Kordamisülesanded

nr 7

① $\left(\frac{b}{a^2-ab}+\frac{b}{b^2-ab}\right):\frac{a^2-ab^2}{a^2b+ab^2}=\frac{b}{b-a}$

1) $\frac{b}{a(a-b)}+\frac{b}{b(b-a)}=\frac{b^2-ab}{ab(a-b)}=\frac{b(b-a)}{ab(a-b)}=\frac{-1}{a}$

$-b(a-b)$

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

Kui $a=\left|-4\cdot 1\frac{1}{2}\right|=\left|-\frac{4\cdot 3}{2}\right|=|-6|=6$ ja $b=27^{\frac{1}{3}}=\sqrt[3]{27}=3$,

siis $\frac{3}{3-6}=\frac{3}{-3}=-1$

② $\begin{cases}\frac{4x-3}{5}+4\geq 3-\frac{7+x}{2} & |\cdot 10\\ 2(1-x)>-\frac{5x}{3}-5(2-x) & |\cdot 3\end{cases}$

I $8x-6+40\geq 30-35-5x$

$8x+5x\geq 30-35+6-40$

$13x\geq -39\ |:13$

$x\geq -3$

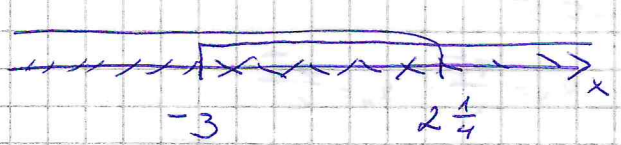
II $6-6x>-5x-30+15x$

$-6x+5x-15x>-30-6$

$-16x>-36\ |:(-16)$

$x<2\frac{4}{16}$

$x<2\frac{1}{4}$



$x\in[-3;\ 2\frac{1}{4})$

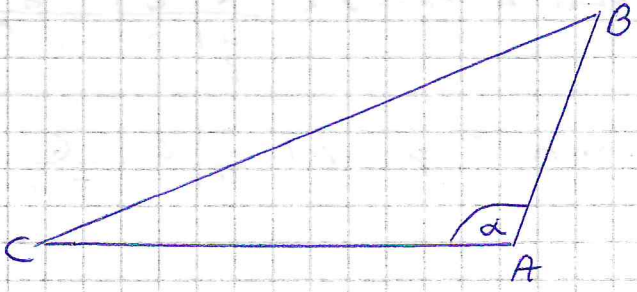
V: Naturaalarvulised lahendid on $0;\ 1;\ 2$

③ $AB=58\text{m}$

$AC=76\text{m}$

$\alpha=100°$

P, S



1) Pindala S.

$$S = \frac{AB \cdot AC \cdot \sin\alpha}{2}$$

$$S = \frac{58 \cdot 76 \cdot \sin 100^\circ}{2} \approx 2171\ m^2$$

2) Külg BC.

$$BC = \sqrt{AB^2 + AC^2 - 2 \cdot AB \cdot AC \cdot \cos\alpha}$$

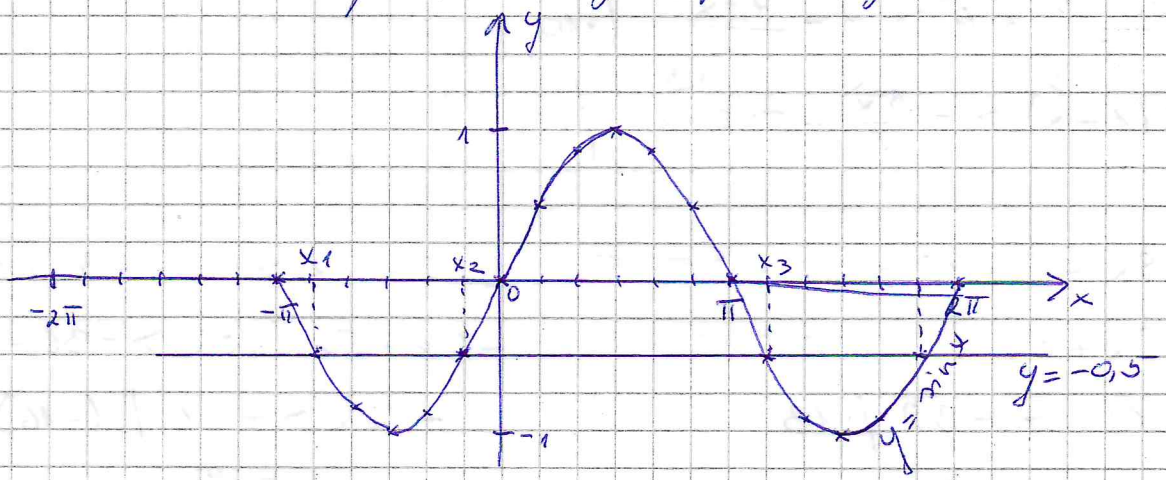
$$BC = \sqrt{58^2 + 76^2 - 2 \cdot 58 \cdot 76 \cdot \cos 100^\circ} \approx 103\ m$$

3) Ümbermõõt P.

$$P = AB + AC + BC$$

$$P = 58 + 76 + 103 \approx 237\ m$$

4) 1) Funktsiooni $f(x) = \sin x$ graafik lõigus $[-\pi; 2\pi]$



2) Võrrandi $\sin x = -0{,}5$ lahendid jooniselt.

Joonestan sirge $y = -0{,}5$

$$x_1 = -\frac{5\pi}{6};\ x_2 = -\frac{\pi}{6};\ x_3 = \frac{7\pi}{6};\ x_4 = \frac{11\pi}{6}$$

5) a) Firma A sõidu maksumus: $y = 3 + 0{,}65x$

Firma B sõidu maksumus: $y = 2 + 0{,}85x$

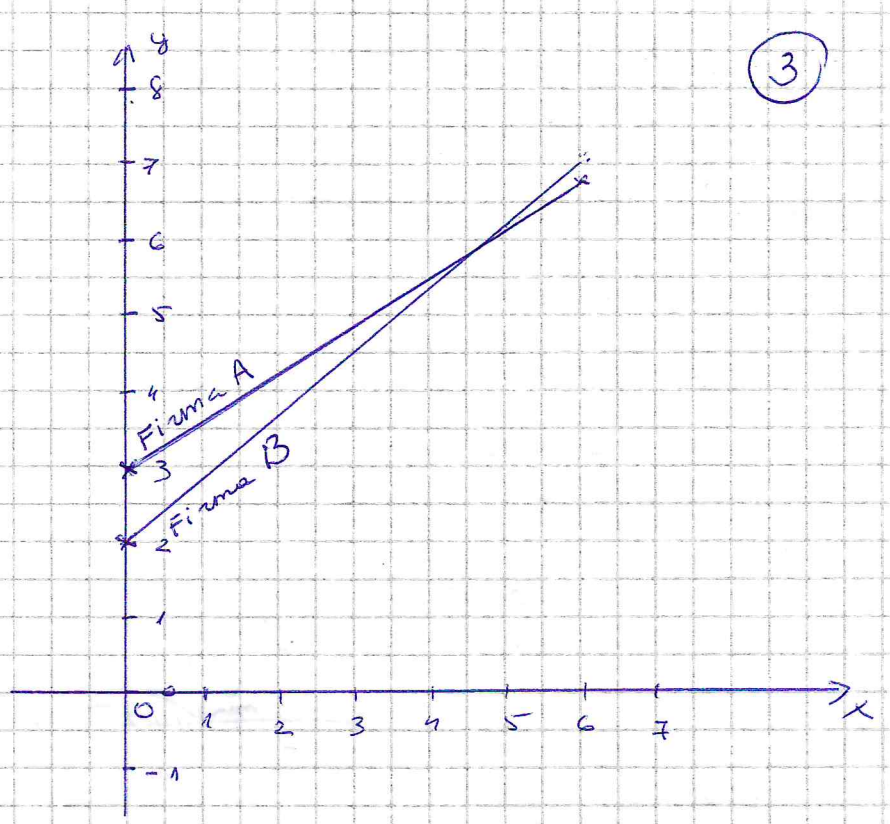
Firma A graafik

x	0	6
y	3	6,9

Firma B graafik

x	0	6
y	2	7,1

(3)



b) Mitu km tuleb sõita, et maksumus oleks sama

$$\begin{cases} y = 3 + 0{,}65x \\ y = 2 + 0{,}85x \end{cases} \Rightarrow 3 + 0{,}65x = 2 + 0{,}85x$$

$$0{,}65x - 0{,}85x = 2 - 3$$

$$-0{,}2x = -1 \quad (:(-0{,}2))$$

$$x = 5$$

Sõita tuleb 5 km

Sõidumaksumus sellisel juhul: $y = 3 + 0{,}65 \cdot 5 = 6{,}25$ eurot

c) Kumb firma valida, kui sõita rohkem kui 6 km.

Jooniselt nähtub, et firma A, sest tema sõidukulud jääb siis madalamaks.

(K.) Firma A:

$x = 7$ km ; $y = 3 + 0{,}65 \cdot 7 = 7{,}55$ eurot

Firma B:

$x = 7$ km $y = 2 + 0{,}85 \cdot 7 = 7{,}95$ eurot

(6) $f(x) = -x^3 + 3x^2 - 7$

a) $f(-2) > f(3)$

$f(-2) = -(-2)^3 + 3 \cdot (-2)^2 - 7 = 21$

$f(3) = -3^3 + 3 \cdot 3^2 - 7 = -7$

$21 > -7 \Rightarrow f(-2) > f(3)$

6) Funktsiooni tuletis:

$y' = -3x^2 + 6x$

c) *Kasvamisvahemik $X\uparrow$; tingimus $y' > 0$

$-3x^2 + 6x > 0$

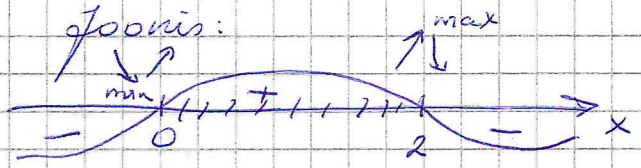
$-3x^2 + 6x = 0 \mid :(-3)$

$x^2 - 2x = 0$

$x(x-2) = 0$

$x_1 = 0$; $x - 2 = 0$, $x_2 = 2$

joonis:



$X\uparrow = (0; 2)$

* Ekstreemumpunktid E

$x_{min} = 0$; $y_{min} = -0^3 + 3 \cdot 0^2 - 7 = -7$

$\Rightarrow E_{min}(0; -7)$

$x_{max} = 2$; $y_{max} = -2^3 + 3 \cdot 2^2 - 7 = -3$

$\Rightarrow E_{max}(2; -3)$

7) a) $a_7 = 4a_2$

$S_8 = 100$

a_8 .

1) a_1, d?

$$\begin{cases} a_7 = 4a_2 \\ S_8 = 100 \end{cases} \quad \begin{cases} a_1 + 6d = 4(a_1 + d) \\ \frac{(2a_1 + 7d) \cdot 8}{2_1} = 100 \end{cases}$$

$$\begin{cases} a_1 + 6d = 4a_1 + 4d \\ 8a_1 + 28d = 100 \mid :4 \end{cases} \quad \begin{cases} -3a_1 + 2d = 0 \\ 2a_1 + 7d = 25 \end{cases}$$

$$D = \begin{vmatrix} -3 & 2 \\ 2 & 7 \end{vmatrix} = -21 - 4 = -25$$

a_1? $a_1 = \frac{D_{a_1}}{D} = \frac{-50}{-25} = 2$

$$D_{a_1} = \begin{vmatrix} 0 & 2 \\ 25 & 7 \end{vmatrix} = 0 - 50 = -50$$

d? $d = \frac{D_d}{D} = \frac{-75}{-25} = 3$

$$D_d = \begin{vmatrix} -3 & 0 \\ 2 & 25 \end{vmatrix} = -75 - 0 = -75$$

$$\begin{cases} a_1 = 2 \\ d = 3 \end{cases}$$

2) Kõige vanema lapselapse vanus a_8:

$a_8 = a_1 + 7d$

$a_8 = 2 + 7 \cdot 3 = 23$ aastat

b) Lastelaste keskmine vanus:

$\frac{100}{8} = 12,5$ aastat

(8) sirge s: $y = \frac{1}{3}x - 2$

a) sirge t võrrand: $t \parallel s \Rightarrow k_1 = k_2 = \frac{1}{3}$, läbi b punkti $T(-3; 7)$

b? $y = kx + b$

$\frac{1}{3} \cdot (-3) + b = 7$

$b = 8$

Võrrand: $y = \frac{1}{3}x + 8$

b) sirge u võrrand: $u \perp t \Rightarrow k_1 \cdot k_2 = -1$

$k_1 = \frac{1}{3} \Rightarrow \frac{1}{3} k_2 = -1 \mid : \frac{1}{3}$ $k_2 = -3$, läbi b punkti $U(2; -5)$

b? $y = kx + b$

$-3 \cdot 2 + b = -5$

$b = 1$

Võrrand: $y = -3x + 1$

c) sirgete t ja u lõikepunkt

$\begin{cases} y = \frac{1}{3}x + 8 \\ y = -3x + 1 \end{cases} \Rightarrow \frac{1}{3}x + 8 = -3x + 1$

$\frac{1}{3}x + 3 = 1 - 8$

$3\frac{1}{3}x = -7 \mid : 3\frac{1}{3}$

$x = -\frac{7 \cdot 3}{10}$

$x = -2,1$

y? $y = -3 \cdot (-2,1) + 1 =$

$= 7,3$

$\begin{cases} x = -2,1 \\ y = 7,3 \end{cases}$

Lõikepunkt $L(-2,1; 7,3)$

(9) Kolmnurk ABC: $A(-2;4)$, $\vec{AB}=(5;-1)$ (6)

$\vec{BC}=(-3;2)$

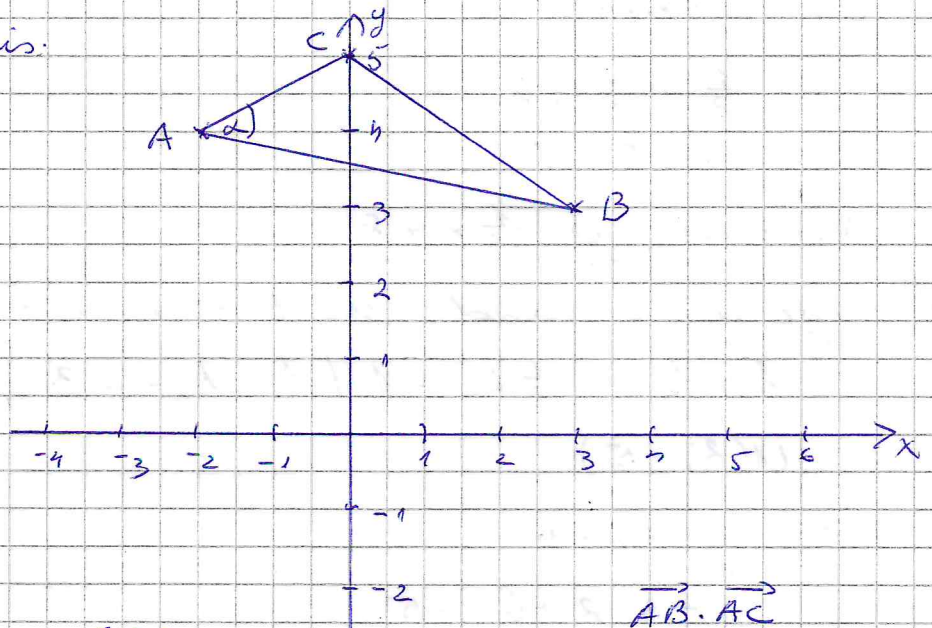
a) Tipu B koordinaadid: $A(-2;4)$, $\vec{AB}=(5;-1)$, $B(x_2;y_2)$

$$\begin{cases} X = x_2 - x_1 \\ Y = y_2 - y_1 \end{cases} \quad \begin{cases} x_2 + 2 = 5 \\ y_2 - 4 = -1 \end{cases} \quad \begin{cases} x_2 = 3 \\ y_2 = 3 \end{cases} \Rightarrow \underline{B(3;3)}$$

Tipu C koordinaadid: $B(3;3)$, $\vec{BC}=(-3;2)$, $C(x_2;y_2)$

$$\begin{cases} x_2 - 3 = -3 \\ y_2 - 3 = 2 \end{cases} \quad \begin{cases} x_2 = 0 \\ y_2 = 5 \end{cases} \Rightarrow C(0;5)$$

b) Joonis:



c) Nurga $BAC=\alpha$ suurus: $\cos\alpha = \dfrac{\vec{AB}\cdot\vec{AC}}{|\vec{AB}|\cdot|\vec{AC}|}$

* Vektorite koordinaadid:

$\vec{AB}=(5;-1)$

$\vec{AC}=(0+2;\ 5-4)=(+2;\ 1)$

* Vektorite pikkused:

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

$|\vec{AC}| = \sqrt{2^2+1^2} = \sqrt{5}$

* Vektorite skalaarkorrutis:

$\vec{AB}\cdot\vec{AC} = 5\cdot 2 + (-1)\cdot 1 = 9$

* nurk α $\quad \cos\alpha = \dfrac{9}{\sqrt{26}\cdot\sqrt{5}} \approx 0{,}7894$

$\alpha \approx \underline{37{,}9°}$

(7)

d) Sirge AB võrrand: $y = kx + b$

$A(-2; 4)$ $\quad \begin{cases} -2k + b = 4 \quad | \cdot (-1) \\ 3k + b = 3 \end{cases} \quad + \begin{cases} 2k - b = -4 \\ 3k + b = 3 \end{cases}$

$B(3; 3)$

$5k = -1 \quad | : 5$

$k = -0,5$

$b?$ $\quad 3 \cdot (-0,5) + b = 3$

$b = 4,5$

Sirge võrrand: $y = -0,5x + 4,5$

(10) a)

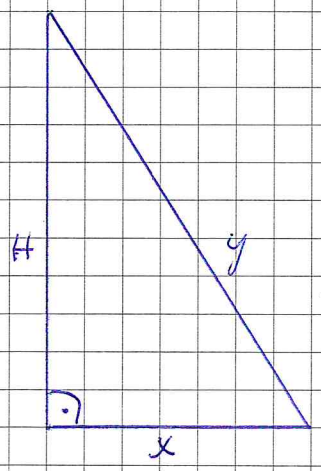
$a = 9,4\,m$

$y = 8\,m$

$x = 3\,m$

18% - ahmad

S.?



1) Seina kõrgus H:

$H = \sqrt{y^2 - x^2}$; $\quad H = \sqrt{8^2 - 3^2} = \sqrt{55} \approx 7,4\,m$

2) Seina pindala S:

$S = a \cdot H$; $\quad S = 9,4 \cdot 7,4 \approx 69,6\,m^2$

3) Värvitav pind:

100% - 69,6

82% - x

$x = \frac{82 \cdot 69,6}{100} \approx \underline{57,1\,m^2}$

b) Seina värvimise maksumus:

* Värvitav ala: $57,1 \cdot 2 \approx 114,2\,m^2$
* Mitu liitrit värvi kulub: $114,2 : 7 \approx 16,3\,l$
* Värvi hind: $16,3 \cdot 7,45 \approx \underline{121,44 \text{ eurot}}$