{x+2}{-2-8} = \frac{y-4}{4-(-1)}$ $\quad y-4 = \frac{x+2}{2}$ $\quad y = -\frac{1}{2}x+3$.



$CE: y = 2x-7$. $\quad 2x-7 = -\frac{1}{2}x+3$

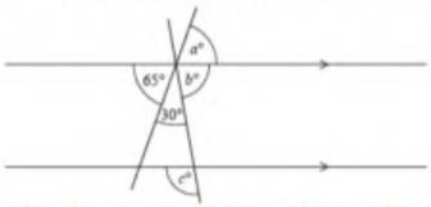
$AB \quad y = -\frac{1}{2}x+3$ $\quad \frac{5x}{2} = 10$

$x=4 \quad y=3$.

$|CE| = \sqrt{2^2+4^2} = \sqrt{20} = 2\sqrt{5}$. $\quad AB = 5\sqrt{5}$. $\quad E(4;3)$.

$S_{ABC} = \frac{1}{2} \cdot 2\sqrt{5} \cdot 5\sqrt{5} = 25$ $\quad$ **S = 25 (kv. birlik)**

11. Gorizontal to‘g‘ri chiziqlar o‘zaro parallel bo‘lsa, noma’lum *a*, *b*, *c* burchaklar qiymatini toping.

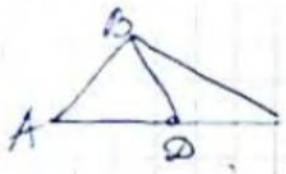


$\angle a, \angle b, \angle c = ?$

$\angle b = 180^\circ - (65^\circ + 30^\circ) = 85^\circ$

$\angle a = 65^\circ$ $\quad \angle c = 65^\circ + 30^\circ = 95^\circ$ $\quad$ J: 65°, 85°, 95°

12. Tomonlari 11, 12 va 13 ga teng bo‘lgan uchburchakning katta tomoniga tushirilgan mediana uzunligini toping.



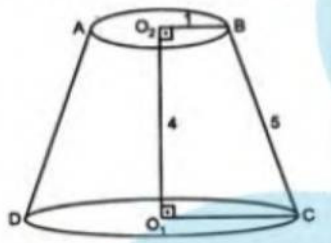
$AB = 11$.
$BC = 12$.
$AC = 13$.
$m_{AC} - ?$

$m_{AC} = \frac{1}{2}\sqrt{2(11^2+12^2)-13^2} =$

$= \frac{1}{2}\sqrt{2(121+144)-169} =$

$= \frac{1}{2}\sqrt{530-169} = \frac{1}{2}\sqrt{361} = \frac{19}{2} = 9.5$

13. Kesik konusning hajmini toping.



$O_2B = 1$
$O_1O_2 = 4$
$BC = 5$
$V_{kk} - ?$

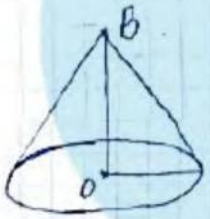
$EC = \sqrt{5^2-4^2} = \sqrt{9} = 3$

$O_1E = 1 \quad O_1C = 3+1 = 4$

$V = \frac{1}{3}\pi \cdot H(R_1^2 + R_1 + R_2 + R_2^2)$

$V = \frac{1}{3}\pi \cdot 4 \cdot (1^2 + 1 \cdot 4 + 4^2) = \frac{4}{3}\pi \cdot 21 = 28\pi$ (kub birlik)

14. Konus asosining radiusi 2 ga teng. Uning yasovchisi asos tekisligi bilan 60₀ li burchak tashkil qiladi. Shu konusning hajmini toping.



$OA = 2$.
$\angle BAO = 60^\circ$.
$V - ?$

$\angle OBA = 90^\circ - 60^\circ = 30^\circ$

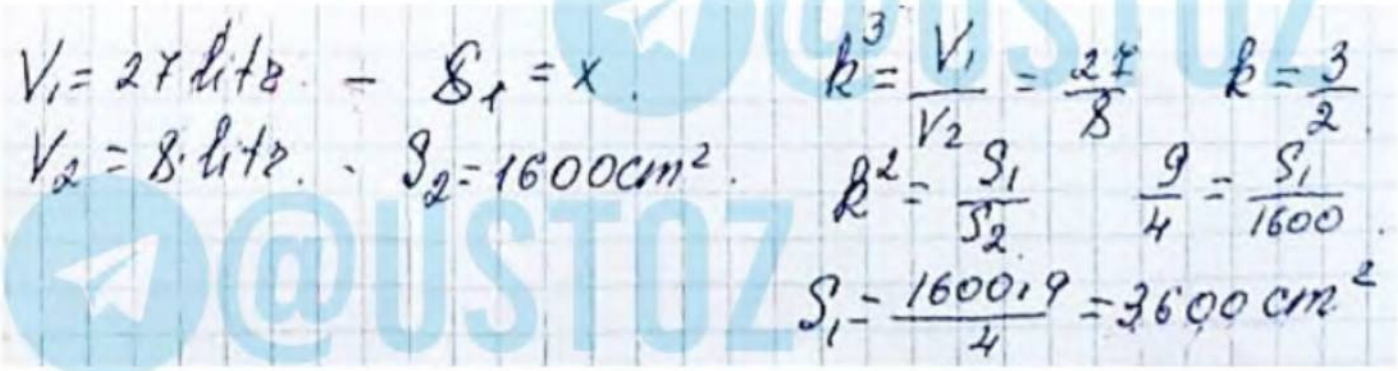
ΔAOB dan. $\quad AB = 2 \cdot OA$

$AB = 2 \cdot 2 = 4$.

$OB = \sqrt{4^2-2^2} = \sqrt{12} = 2\sqrt{3}$

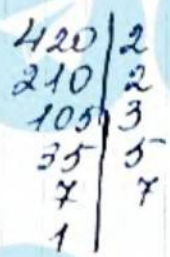
$V = \frac{1}{3}\pi R^2 H = \frac{1}{3}\pi \cdot 2^2 \cdot 2\sqrt{3} = \frac{8\sqrt{3}}{3}$ (kub birlik)

15. O‘xshash ikkita konteyner 27 litr va 8 litr hajmga ega. Kichikroq idishning sirt yuzi 1600 cm^2 ni tashkil qilsa, kattaroq idishning sirt yuzini toping.



3-VARIANT

1. 420 va 156 ning umumiy bo‘luvchilari nechta?



$420 = 2^2 \cdot 3 \cdot 5 \cdot 7$. $EKUB(420;156) = 2^2 \cdot 3 = 12$.

$156 = 2^2 \cdot 3 \cdot 13$ $UB = (2+1)(1+1) = 6$.

UB: 1, 2, 3, 4, 6, 12 (6 ta)

2. $100^2 - 97^2 + 96^2 - 93^2 + 92^2 - 89^2 + \ldots + 4^2 - 1$ ni hisoblang.

$100^2 - 97^2 + 96^2 - 93^2 + 92^2 - 89^2 + \ldots + 4^2 - 1 =$

$(100-97)(100+97) + (96-93)(96+93) + (92-89)(92+89) +$

$+ \ldots + (4-1)(4+1) = 3 \cdot 197 + 3 \cdot 189 + 3 \cdot 181 + 3 \cdot 173 + \ldots + 3 \cdot 5 =$

$= 3(197 + 189 + 181 + 173 + \ldots + 5) = 3 \cdot \frac{197+5}{2} \cdot 25 = 7575$

3. $x^2+rx+6=0$ tenglama ildizlari ayirmasining kvadrati 40 ga teng. r ning qiymatini toping.

$x^2 + rx + 6 = 0$

$(x_1 - x_2)^2 = 40$

$r - ?$

$\begin{cases} (x_1 - x_2)^2 = 40 \\ x_1 \cdot x_2 = 6 \end{cases} \Rightarrow \begin{cases} x_1 - x_2 = \sqrt{40} \\ x_1 \cdot x_2 = 6 \end{cases} \Rightarrow x_1 = \sqrt{40} + x_2$

$(\sqrt{40} + x_2) \cdot x_2 = 6$. $x_2 = t$. $t^2 + \sqrt{40}t - 6 = 0$.

$D = 40 + 4 \cdot 6 = 64$ $t_1 = \frac{-2\sqrt{5} + 8}{2} = -\sqrt{5} + 4$ $t_2 = \sqrt{5} - 4$

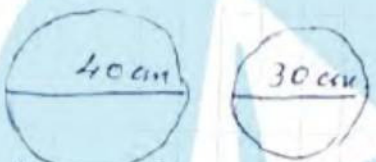
$x_2 = -\sqrt{5} \pm 4$. $x_1 = 2\sqrt{5} - \sqrt{5} \pm 4 = \sqrt{5} \pm 4$.

$r_1 = -(\sqrt{5} + 4 - \sqrt{5} + 4) = -8$ $r_2 = -(\sqrt{5} - 4 - \sqrt{5} - 4) = 8$.

4. Ikkita musbat sonning o‘rta arifmetigi 7,5. Ularning o‘rta geometrigi esa o‘rta arifmetigining 80% iga teng. Shu sonlarni toping.

$\begin{cases} \frac{a+b}{2} = 7,5 \\ \sqrt{ab} = 7,5 \cdot 0,8 \\ a, b \in \text{musbat sonlar to‘plami} \end{cases} \Rightarrow \begin{cases} a+b = 15 \\ \sqrt{ab} = 6 \end{cases} \Rightarrow \begin{cases} a+b = 15 \\ ab = 36 \end{cases} \Rightarrow$ $a = 3$ $b = 12$ yoki $a = 12$ $b = 3$.

5. Pitsaxonada qalinligi bir xil bo‘lgan, turli o‘lchamli doira shaklidagi ikki xil pitsa tayyorlanadi. Kichik pitsaning diametri 30 cm bo‘lib, uning narxi 30 000 so‘m. Katta pitsaning diametri 40 cm bo‘lib, uning narxi 40 000 so‘m. Qaysi pitsaning narxi puliga ko‘proq arziydi? Mulohazalaringizni yozing.



40000 so‘m 30000 so‘m

$d_1 = 40$ cm. $r_1 = 20$ $S_1 = 400\pi \approx 1256$.

$d_2 = 30$ cm. $r_2 = 15$. $S_2 = 225\pi \approx 706,5$.

$S = \pi r^2$. $\frac{40000}{1256} \approx 31,84$ so‘m.

$\frac{30000}{706,5} \approx 42,46$.

Bundan xaridorga katta pitsa arzon tushadi. Pitsaxona esa kichik pitsadan ko‘p foyda ko‘radi.

6. $tg555^o$ ni hisoblang.

$tg\,555^\circ = tg(540^\circ + 15^\circ) = tg\,15^\circ = tg(60^\circ - 45^\circ) =$

$= \frac{tg\,60^\circ - tg\,45^\circ}{1 + tg\,60^\circ \cdot tg\,45^\circ} = \frac{\sqrt{3}-1}{1+\sqrt{3}} = \frac{-1+\sqrt{3}}{1+\sqrt{3}} = \frac{1-2\sqrt{3}+3}{3-1} =$

$= \frac{4-2\sqrt{3}}{2} = 2-\sqrt{3}$

7. Absissasi $x_0=0$ bo'lgan nuqtadan $y=x^3$ funksiyaning grafigiga o'tkazilgan urinmaning tenglamasini ko'rsating.

$x_0 = 0$ nuqtadan $y = x^3$ funksiya grafigiga o'tkazilgan urinma tenglamasini ko'rsating.

$y(0) = 0^3 = 0 \quad y' = 3x^2 \quad y'(0) = 0.$ (Javob: $y=0$ urinma emas kesuvchi bo'ladi)

$y = f(x_0) + f'(x_0)(x - x_0)$ dan $y = 0 + 0 \cdot (x-0) \quad y = 0.$

8. $\int_0^{\pi} \cos^4 5x\,dx$ ni hisoblang.

$$\int_0^{\pi} \cos^4 5x\,dx = \int_0^{\pi} (\cos^2 5x)^2 dx = \int_0^{\pi} \left(\frac{1+\cos 10x}{2}\right)^2 dx =$$

$$= \int_0^{\pi} \frac{1+2\cos 10x + \cos^2 10x}{4} dx = \int_0^{\pi} \left(\frac{1}{4} + \frac{1}{2}\cos 10x + \frac{1}{4}\cos^2 10x\right) dx =$$

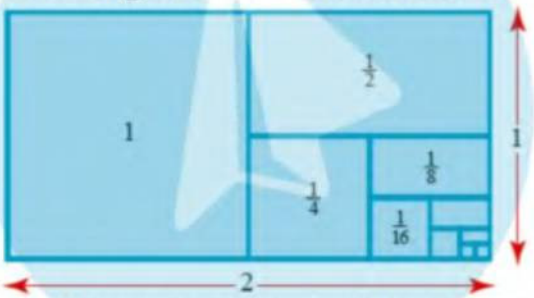
$$= \int_0^{\pi} \left(\frac{1}{4} + \frac{1}{2}\cos 10x + \frac{1}{4} \cdot \frac{1+\cos 20x}{2}\right) dx = \int_0^{\pi} \left(\frac{1}{4} + \frac{1}{2}\cos 10x + \frac{1}{8} + \frac{1}{8}\cos 20x\right) dx$$

$$= \left(\frac{1}{4}x + \frac{1}{20}\sin 10x + \frac{1}{8}x + \frac{1}{160}\sin 20x\right)\Big|_0^{\pi} = \left(\frac{\pi}{4} + \frac{1}{20}\sin 10\pi + \frac{\pi}{8} + \right.$$

$$\left. + \frac{1}{160}\sin 20\pi\right) - \left(\frac{1}{4}\cdot 0 + \frac{1}{2}\sin 0 + \frac{1}{8}\cdot 0 + \frac{1}{160}\cdot \sin 0\right) = \left(\frac{\pi}{4} + 0 + \frac{\pi}{8} + 0\right) - (0 +$$

$$+ 0 + 0 + 0) = \frac{\pi}{4} + \frac{\pi}{8} = \frac{3\pi}{8}. \qquad \text{Javob: } \frac{3\pi}{8}.$$

9. Berilgan rasmni matematik modellashtiring.



$S = 1,2 = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots \quad q = \frac{1}{2}.$

$S = \frac{1}{1-\frac{1}{2}} = 2. \quad S_n = \frac{b_1}{1-q}.$ mat b model

10. Maxsus topshiriqni telefon orqali xabardor qilish uchun firma rahbari ikki yordamchisini chaqirdi. Bu ikki yordamchining har biri yana ikkitasini chaqirdi. Bu jarayon rasmda ko'rsatilgandek amalga oshiriladi.

a) Dastlabki 4 bosqichda qancha odam chaqirilishini ko'rsatish uchun rasmni to'ldiring.

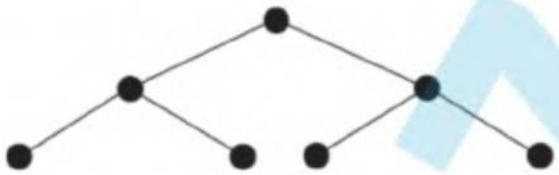
0-bosqich

1-bosqich

2-bosqich

3-bosqich

4-bosqich .....

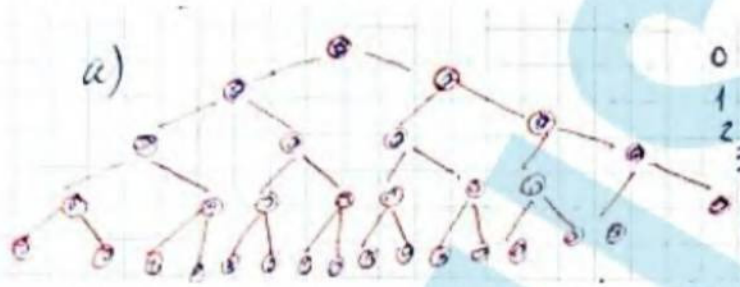


b) Har bir bosqichda qancha telefon qo‘ng‘iroqi amalga oshirilganini ko‘rsatadigan quyidagi jadvalni to‘ldiring:

Bosqichlar	0	1	2	3	4	5	6	7	8
Qo‘ng‘iroqlar	1	2	4						

c) Jadval asosida sakkiz bosqichning har birida qilingan qo‘ng‘iroqlar sonini aks ettiruvchi diagramma tuzing.

d) Jadval asosida masalaning matematik modelini tuzing.



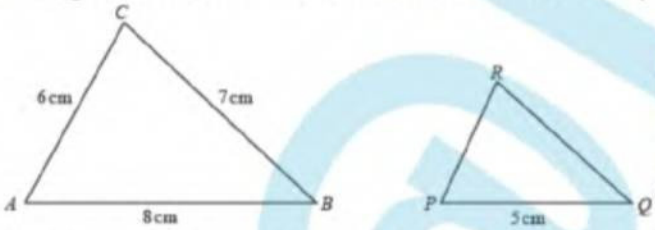
b)

0	1	2	3	4	5	6	7	8
1	2	4	8	16	32	64	128	256

c) diagramma tuzish.

d) $b_n = 2^n$ = odamlar soni

11. PQR uchburchak ABC uchburchakka o‘xshaydi. PR uzunligini toping.



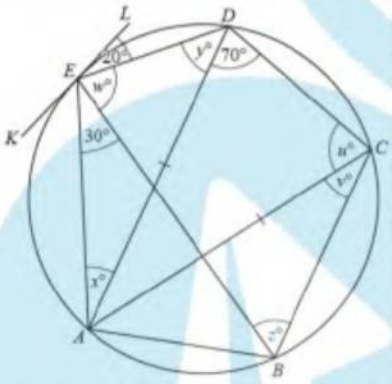
AB = 8 cm
BC = 7 cm
AC = 6 cm
PQ = 5 cm
$\triangle ABC \sim \triangle PQR$
PR - ?

$\frac{5}{8} = \frac{PR}{6}$

$PR = \frac{5 \cdot 6}{8}$ $PR = 3,75$

J: 3,75 cm

12. A, B, C, D va E aylanadagi nuqtalardir. KL chiziq aylananing E nuqtasida urinadi. $AC = AD$ bo‘lsa, u, v, w, x, y va z burchaklar qiymatini toping.



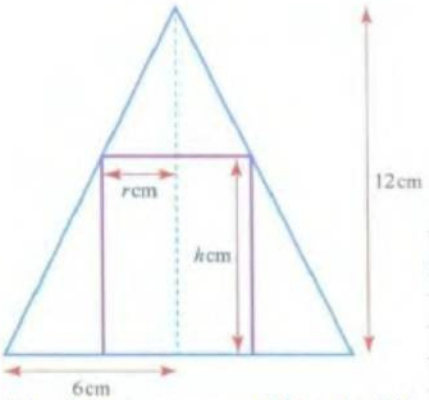
AC = AD
KL - urinma
∠u, v, w, x, y, z - ?

$\triangle DAC$ da AD = AC bundan
$\angle u = 70°$ $\angle DAC = 40°$.
$\angle LED = \angle x° = 20°$
$\angle ACB = \angle AEB$ ga, chunki bitta vatarga tiralgan, demak $v = 30°$.
$30° + \frac{w}{2} = u$ $w = (70 - 30) \cdot 2 = 80°$

$x + 30 + w + y = 180$. $y = 180° - 20° - 30° - 80°$ $y = 50°$.
$z = x + 180° - 70° - u$ $z = 60°$. Vatarga tiralgan burchaklar xossasi bo‘yicha.

Javob: $u = 70°$, $v = 30°$, $w = 80°$, $x = 20°$, $y = 50°$, $z = 60°$

13. Rasmda konus va silindrning o‘q kesimi ko‘rsatilgan. Silindrning hajmini toping.

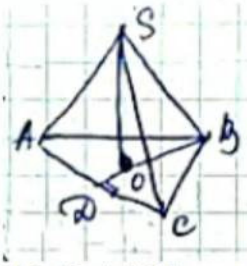


$H_k = OB = 12\ cm$. $R_{kes} = OA = 6\ cm$. $KP = r$. $PO = h$. $\triangle ABC \sim \triangle KBL$. $\frac{12}{6} = \frac{BP}{KP} = 2$. $BP = 2r = h$.

$V_f - ?$ $V_{silindr} = \pi R^2 H = \pi r^2 (12 - 2r) =$

$= 2\pi R^2 (6 - r)$

14. Muntazam uchburchakli piramidaning yon qirrasi 10 ga, asosining tomoni 12 ga teng. Piramidaning balandligini toping.



ABC - muntazam. $SA = 10$. $AB = 12$. $SO - ?$

$BD = \sqrt{12^2 - 6^2} = \sqrt{144 - 36} = \sqrt{108} = 6\sqrt{3}$

$OB = R_{t.a} = \frac{2}{3} \cdot 6\sqrt{3} = 4\sqrt{3}$.

$SO = \sqrt{10^2 - (4\sqrt{3})^2} = \sqrt{52} = 2\sqrt{13}$

15. Bo‘yi 35 cm va eni 25 cm bo‘lgan to‘g‘ri burchakli parallelepiped shaklidagi idishga toshni suvga solindan keyin suv sathining balandligi 10 cm ga yetdi. Toshni suvdan olgandan so‘ng suv sathi 8 cm ga tushdi. Toshning hajmini toping.

$AB = 35\ cm$.
$BC = 25\ cm$.
$H_1 = 10\ cm$.
$H_2 = 8\ cm$.
$V_{tosh} - ?$

$V_{tosh} = 35 \cdot 25 \cdot 10 - 35 \cdot 25 \cdot 8 =$

$= 35 \cdot 25 \cdot (10 - 8) = 875 \cdot 2 = 1750\ cm^3$

4-VARIANT

1. 3602,1 sonini standart shaklda yozing.

Javob: $3602{,}1 = 3{,}6 \cdot 10^3$

2. $\dfrac{0{,}8(3)-0{,}4(6)}{0{,}(3)}$ ni hisoblang.

$$\frac{0,8(3)-0,4(6)}{0,(3)} = \frac{\frac{83-8}{90}-\frac{46-4}{90}}{\frac{3}{9}} = \frac{\frac{75-42}{90}}{\frac{3}{9}} = \frac{33}{30} = \frac{11}{10} = 1,1.$$

3. U = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}; A = {2, 3, 4, 5}; B = {7, 8, 9, 10} berilgan.

a) $A \cup B$; $A \cap B$ larni toping.

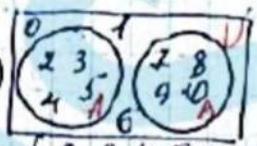
b) $n(A)$ va A^1 ni toping.

c) Ushbu ma'lumotni ko'rsatish uchun Venn diagrammasini chizing.

$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{2, 3, 4, 5\}$

$B = \{7, 8, 9, 10\}$



a) $A \cup B = \{2, 3, 4, 5, 7, 8, 9, 10\}$.

$A \cap B = \{\emptyset\}$

b) $n(A) = 4$.

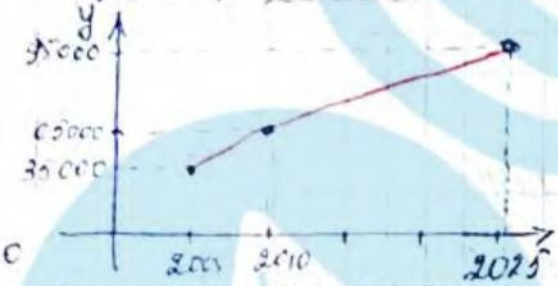
$A^1 = \{0, 1, 6, 7, 8, 9, 10\}$

4. 2005-yilda Zarafshon shahri aholisi 55 000 ga yaqin edi. O'sha paytda aholi soni yiliga 2000 ga yaqin sur'atda o'sib borardi. Har qanday yil uchun Zarafshon aholisini topish zarur. Buning uchun uning chiziqli modelini tuzing. 2010-yili Zarafshon aholisi qancha bo'lgan? Zarafshon aholisi soni 2025-yili qancha bo'lishini hisoblang. Grafikda modelini yasang.

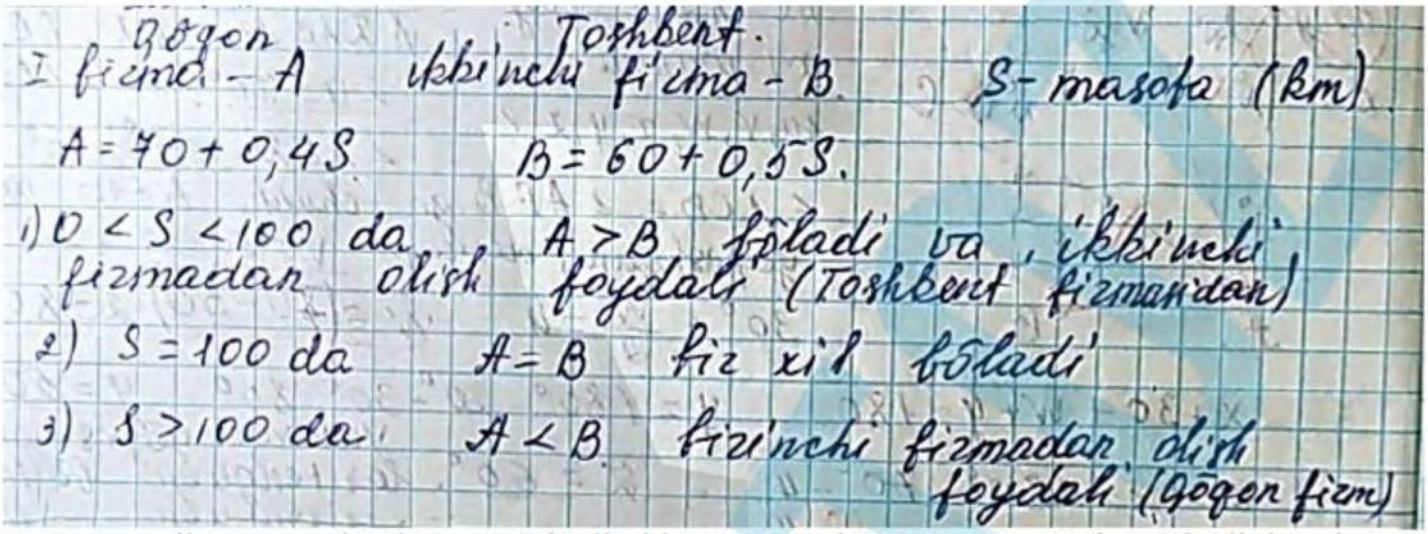
2005 yil - 55000 ta. $d = 2000$.

$a_1 = 55000$ $\quad 2010 - 2005 = 5$. $\quad a_5 = a_1 + 2000 \cdot 5 = 65000$.

$f(2010) = 65000$ ta $\quad f(2025) = 55000 + 2000 \cdot 20 = 95000$ ta

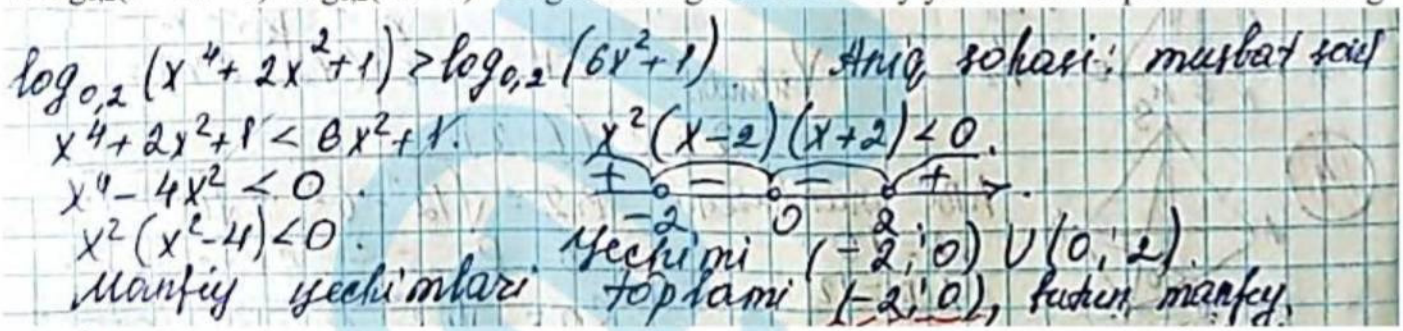


5. Qo'qon avtomobil ijarasi firmasi avtomobilni kuniga 70 so'm va har kilometrga 40 tiyindan ijaraga beradi. Toshkent avtomobil ijara firmasi kuniga 60 so'm va har kilometrni 50 tiyindan ijaraga beradi. Siz mashinani bir kunga qaysi firmadan ijaraga olishni tavsiya etasiz? Javobingizni asoslab ko'rsating.

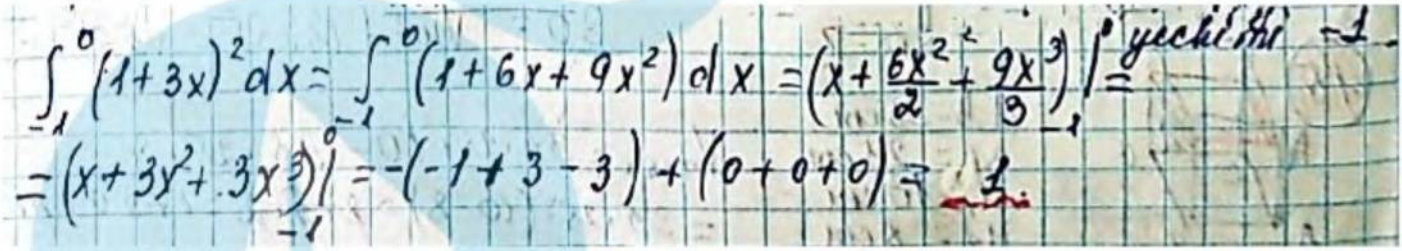


6. Geometrik progressiyada 3- va 7-hadlari ko‘paytmasi 144 ga teng. Uning 5-hadini toping.

7. $\log_{0,2}(x^4+2x^2+1) > \log_{0,2}(6x^2+1)$ tengsizlikning barcha manfiy yechimlari to‘plamini ko‘rsating.

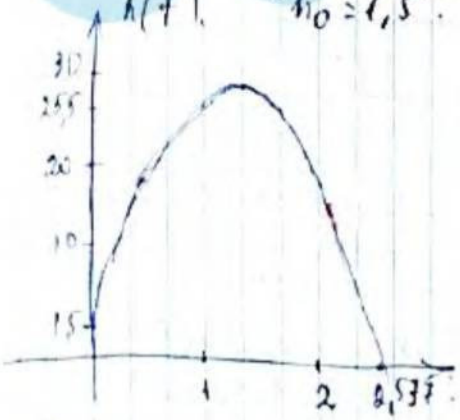


8. $\int_{-1}^{0} (1+3x)^2\,dx$ ni hisoblang.



9. To‘p (koptok) havoga 40 m/s tezlik bilan otildi. Har qanday vaqtda otilgan to‘pning balandligi $h(t) = -16t^2 + 40t + 1{,}5$ tenglama bilan ifodalandi. To‘p yerga qancha vaqtda kelib tushadi? Masalani grafikda modellashtiring.

$v_0 = 40$ m/s.
$h(t) = -16t^2 + 40t + 1{,}5$
$t - ?$ $g = 32$ m/s^2.
$h(t)$. $h_0 = 1{,}5$.



$t = \frac{v_0}{g} = \frac{40}{32} = 1{,}25$ sek.

$h_{max} = -16 \cdot \frac{25}{16} + 40 \cdot \frac{5}{4} + 1{,}5 = 26.5$

1-usul. $h(t) = -16t^2 + 40t + 1{,}5$

$t_1 = 1$ $h(1) = -16 + 40 + 1{,}5 = 25{,}5$ m.

$t_2 = 1{,}25$ $h(1{,}25) = -16 \cdot \frac{25}{16} + 40 \cdot \frac{5}{4} + 1{,}5 = 26{,}5$

$t_3 = 1{,}5$ $h(1{,}5) = -16 \cdot \frac{9}{4} + 40 \cdot \frac{3}{2} + 1{,}5 = 25{,}5$.

$t_4 = 2{,}5$ $h(2{,}5) = -16 \cdot \frac{25}{4} + 40 \cdot \frac{5}{2} + 1{,}5 = 1{,}5$

$t_5 - ?$ yerga tushganda balandligi nolga teng bo'ladi, bundan $h = 0$.

$h = 0$ $-16t^2 + 40t + 1{,}5 = 0$. $2t^2 - 5t + \frac{3}{16} = 0$.

$D = 25 + 8 \cdot \frac{3}{16} = 26{,}5$. $t = \frac{5 + \sqrt{26{,}5}}{2 \cdot 2} \approx 2{,}537$ sek.

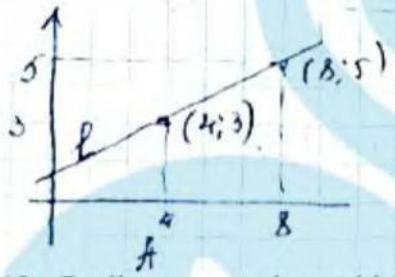
10. Agar $f(x) = \frac{x^2 - x}{x + 2}$ bo'lsa, $f'(2)$ ning qiymatini toping.

$f(x) = \frac{x^2 - x}{x+2}$ $f'(2) - ?$

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

$f(2) = \frac{2^2 + 4 \cdot 2 - 2}{(2+2)^2} = \frac{10}{16} = \frac{5}{8}$.

11. Rasmda L to'g'ri chiziq va chiziqdagi ikkita nuqtaning koordinatalari ko'rsatilgan. L chiziq tenglamasi $2y - x = 2$ ekanligini ko'rsating.



$y = kx + b$. $\begin{cases} 4k + b = 3 \\ 8k + b = 5 \end{cases}$

$4k = 2$.

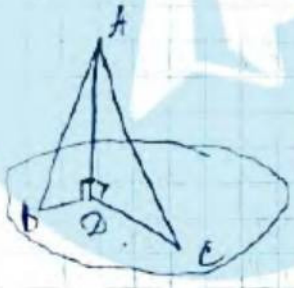
$k = \frac{1}{2}$.

$b = 3 - 4k = 3 - 2 = 1$.

$y = \frac{1}{2}x + 1$. $(\cdot 2)$.

$2y - x = 2$. #

12. Berilgan nuqtadan tekislikka uzunliklari 13 va 37 cm bo'lgan ikkita og'ma o'tkazilgan. Og'malarning tekislikdagi proyeksiyalari nisbati 1:7 kabi bo'lsa, tekislikdan berilgan nuqtagacha bo'lgan masofani toping.



$AB = 13$.
$AC = 37$.
$BD : DC = 1 : 7$.
$AD - ?$

$AD^2 = AB^2 - BD^2$ $AD^2 = AC^2 - DC^2$.

$13^2 - x^2 = 37^2 - (7x)^2$.

$169 - x^2 = 1369 - 49x^2$.

$48x^2 = 1200$

$x^2 = 25$

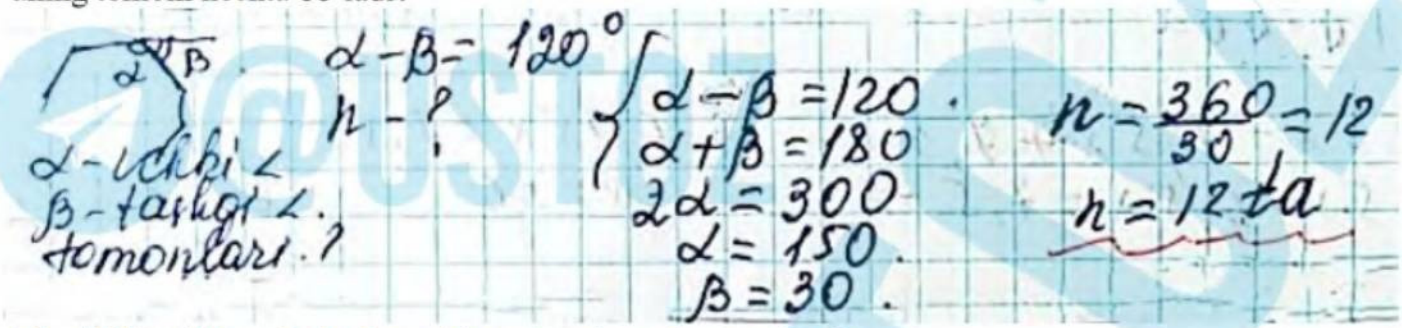
$x = 5$.

$AD = \sqrt{169 - 25}$.

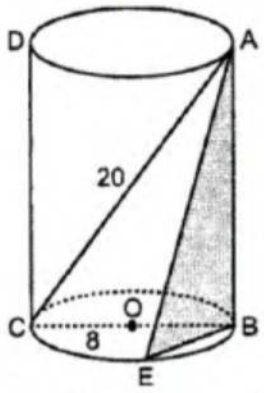
$AD = \sqrt{144}$

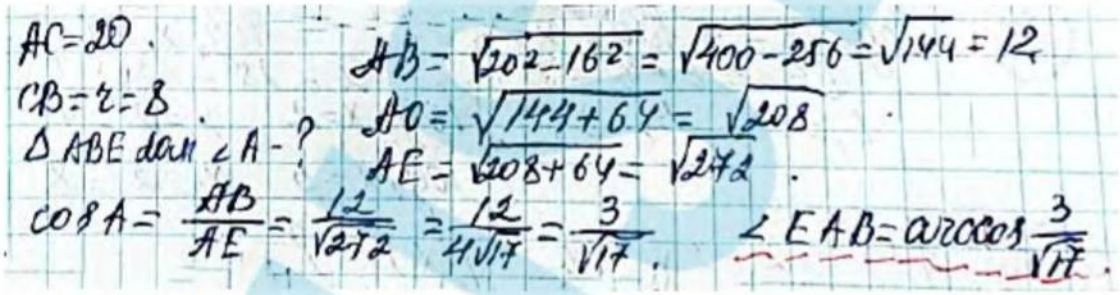
$AD = 12$

13. Muntazam ko‘pburchakning uchidagi ichki va bitta tashqi burchagi ayirmasi 120^0 ga teng bo‘lsa, uning tomoni nechta bo‘ladi?

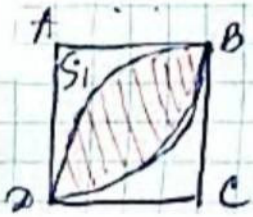


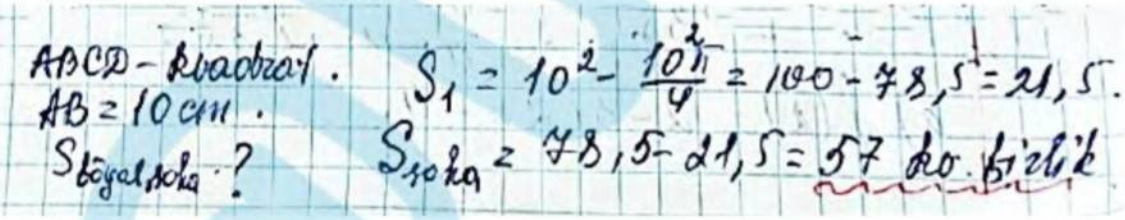
14. *ABE* uchburchakning *A* burchagi necha gradus?





15. Kvadratdagi bo‘yalgan soha yuzini toping.





5-VARIANT

1. n ning qanday qiymatlarida $\frac{6n-12}{n}$ ifoda qiymati natural son bo‘ladi?

2. Ikki sonning yig‘indisi 51 ga, ayirmasi esa 21 ga teng. Shu sonlarni toping.

(2) $\begin{cases} a+b=51 \ (*) \\ a-b=21 \ (**) \end{cases} \rightarrow (*)+(**) \rightarrow 2a=72$

$a=36.$

Ifodalarni a ga $(*)$ ga $\rightarrow 36+b=51 \rightarrow b=15.$

Javob: $a=36;\ b=15.$

3. $y=\sqrt{x}$, $y=0$ va $x=4$ chiziqlar bilan chegaralangan figuraning yuzini hisoblang.

(3) $y_1=\sqrt{x}$, $y_2=0$, $x=4$. $S-?$

$S=\int_a^b y_1-y_2\,dx$, bunda a, b *integratsiya chegaralari*

$a \rightarrow y_1=y_2 \rightarrow \sqrt{x}=0 \rightarrow x=0$

$b \rightarrow x=4.$

$S=\int_0^4 \sqrt{x}-0\,dx=\int_0^4 \sqrt{x}\,dx=\frac{2x\sqrt{x}}{3}\Big|_0^4=\frac{2}{3}\cdot 4\cdot 2-0=\frac{16}{3}$

Javob: $S=5\frac{1}{3}.$

4. $x^3-3x^2-4x+12=0$ tenglamaning ildizlari ko‘paytmasini toping.

(4) $x^3-3x^2-4x+12=0 \ (*)$

Agar $(*)$ uchta yechimga ega bo‘lsa, u holda $(*)=a(x-x_1)(x-x_2)(x-x_3)$ $(a=1)$.

$(*)=x^3-(x_1+x_2+x_3)x^2+(x_1x_2+x_2x_3+x_1x_3)x-x_1x_2x_3 \rightarrow$

$\rightarrow -x_1x_2x_3=12 \rightarrow x_1x_2x_3=-12.$

Javob: $-12.$

5. $\sqrt{11-4\sqrt{7}}$ ni soddalashtiring.

(5). $\sqrt{11-4\sqrt{7}}=\sqrt{(\sqrt{7})^2-2\cdot\sqrt{4}\cdot\sqrt{7}+(\sqrt{4})^2}=\sqrt{(\sqrt{7}-\sqrt{4})^2}=$

$=|\sqrt{7}-2|=\sqrt{7}-2.$

Javob: $\sqrt{7}-2.$

6. $a(b-c)+b(c-a)-c(b-a)$ ni soddalashtiring.

(6). $a(b-c)+b(c-a)-c(b-a)$

$ab-ac+bc-ab-bc+ac=0$.

Javob: 0.

7. $4^x-5\cdot2^x+3=0$ tenglama ildizlarining yig'indisini toping.

(7). $4^x-5\cdot2^x+3=0 \to 2^{2x}-5\cdot2^x+3=0$ *Deylik* $2^x=t$

$t^2-5t+3=0 \to \begin{cases} t_1+t_2=5 \\ t_1\cdot t_2=3 \end{cases} \to \begin{cases} 2^{x_1}+2^{x_2}=5 \\ 2^{x_1}\cdot 2^{x_2}=3 \end{cases}$

$2^{x_1}\cdot 2^{x_2}=2^{x_1+x_2}=3 \to x_1+x_2=\log_2 3$.

Javob: $x_1+x_2=\log_2 3$

8. Velosipedchi bir soatda butun yo'lning 0,65 qismini bosib o'tdi, bu esa yo'lning yarmidan 7,5 km ko'p. Butun yo'lning uzunligini toping.

(8). $0,65\ell=0,5\ell+7,5$

$0,15\ell=7,5$

$\ell=50$ (km).

Javob: $\ell=50$ km.

9. $\log_2^2 x-5\log_2 x+6=0$ tenglamani yeching va ildizlari ko'paytmasini toping.

(9). $\log_2^2 x-5\log_2 x+6=0$ *Deylik* $\log_2 x=t$.

$t^2-5t+6=0$.

Vyeta teoremasiga ko'ra: $\begin{cases} t_1+t_2=5 \\ t_1\cdot t_2=6 \end{cases}$

$(t-3)(t-2)=0 \to t_1=3;\ t_2=2$.

$\begin{bmatrix} \log_2 x=3 \\ \log_2 x=2 \end{bmatrix} \to \begin{bmatrix} x=8 \\ x=4 \end{bmatrix}$

Javob: $x=8;\ x=4$.

10. $f(x)=2-3x$, va $g(x)=\dfrac{5}{2-3x}$ funksiyalar berilgan.

a) $f(2)$ ni toping.

b) $g(x)=4$ bo'lsa, x ning qiymatini toping.

c) $f^{-1}(x)$ va $g^{-1}(x)$ ni toping.

d) $g(f(x))$ ni toping.

e) $f(x)$ va $g(x)$ funksiyalarning hosilasi hamda boshlang'ich funksiyalarini toping.

(10). $f(x) = 2 - 3x$; $g(x) = \frac{5}{2-3x}$.

a) $f(2) = 2 - 3 \cdot 2 = 2 - 6 = -4$.

b). $x - ?$; $g(x) = 4$ (O.D.Z. $x \neq \frac{2}{3}$).

$\frac{5}{2-3x} = 4 \rightarrow 8 - 12x = 5 \rightarrow 12x = 3 \rightarrow x = \frac{1}{4}$.

c) $f^{-1}(x)$: $x = 2 - 3f^{-1}(x) \rightarrow f^{-1}(x) = \frac{2-x}{3}$.

$g^{-1}(x)$: $x = \frac{5}{2-3g^{-1}(x)} \rightarrow \frac{2-3g^{-1}(x)}{5} = \frac{1}{x} \rightarrow$

$\rightarrow 2 - 3g^{-1}(x) = \frac{5}{x} \rightarrow g^{-1}(x) = \frac{2x-5}{3x}$.

d) $g(f(x)) = \frac{5}{2-3f(x)} \rightarrow g(f(x)) = \frac{5}{2-3(2-3x)}$

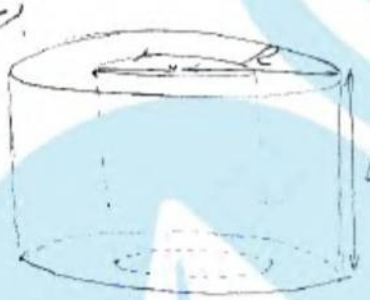
$g(f(x)) = \frac{5}{9x-4}$.

11. Qog‘ozli qo‘l sochiq radiusi 6 cm va balandligi 10 cm bo‘lgan o‘ram shaklida. Uning radiusi 2 cm bo‘lgan ichi bo‘sh silindrsimon qism mavjud.

a) Qog‘oz o‘rami hajmini hisoblang.

b) O‘zbekistonda 35 million kishi bor. Bir yil davomida har bir kishi o‘rtacha 23,6 dona qog‘oz o‘ramidan foydalansa, 1 yilda ishlatiladigan qog‘oz o‘ramlarining umumiy sonini hisoblang.

(11).



a) *Berilgan:*

$r = 2$ cm ; $R = 6$ cm ; $l = 10$ cm

Topish $V_t - V_r$.

$V_t = \pi R^2 l$; $V_r = \pi r^2 l$

$V_t - V_r = \pi l (R^2 - r^2) = \pi \cdot 10 (36 - 4) = 320\pi$ (cm^3).

Javob: 320π cm^3.

b) $P = 35 \cdot 10^6$ ta.

$p = 23{,}6$ p/n

Bcero $= P \cdot p = 35 \cdot 23{,}6 \cdot 10^6 = 826 \cdot 10^6$

Hammasi - ? *Javob: 826*

12. Diagonali 10 ga, o‘tkir burchagi 45° ga teng parallelogrammning yuzi nimaga teng?

(12). 

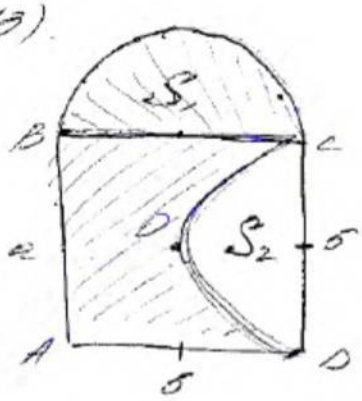
Berilgan ABCD – burchaklar

d – диагональ = 10

$\alpha = 45^\circ$

Topish S

13. Bo‘yalgan soha yuzini toping.

(13). 

Berilgan

ABCD – квадрат

a = 5 см

Topish $S_{штрих}$.

Т.к BC = CD, то полукруги 1 и 2 тоже равны, как и их площади $S_1 = S_2$

$S_{штрих} = a^2 = 25\ (см^2)$

Javob: $S_ш = 25\ см^2$

14. Radiuslari 2; 3 va 4 ga teng bo‘lgan metall sharlar eritilib, bitta shar quyildi. Shu sharning hajmini toping.

Berilgan : шары

$r_1 = 2;\ r_2 = 3;\ r_3 = 4.$

Найти: $V_{об шар}$

Topshiriq

$V = V_1 + V_2 + V_3$

$V = \frac{4}{3}\pi r_1^3 + \frac{4}{3}\pi r_2^3 + \frac{4}{3}\pi r_3^3$

$V = \frac{4}{3}\pi(r_1^3 + r_2^3 + r_3^3) = \frac{4}{3}\pi(8 + 27 + 64)$

Javob: $V = 132\pi\ см^3$ $V = 132\pi\ (см^3)$.

15. *Oyz* tekislikka nisbatan *R*(3; –2; 4) nuqtaga simmetrik bo‘lgan nuqtalarni aniqlang.

(15). R(3; -2; 4)

x_0 y_0 z_0

$O(x_1; y_1; z_1)$ – симмет. отн. Oyz.

Если симметрия отн Oyz, то $O(-x_0; y_0; z_0)$.

O(-3; -2; 4).

Javob: O(-3; -2; 4)