

Kordamisülesanded

①

nr 6

$$\textcircled{1} (a-b)(a+b) - 2a(5a-7b) + (3a-b)^2 = a^2 - \cancel{b^2} - 10a^2 + 14ab + 9a^2 - 6ab + \cancel{b^2} = \underline{8ab}$$

Kui $a = 3^{-1} = \frac{1}{3}$ ja $b = \log_3 9 = 2$, siis $8 \cdot \frac{1}{3} \cdot 2 = \frac{8 \cdot 1 \cdot 2}{3} = \frac{16}{3} = \underline{5 \frac{1}{3}}$

$$\textcircled{2} \begin{cases} \frac{2x-11}{4} + \frac{19-2x}{2} < 2x \quad | \cdot 4 \\ \frac{2x+15}{9} > \frac{1}{5}(x-1) + \frac{x}{3} \quad | \cdot 45 \end{cases}$$

$$\text{I} \quad 2x - 11 + 38 - 4x < 8x$$

$$2x - 4x - 8x < 11 - 38$$

$$-10x < -27 \quad | : (-10)$$

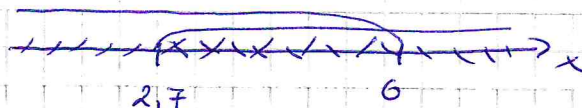
$$x > 2,7$$

$$\text{II} \quad 10x + 75 > 9x - 9 + 15x$$

$$10x - 9x - 15x > -9 - 75$$

$$-14x > -84 \quad | : (-14)$$

$$x < 6$$



$$\underline{x \in (2,7; 6)}$$

Võrratuse süsteemi täisarvulised lahendid on 3, 4, 5

$$\textcircled{3} \quad 1) \text{ Kasum, kui ringi hind on } 5,6 \text{ €}$$

$$(5,6 - 4) \cdot 120 = 192 \text{ €}$$

$$2) \text{ Kasum, kui ringi hind on } 5,6 + 1 = 6,6 \text{ €}$$

$$(6,6 - 4) \cdot 80 = \underline{208 \text{ €}}$$

3) Suurem kasum oleks siis, kui ringi müüa hinnaga 6,6 eurot

$$\textcircled{4} \quad a) \quad 2\log(5+x) = \log(25-x)$$

$$\log(5+x)^2 = \log(25-x)$$

$$\cancel{25} + 10x + x^2 = \cancel{25} - x$$

$$x^2 + 11x = 0$$

$$x(x+11) = 0$$

$$x_1 = 0$$

$$x+11=0; x_2 = -11$$

(K) $x_1 = 0$

(2)

$$vp = 2 \log(5+0) = 2 \log 5 = \log 25$$

$$pp = \log(25-0) = \log 25$$

$$vp = pp$$

$$x_2 = -11 \text{ (võõrloend)}$$

$$vp = 2 \log(5 * 11) = 2 \log(-6)$$

Logaritmitas ei tohi olla negatiivne

V: $x = 0$

$$b) 27^{x-3} = \left(\frac{1}{3}\right)^{-4} \cdot 9^{3x-7}$$

$$3^{3(x-3)} = 3^4 \cdot 3^{2(3x-7)}$$

$$3^{3(x-3)} = 3^{4+2(3x-7)}$$

$$3x - 9 = 4 + 6x - 14$$

$$3x - 6x = 4 - 14 + 9$$

$$-3x = -1 \quad | :(-3)$$

$$x = \frac{1}{3}$$

(5) a) Mitu õpilast küsitleti:

$$\begin{array}{l} 100\% - x \\ 4\% - 14 \end{array}$$

$$x = \frac{100 \cdot 14}{4} = \underline{350 \text{ õpilast}}$$

b) Mitu õpilast valis sõna röömus:

$$\begin{array}{l} 100\% - 350 \\ 16\% - x \end{array}$$

$$x = \frac{16 \cdot 350}{100} = \underline{56 \text{ õpilast}}$$

c) Sõna õnnelik valis:

$$\begin{array}{l} 360^\circ - 350 \\ 72^\circ - x \end{array}$$

$$x = \frac{72 \cdot 350}{360} = \underline{70 \text{ õpilast}}$$

d) mitu protsenti valis sõna õiglase:

* Sõna õnnelik valinute %:

$$\begin{array}{l} 100\% - 350 \\ x\% - 70 \end{array}$$

$$x = \frac{100 \cdot 70}{350} = 20\%$$

$$* \text{ sõna õiglase } \% : 100 - 18 - 12 - 16 - 20 - 4 = \underline{30\%}$$

c) A - aukinnas saab vastaja, kes valis mõne õnnelik:

(3)

$$k = 350$$

$$n = 70$$

$$P(A) = \frac{n}{k}; P(A) = \frac{70}{350} = 0,2$$

(6) a) * Kuusriinuke arv korvis:

$$1 - 60$$

$$0,65 - x$$

$$x = 0,65 \cdot 60 = \underline{39}$$

* Männiriinuke arv korvis

$$60 - 39 = \underline{21}$$

b) A - korvist võetud seen on männiriinuke

$$k = 60$$

$$n = 21$$

$$P(A) = \frac{21}{60} \approx \underline{0,35}$$

c) 1) B - korvist kolme seen võtmisel, üks on männiriinuke

$$k = C_{60}^3 = \frac{60!}{3! \cdot 57!} = 34220$$

$$n = C_{21}^1 \cdot C_{39}^2 = \frac{39!}{2! \cdot 37!} \cdot 21 = 21 \cdot 741 = 15561$$

$$P(B) = \frac{15561}{34220} \approx \underline{0,45}$$

2) C - korvist kolme seen võtmisel vähemalt kaks on kuusriinuke

$$k = 34220$$

$$n = C_{39}^2 \cdot C_{21}^1 + C_{39}^3 = \frac{39!}{2! \cdot 37!} \cdot 21 + \frac{39!}{3! \cdot 36!} = 741 \cdot 21 + 9139 = 24700$$

$$P(C) = \frac{24700}{34220} \approx \underline{0,72}$$

(7) $a_1 = 800m$

$$d = -25m$$

$$S_n = 5700m$$

n

$$n? S_n = \frac{2a_1 + (n-1) \cdot d}{2} \cdot n$$

$$\frac{[2 \cdot 800 + (n-1) \cdot (-25)] \cdot n}{2} = 5700 \quad | \cdot 2$$

$$(1600 - 25n + 25) \cdot n = 11400$$

$$1600n - 25n^2 + 25n = 11400$$

$$-25n^2 + 1625n - 11400 = 0 \quad | : (-25)$$

4

$$n^2 - 65n + 456 = 0$$

$$n_{1,2} = \frac{65 \pm \sqrt{4225 - 4 \cdot 1 \cdot 456}}{2 \cdot 1} = \frac{65 \pm \sqrt{2401}}{2} = \frac{65 \pm 49}{2}$$

$$n_1 = \frac{65 - 49}{2} = 8$$

$$n_2 = \frac{65 + 49}{2} = 114 \text{ (ei mõistetuks) }$$

V: matkaja jõuab märe tippu 8 tunni

8) $f(x) = \frac{1}{3}x^3 - \frac{2}{3}x^2$

a) miinimumpunkti koordinaadid $E_{\min}$

* ekstremumkohad: $x_c \Rightarrow$ tingimus $y' = 0$

teletis: $y' = x^2 - \frac{4}{3}x$

$$x^2 - \frac{4}{3}x = 0 \quad | \cdot 3$$

$$3x^2 - 4x = 0$$

$$x(3x - 4) = 0$$

$$x_1 = 0$$

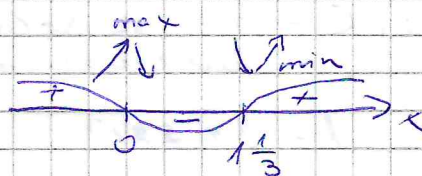
$$3x - 4 = 0$$

$$3x = 4 \quad | : 3$$

$$x = \frac{4}{3}$$

$$x_2 = 1\frac{1}{3}$$

* Lüh joonise abil



$$x_{\min} = 1\frac{1}{3} \Rightarrow$$

$$y_{\min} = \frac{1}{3} \cdot \left(\frac{4}{3}\right)^3 - \frac{2}{3} \cdot \left(\frac{4}{3}\right)^2 = \frac{1 \cdot 64}{3 \cdot 27} - \frac{2 \cdot 16}{3 \cdot 9} = \frac{64}{81} - \frac{32}{27} = \frac{64 - 96}{81} = -\frac{32}{81}$$

miinimumpunkt $E_{\min}\left(1\frac{1}{3}; -\frac{32}{81}\right)$

b) Punktide koordinaadid kui $f'(x) = x$

$$x^2 - \frac{4}{3}x = x$$

$$x^2 - 2\frac{1}{3}x = 0$$

$$x(x - 2\frac{1}{3})$$

$$x_1 = 0$$

$$x_2 = 2\frac{1}{3}$$

* Enimene punkt:

$$x_1 = 0; y_1 = \frac{1}{3} \cdot 0^3 - \frac{2}{3} \cdot 0^2 = 0 \quad \underline{A(0;0)}$$

(5)

* Teine punkt:

$$x_2 = 2\frac{1}{3}; y_2 = \frac{1}{3} \cdot \left(\frac{7}{3}\right)^3 - \frac{2}{3} \cdot \left(\frac{7}{3}\right)^2 = \frac{1 \cdot 343}{3 \cdot 27} - \frac{2 \cdot 49}{3 \cdot 9} = \frac{343}{81} - \frac{98}{27} = \frac{343 - 294}{81} = \frac{49}{81} \quad \text{li } \left(2\frac{1}{3}; \frac{49}{81}\right)$$

9) Maja A müügihind on x eurot

Maja B müügihind = $x - 50000$ eurot

Maja C müügihind: $0,75x$ eurot

$$x + x - 50000 + 0,75x = 3(x - 50000) - 25000$$

$$2,75x - 50000 = 3x - 150000 - 25000$$

$$-0,25x = -125000 \quad | :(-0,25)$$

$$x = 500000$$

Maja A müügihind on 500000 eurot

Maja B müügihind on $500000 - 50000 = 450000$ eurot

Maja C müügihind on $0,75 \cdot 500000 = 375000$ eurot

(K) Kolme maja müügihind kokku:

$$500000 + 450000 + 375000 = 1325000 \text{ eurot}$$

Maja B kolme korda hind = $3 \cdot 450000 = 1350000$ eurot

Hindade vahe: $1350000 - 1325000 = 25000$ eurot

V: Majade müügihind on vastavalt 500000 eurot, 450000 eurot ja 375000 eurot.

10) Antud:

$$1 \text{ cm}^3 \rightarrow 0,9 \text{ g}$$

$$d = 9 \text{ cm}; r = 4,5 \text{ cm}$$

$$H_n = 16 \text{ cm}$$

$$\alpha = 48^\circ$$

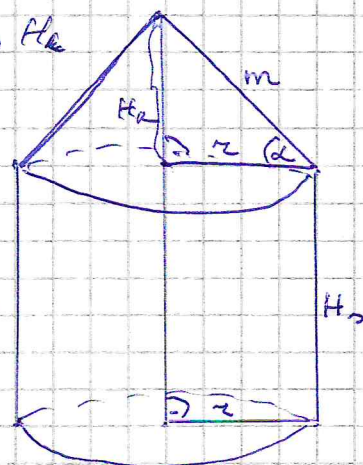
m?

a) 1) Koonuse kõrgus H_k

$$\tan \alpha = \frac{H_k}{r}$$

$$\tan 48^\circ = \frac{H_k}{4,5}$$

$$H_k = \tan 48^\circ \cdot 4,5 \approx 5,0 \text{ cm}$$



2) Kõnnika ruumala V :

$$V = \frac{S_p \cdot H_k}{3} + S_p \cdot H_n; \quad V = \frac{\pi \cdot 4,5^2 \cdot 5,0}{3} +$$

$$+ \pi \cdot 4,5^2 \cdot 16 \approx 1123,2 \text{ cm}^3$$

3) Kõrvala hool:

6

$$1123,9 \cdot 0,9 \approx 1011,5g \approx \underline{1,0kg}$$

b) Värvi külgsiirde hõlmisus:

$$S_k = \pi r m \quad * \text{ moodustaja } m$$

$$\cos \alpha = \frac{r}{m} ; \cos 48^\circ = \frac{4,5}{m}$$

$$m = \frac{4,5}{\cos 48^\circ} \approx 6,7 \text{ cm}$$

* külgsiirde S_k :

$$S_k = \pi \cdot 4,5 \cdot 6,7 \approx \underline{94,7 \text{ cm}^2}$$