

b) $f(x) = x^2 + 2x + 14$

coeficientes	intercepto-y	intercepto-x	Vértice
$a=1$	$y=?$ qdo $x=0$	$x=?$ quando $y=0$	$x_v = \frac{-b}{2a} = \frac{-2}{2} = -1$
$b=2$	$y=0^2+2\cdot 0+14$	$x^2+2x+14=0$	$y_v = -\frac{\Delta}{4a} = -\frac{-52}{4(1)} = 13$
$c=14$	$y=14$	$\Delta = (2)^2 - 4(1)(14)$	
		$\Delta = 4 - 56 = -52$	
		$\hookrightarrow \Delta < 0 \rightarrow$ sem raízes reais	

gráfico \Rightarrow slide 27!

c) $f(x) = -x^2 + 8x - 15$

coeficientes	intercepto-y	intercepto-x	$x = \frac{-b \pm \sqrt{\Delta}}{2a}$
$a=-1$	$y=?$ qdo $x=0$	$x=?$ qdo $y=0$	
$b=8$	$y=-(0)^2+8(0)-15$	$-x^2+8x-15=0$	$x_1 = \frac{-8 + \sqrt{4}}{2(-1)} = \frac{-8+2}{-2} = \frac{-6}{-2} = 3$
$c=-15$	$y=-15$	$\Delta = (8)^2 - 4(-1)(-15)$	$x_2 = \frac{-8 - \sqrt{4}}{2(-1)} = \frac{-8-2}{-2} = \frac{-10}{-2} = 5$
		$= 64 - 60 = 4$	
		$\Delta > 0 \Rightarrow$ duas raízes reais	

Vértice $x_v = -\frac{b}{2a} = -\frac{8}{2(-1)} = \frac{-8}{-2} = 4$

$y_v = -\frac{\Delta}{4a} = \frac{-4}{4(-1)} = \frac{-4}{-4} = 1$

$v(4; 1)$ gráfico \rightarrow slide 27!

SLIDE 42

a) $C_t = 50 + 2x$ $R = 4x$

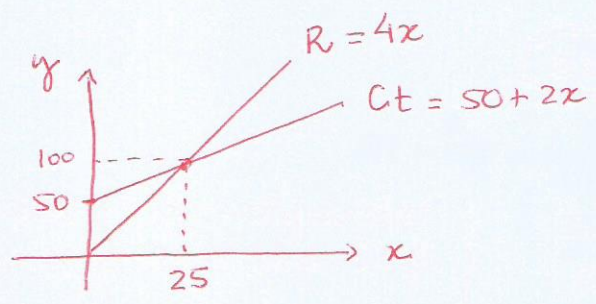
- Ponto nivelamento $C_t = R$

$$50 + 2x = 4x$$

$$2x - 4x = -50$$

$$-2x = -50$$

$$x = \frac{-50}{-2} = 25$$

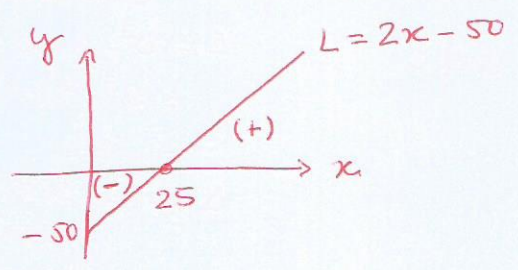


- Função lucro $L = R - C_t$

$$L = 4x - (50 + 2x)$$

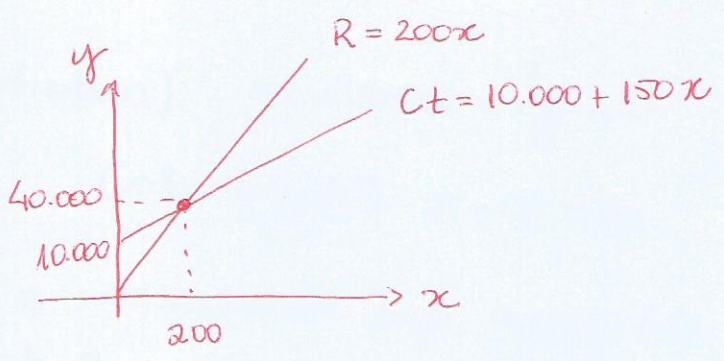
$$L = 4x - 50 - 2x$$

$$L = 2x - 50$$

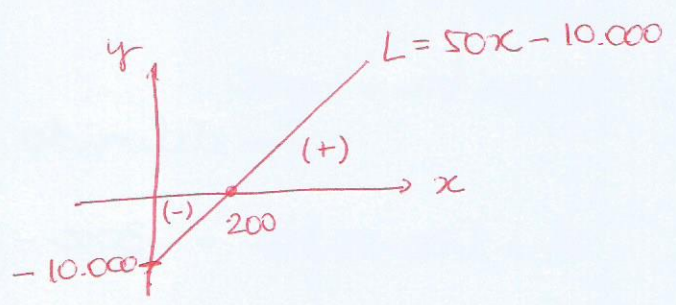


b) $C_t = 10.000 + 150x$ $R = 200x$

- Ponto nivelamento $C_t = R$
 $10.000 + 150x = 200x$
 $10.000 = 200x - 150x$
 $10.000 = 50x$
 $x = \frac{10000}{50} = 200$



- Função lucro $L = R - C_t$
 $L = 200x - (10.000 + 150x)$
 $L = 200x - 10.000 - 150x$
 $L = 50x - 10.000$



SLIDE 43

Livro R\$ 60,00 a unidade (venda)
 $C_f = R\$ 10.000,00 / \text{mês}$
 $C_v = R\$ 40,00 / \text{livro}$

- Qual o ponto nivelamento?
 $x = ?$ quando $C_t = R$

$$C_t = C_f + C_v = 10.000 + 40x$$

$$R = px = 60x$$

$$\left\{ \begin{array}{l} 10.000 + 40x = 60x \\ 10.000 = 60x - 40x \\ 10.000 = 20x \\ x = \frac{10.000}{20} = 500 \text{ livros} \end{array} \right.$$

- Quantas unidades deve vender para $h = R\$ 8.000,00$

Função lucro? $L = R - C_t$
 $L = 60x - (10.000 + 40x)$
 $L = 20x - 10.000$
 $8.000 = 20x - 10.000$
 $8.000 + 10.000 = 20x$
 $18.000 = 20x$
 $x = \frac{18.000}{20} = 900 \text{ livros}$

$$C = \frac{x^2}{2} + 20x + 15 \quad (\text{custo total})$$

$$p = 30 - x \quad (\text{demanda})$$

a) preço que maximiza o lucro?

$$\text{lucro} = \text{Receita} - \text{Custo}$$

$$\text{Receita} = p \cdot x$$

↳ definido pela demanda

$$R = (30 - x)x = 30x - x^2$$

Logo,

$$L = R - C = (30x - x^2) - \left(\frac{x^2}{2} + 20x + 15\right)$$

$$L = 30x - x^2 - \frac{x^2}{2} - 20x - 15$$

$$L = -\frac{3x^2}{2} + 10x - 15 \quad \rightarrow \text{quadrática} \quad \begin{matrix} \text{máximo} \\ \uparrow \\ \text{Lucro} \end{matrix}$$

$$a = -3/2$$

$$\Delta = b^2 - 4ac$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$b = 10$$

$$\Delta = (10)^2 - 4\left(-\frac{3}{2}\right)(-15)$$

$$x_1 = \frac{-10 + \sqrt{10}}{-3} \approx 2,3$$

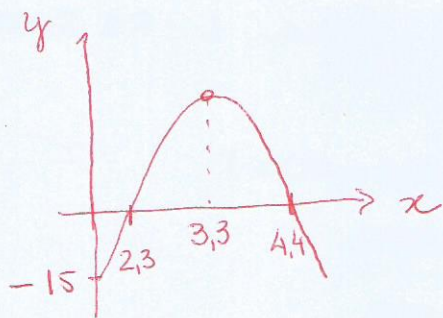
$$c = -15$$

$$\Delta = 100 - 90 = 10$$

$$x_2 = \frac{-10 - \sqrt{10}}{-3} \approx 4,4$$

$$\text{Vértice } x_v = \frac{-b}{2a} = \frac{-10}{2\left(-\frac{3}{2}\right)} \approx 3,3$$

↳ quantidade que maximiza o lucro.



$$y_v = \frac{-\Delta}{4a} = \frac{-10}{4\left(-\frac{3}{2}\right)} = \frac{-10}{-6} = 1,67$$

↓
lucro máximo

Preço que maximiza o lucro

$$p = 30 - x_v = 30 - 3,3 = 26,7 \text{ reais}$$

SLIDE 22

Considere a função $f(x) = -10x + 5$

→ Identifique os coeficientes a e b ;

$$a = -10 \quad e \quad b = 5$$

→ Obtenha os interceptos x e y ;

Intercepto $-x \Rightarrow x = ?$ quando $y = 0$

$$y = -10x + 5 \Rightarrow 0 = -10x + 5$$

$$10x = 5$$

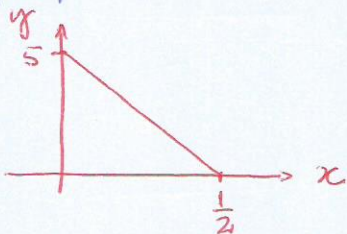
$$x = 5/10 = \underline{\underline{1/2}}$$

Intercepto $-y \Rightarrow y = ?$ quando $x = 0$

$$y = -10x + 5 \Rightarrow y = -10(0) + 5$$

$$y = \underline{\underline{5}}$$

→ Gráfico;



SLIDE 26

a) $f(x) = -x^2 - 16$

$$a = -1$$

$$b = 0$$

$$c = -16$$

intercepto $-y$

$y = ?$ qdo $x = 0$

$$y = -(0)^2 - 16$$

$$y = -16$$

↓
coef c

intercepto $-x$

$x = ?$ qdo $y = 0$

$$-x^2 - 16 = 0$$

↓
Báskara

$$\Delta = b^2 - 4ac$$

$$= 0^2 - 4(-1)(-16)$$

$$= -64$$

$\Delta < 0 \Rightarrow$ sem raízes

reais

(sem intercepto)

vértice

$$x_v = -\frac{b}{2a} = -\frac{0}{-2} = 0$$

$$y_v = -\frac{\Delta}{4a} = -\frac{(-64)}{4(-1)} =$$

$$= -16$$

$$V(0; -16)$$

gráfico → slide 27!