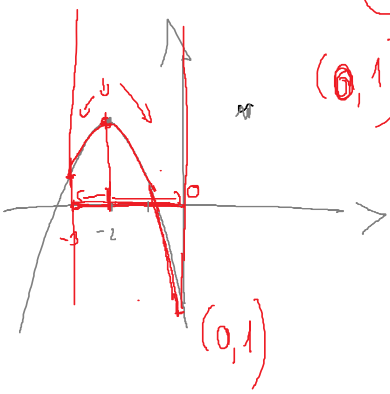
$x \in (-\infty, -2\rangle \Leftrightarrow f \nearrow$ $\quad \langle -2, +\infty)$ $f \searrow$

$x \in \langle -3, 0\rangle$

$y_{max} = 4$

$y_{min} = 1$

$(0,1)$



$p \in \langle -3, 0\rangle \Rightarrow$

$y_{max} = 4 = q$

$W(-2,4) \Rightarrow y = a(x-(-2))^2 + 4$

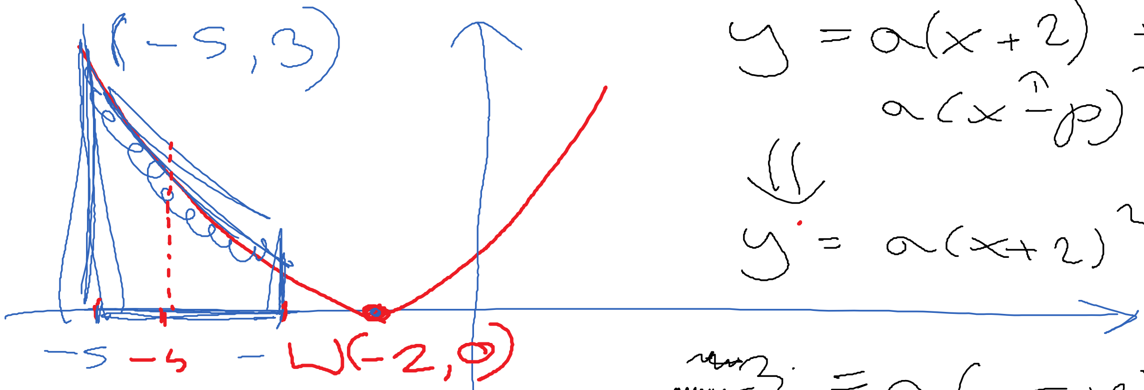
$(0,1) \in \boxed{y = a(x+2)^2 + 4}$ $\quad a = ?$

$1 = a(0+2)^2 + 4$

$a = -\frac{3}{4}$

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

$$y = -\frac{3}{4}x^2 - 3x + 1$$



$$y = a(x+2)^2 + 0$$

$$a(x-p)^2 + q$$

$$\Downarrow$$

$$y = a(x+2)^2$$

$$3 = a(-5+2)^2$$

$$3 = a \cdot 9$$

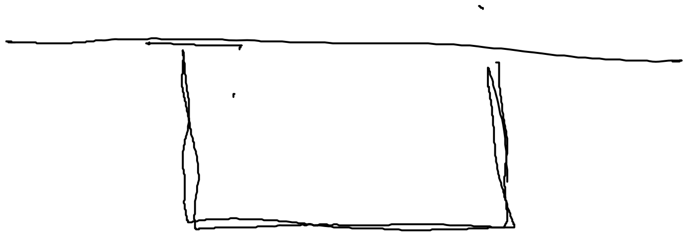
$$a = \frac{1}{3}$$

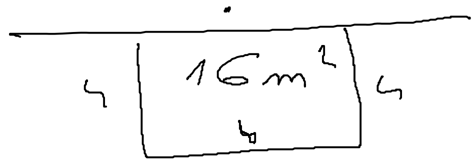
$$y = \frac{1}{3}(x+2)^2$$

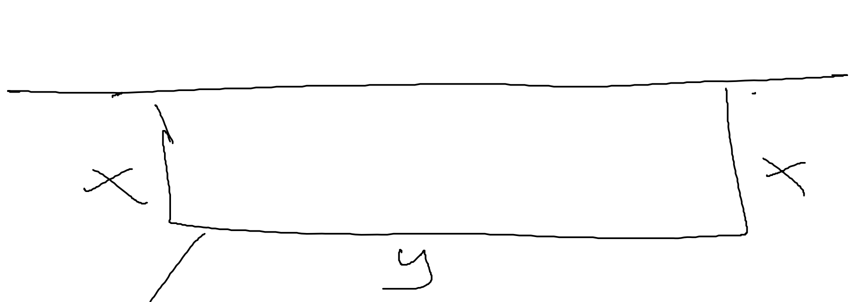
$$y = \frac{1}{3}x^2 + \frac{4}{3}x + \frac{4}{3}$$

3.105 / 3.102 P

12 m sz.







$x \in (0;6)$

$y \in (0,12)$

$2x + y = 12$ $\quad$ $\boxed{y = 12 - 2x}$

$P_{\square}$

$f(x,y) = x \cdot y = x(12 - 2x) = -2x^2 + 12x$

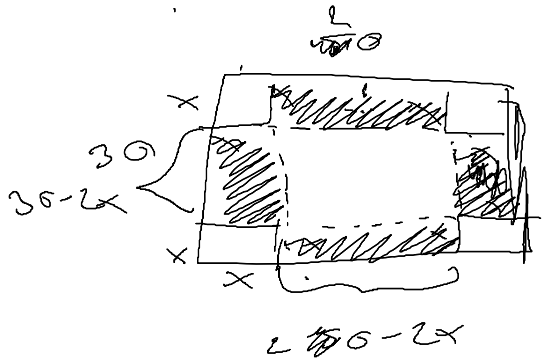
$x_w = p = \frac{-b}{2a} = \frac{-12}{-4} = 3 \in (0,6)$

$x = 3$ $\quad$ $y = 12 - 2x = 12 - 6 = 6$

$P = 3 \cdot 6 = 18$

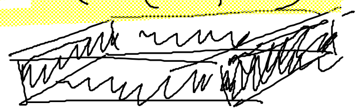
$\boxed{16 m^2}$

$18 m^2$



$\boxed{x>0} \wedge \boxed{x<10}$

$x\in(0,10)$



$P_b = (30x-2x^2)\cdot 2 + (20-2x)\cdot 2x$

$P_b = 60x-4x^2+40x-4x^2 = -8x^2+100x$

$P_b = -8x(x-12,5)$

$0 \quad 12,5$

$x=6,25$

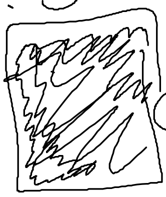
$P_b = -8\cdot 6,25\cdot(-6,25)$

$P = \frac{2}{\cancel{8}}\cdot\frac{12,5}{\cancel{2}}\cdot\frac{12,5}{\cancel{2}} = 25\cdot 12,5 = 312,5$

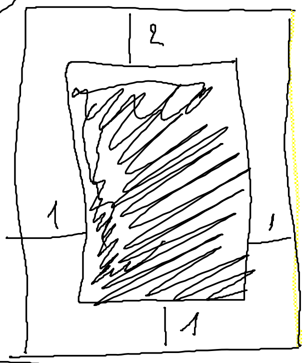
$34 - x - 2 = 32 - x$

$z = 34 - x$

$2x + 2z = 68$



$x - 3$



$x + z = 34$

$z = 34 - x$

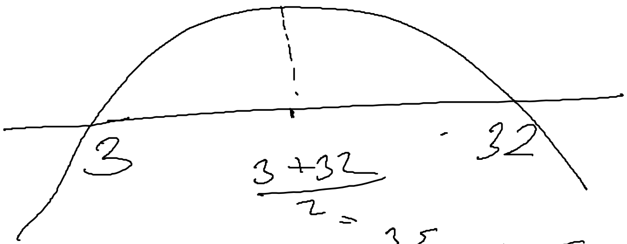
$P = (x-3)(32-x)$

$z = 34 - x$

$D: x \in (3; 32)$

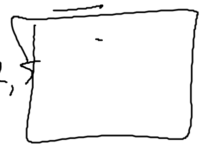
$-x^2$

$a = -1$



$\frac{3+32}{2} = \frac{35}{2} = 17{,}5$

$x = 17{,}5$



16,5

$z = 34 - x$

odp. $17{,}5 \times 16{,}5$

P 3.107 108 109 120 w

R 110 111 112

k: 1200

Sp: 1800

1800 − 10

$40 \times 600 = 24$ 5k

1 41×590

2 42×580

10 50×500

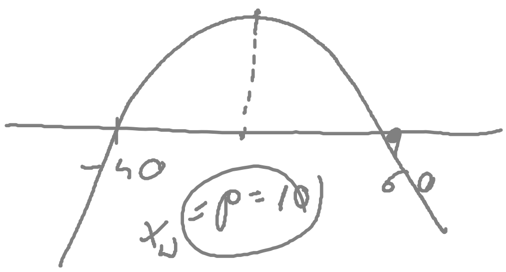
x $(40+x)\cdot(600-10x) = 24$ 5k

$2\ z(x) = (40+x)(-10)\cdot(x-60)$

$\boxed{z(x) = -10(x+40)(x-60)}$ – postać iloczynowa

$a(x-x_1)(x-x_2)$

$a<0$



$D: x \in \{0, 1, 2, \ldots, 60\}$

dla $x = 10$ – zysk jest największy $\Rightarrow$ cena $= 1200 + 600 - 10x$

cena $= 1200 + 500 = \boxed{1700}$

180 [illegible]

1200 zł [illegible]

$40(30+x)\cdot(-5)(-36+x)$

zysk = 180 · 1200

$z = (180-5)(1200+40)$

$z = (180-2\cdot 5)(1200+2\cdot 40)$

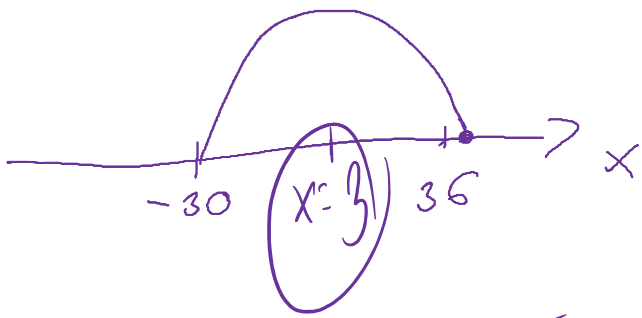
$z = (180-5\cdot 10)(1200+40\cdot 10)$

$D: x \in \{0, 1, 2, \ldots 36\}$

$Z(x) = (\overbrace{1200+40x}^{40})(\overbrace{180-5x}^{-5})$

$Z(x) = a(x-x_1)(x-x_2)$

$z(x) = -200(x+30)(x-36)$



Największy zysk [illegible] gdy [illegible] za lokal [illegible] $1200+3\cdot 40=1320$ zł

$180-15=165$

wtorek, 4 stycznia 2022 10:30

108 — 105 p

$\Delta BCD \sim \Delta FCG$ (kkk)

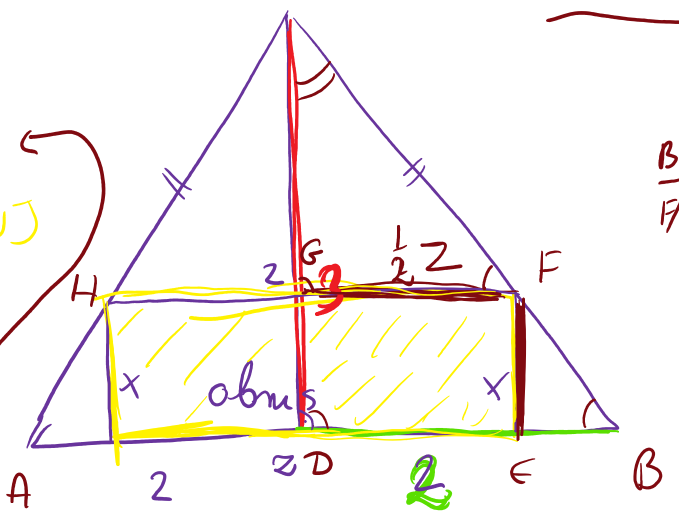
$\Downarrow$

$\frac{BC}{FC} = \frac{BD}{FG} = \frac{CD}{CG}$

$\frac{2}{\frac{1}{2}z} = \frac{3}{3-x}$

$\frac{3}{2}z = 6 - 2x \mid \cdot \frac{2}{3}$

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



$P(x,z) = x \cdot z$

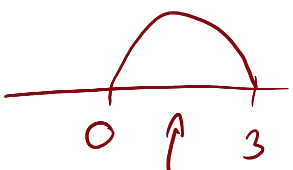
dwie niewiadome FUJ

$P(x) = x \cdot (4 - \frac{4}{3}x)$

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

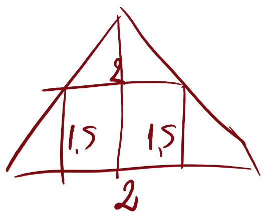
$\cdot -\frac{3}{4}$

$P(x) = -\frac{4}{3} \cdot x \cdot (x-3)$



D: $x \in (0,3)$

$p = x_w = 1{,}5 = \frac{3}{2} \Rightarrow z = 4 - \frac{4}{3} \cdot \frac{3}{2} = 2$



Równan kwdr

$$ax^2+bx+c=0 \qquad a \neq 0$$

1)

3.121 – 3.129

po zadaniu

pocz

3.255

3.255. Dla jakich wartości parametru k, $k \in \mathbf{R}$, suma odwrotności różnych rozwiązań równania $x^2 + kx - 16 = 0$ jest równa -4?

$a_x = 1 \neq 0$
$b_x = k$
$c_x = -16$

$$\begin{cases} 1)\ a_x \neq 0 \\ 2)\ \Delta_x > 0 \\ 3)\ \frac{1}{x_1} + \frac{1}{x_2} = -4 \end{cases} \Leftrightarrow \begin{cases} k \in \mathbb{R} \\ \boxed{k \in \mathbb{R}} \\ k = -64 \end{cases} \Rightarrow$$

odp $k = -64$

ad 2 $\Delta_x = b^2 - 4ac = k^2 + 64$

$\Delta_x > 0 \Leftrightarrow k^2 + 64 > 0 \Leftrightarrow \boxed{k \in \mathbb{R}}$

ad 3 $\boxed{\frac{1}{x_1} + \frac{1}{x_2} = -4}$

$$L = \frac{x_2 + x_1}{x_1 \cdot x_2} = \frac{-\frac{b_x}{\cancel{a}}}{\frac{c_x}{\cancel{a}}} = -\frac{b_x}{c_x} = \frac{-k}{-16} = \boxed{\frac{k}{16} = -4}$$

$\boxed{k = -64}$

3.259. Wyznacz wszystkie wartości parametru k, dla których różne rozwiązania x_1, x_2 równania $x^2-(k-1)x+1=0$ spełniają warunek $\frac{1}{x_1^2}+\frac{1}{x_2^2}\geq 2k^2-k-21$.

$a_x = 1 \neq 0$

$b_x = -(k-1)$

$c_x = 1$

$$\begin{cases} 1)\ a_x \neq 0 \\ 2)\ \Delta_x > 0 \\ 3)\ \frac{1}{x_1^2}+\frac{1}{x_2^2} \geq 2k^2-k-21 \end{cases} \Leftrightarrow \begin{cases} k \in \mathbb{R} \\ k \in (-\infty,-1)\cup(3,+\infty) \\ k \in \langle -5, 4 \rangle \end{cases} \Leftrightarrow$$

odp. $k \in \langle -5;-1) \cup (3,4\rangle$

$$\Delta_x = (k-1)^2-4 = k^2-2k+1-4 = \boxed{k^2-2k-3 = \Delta_x}$$

$$\Delta_x > 0 \Leftrightarrow \boxed{k^2-2k-3>0}$$

Nierówność kwadratowa.
1. Posprzątać
2. Obliczyć miejsca zerowe trójmianu kwadratowego av^2+bx+c
3. ZAWSZE RYSUJEMY WYKRES PARABOLI!!!
   Uśmiech/smutas
   są miejsca zerowe/brak miejsc zerowych
4. Odczytujemy, która część paraboli jest nad/pod osią

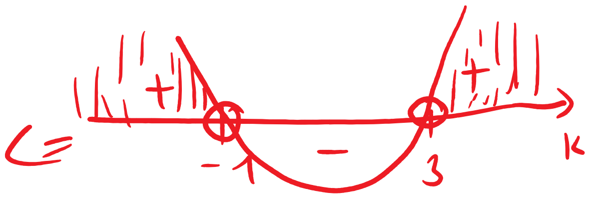
$\Delta_k = (-2)^2+4\cdot 3 = 16 = 4^2$

$k_1 = \frac{-b-\sqrt{\Delta}}{2a} = \frac{2-4}{2} = -1$ / $k_2 = \frac{-b+\sqrt{\Delta}}{2a} = \frac{2+4}{2} = 3$

$(k+1)$ $(k-3)$

$a=1$

$(k+1)(k-3)>0$



$\Leftarrow$

$k \in (-\infty,-1)\cup(3,+\infty)$

ad 3 $\frac{1}{x_1^2}+\frac{1}{x_2^2} \geq 2k^2-k-21$

$\| L$

$$L = \frac{x_1^2+x_2^2}{(x_1\cdot x_2)^2} = \frac{\overbrace{(x_1+x_2)^2}^{x_1^2+2x_1x_2+x_2^2}-2x_1x_2}{\left(\frac{c}{a}\right)^2} =$$

$$\frac{\left(\left(-\frac{b}{a}\right)^2-2\cdot\frac{c}{a}\right)\cdot a^2}{\left(\frac{c^2}{a^2}\right)\cdot a^2} = \frac{b^2-2ac}{c^2} = \frac{(k-1)^2-2\cdot 1\cdot 1}{1^2} =$$

$$k^2-2k+1-2 = \boxed{k^2-2k-1} = L$$

$k^2-2k+1-2 = \boxed{k^2-2k-1} = L$

$\boxed{k^2-2k-1} \geqslant \boxed{2k^2-k-21}$ N.KW.

$$\boxed{k^2+k-20 \leqslant 0}$$

k_1 k_2

$\Delta_k = b^2-4ac = 1+80 = 81 = 9^2$

$a_k > 0$

$k_1 = \frac{-b-\sqrt{\Delta}}{2a} = \frac{-1-9}{2} = -5$

$k_2 = \frac{-b+\sqrt{\Delta}}{2a} = \frac{-1+9}{2} = 4$

$k \in \langle -5; 4 \rangle$

$\Delta \geq 0$ bo mogą być $x_1 = x_2 \Leftrightarrow \Delta = 0$ nie ma słowa 2 różne rozwiązania

$a_x = 1 \neq 0$
$b_x = 2(p-1)$
$c_x = p^2 - 4$

3.257. Dla jakich wartości parametru p, $p \in \mathbb{R}$, równanie $x^2 + 2(p-1)x + p^2 - 4 = 0$ ma dwa rozwiązania, których suma kwadratów jest mniejsza od 12?

$$\begin{cases} 1 \quad a_x \neq 0 \\ 2 \quad \Delta_x \geq 0 \\ 3 \quad x_1^2 + x_2^2 < 12 \end{cases} \Leftrightarrow \begin{cases} p \in \mathbb{R} \\ p \in (-\infty; 2{,}5\rangle \\ p \in (0;4) \end{cases} \Leftrightarrow$$

odp
$$\boxed{p \in (0; 2{,}5\rangle}$$

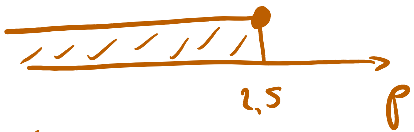
---

ad 2 $\boxed{\Delta_x \geq 0}$

$$\Delta_x = b^2 - 4ac = [2(p-1)]^2 - 4 \cdot 1 \cdot (p^2-4) =$$
$$4(\cancel{p^2} - 2p + 1) - \cancel{4p^2} + 16 = -8p + 4 + 16 = -8p + 20$$

$$\Delta_x \geq 0 \Leftrightarrow \boxed{-8p + 20 \geq 0}$$ NIERÓWNOŚĆ LINIOWA $\Rightarrow -8p \geq -20 \;/ :(-8) < 0$

$$\boxed{p \leq 2{,}5}$$



$p \in (-\infty; 2{,}5\rangle$

---

ad 3 $x_1^2 + x_2^2 < 12$

$$L = x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1x_2 = \left(-\frac{b_x}{a_x}\right)^2 - 2\frac{c_x}{a_x} =$$

$$= \frac{b^2}{a^2} - 2\frac{c}{a} = \frac{(2(p-1))^2}{1} - \frac{2(p^2-4)}{1} = 4(p^2 - 2p + 1) - 2p^2 + 8 =$$

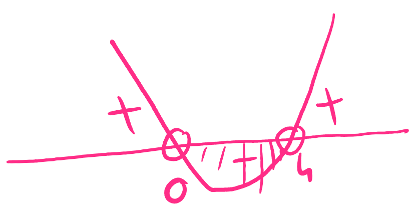
$$= \boxed{2p^2 - 8p + 12 = L}$$

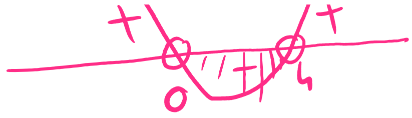
$$2p^2 - 8p + 12 < 12 \quad / :2$$

$$\boxed{p^2 - 4p < 0}$$

$$p(p-4) < 0$$

0 $\quad 4$





$p \in (0, 4)$