

PS. 90, no 3

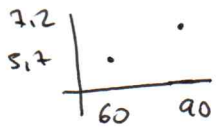
$$a) \begin{cases} x = 1 \\ y = -2 \\ z = 3 \end{cases} \quad b) \begin{cases} x = 4 \\ y = 2 \\ z = -3 \end{cases}$$

PS 90, no 4

a) (1, -2, 0) b) (2, 1/3, -2)

PS. 113, no 4 a)

$$f(60) = 5,7 ; \quad f(90) = 7,2$$



$$m = \frac{7,2 - 5,7}{90 - 60} = \frac{1,5}{30} = 0,05$$

$$y = 0,05(x - 60) + 5,7 = 0,05x - 3 + 5,7 = 0,05x + 2,7$$

a) $f(80) = 0,05 \cdot 80 + 2,7 = \underline{\underline{6,7}}$

b) $f(100) = 0,05 \cdot 100 + 2,7 = \underline{\underline{7,7}}$

PS. 115, ej. no. 1 ht)

(0,3), (2,-3), (6,9)

$$y = ax^2 + bx + c \Rightarrow$$

$$\begin{cases} 4a + 2b + c = -3 \\ 36a + 6b + c = 9 \end{cases} \quad \begin{cases} 4a + 2b = -6 \\ 36a + 6b = 6 \end{cases} \quad \begin{cases} 2a + b = -3 \\ 6a + b = 1 \end{cases} \quad \begin{cases} 4a = 4 \Rightarrow a = 1 \\ b = 1 - 6a = -5 \end{cases}$$

$$y = x^2 - 5x + 3$$

No me junte, per d (0,3)

$$y = p + m(x-x_1) + n(x-x_1)(x-x_2) \Rightarrow \begin{cases} p = 3 \\ p + 2m = -3 \\ p + 6m + 24n = 9 \end{cases} \quad \begin{cases} 2m = -6 \Rightarrow m = -3 \\ 2m = -6 \Rightarrow m = -3 \end{cases}$$

$$3 - 18 + 24n = 9 \Rightarrow 24n = 24 \Rightarrow n = 1$$

$$y = 3 - 3(x-0) + 1 \cdot (x-0)(x-2) = 3 - 3x + x^2 - 2x = x^2 - 5x + 3$$

PS 115, no 3

a) $f(x) = ax^2 + bx + c$

$$\begin{cases} f(-1) = 0 \Rightarrow a - b + c = 0 \\ f(2) = 12 \Rightarrow 4a + 2b + c = 12 \\ f(8) = -72 \Rightarrow 64a + 8b + c = -72 \end{cases} \quad \begin{cases} a - b + c = 0 \\ 3a + 3b = 12 \\ 63a + 9b = -72 \end{cases} \quad \begin{cases} a - b + c = 0 \\ a + b = 4 \\ 7a + b = -8 \end{cases} \quad \begin{cases} a - b + c = 0 \\ a + b = 4 \\ 6a = -12 \end{cases} \quad \begin{cases} c = 8 \\ b = 6 \\ a = -2 \end{cases}$$

$$f(x) = -2x^2 + 6x + 8$$

b) $f(x) = p + m(x+1) + n(x+1)(x-2)$

$f(-1) = 0 \Rightarrow p = 0$

$f(2) = 12 \Rightarrow 3m = 12 \Rightarrow m = 4$

$f(8) = -72 \Rightarrow 36 + n \cdot 54 = -72 \Rightarrow n = -2$

$f(x) = 4(x+1) - 2(x+1)(x-2) = 4x + 4 - 2(x^2 - x - 2) =$
 $= 4x + 4 - 2x^2 + 2x + 4 = -2x^2 + 6x + 8$

mio $f(-2) = 13, f(-1) = 8, f(3) = 8; f(2) = ?$

$f(x) = p + m(x+2) + n(x+2)(x+1)$

$f(-2) = 13 \Rightarrow p = 13$

$f(-1) = 8 \Rightarrow 13 + m = 8 \Rightarrow m = -5$

$f(3) = 8 \Rightarrow 13 - 25 + n \cdot 20 = 8 \Rightarrow n = 1$

$f(x) = 13 - 5(x+2) + (x+2)(x+1) = 13 - 5x - 10 + x^2 + 3x + 2 =$
 $= x^2 - 2x + 5$

$f(2) = 4 - 4 + 5 = \underline{\underline{5}}$

PS. 231,
no 27

$f(2) = 30; f(4) = 50; f(8) = 50; f(5) = ?$

$f(x) = p + m(x-2) + n(x-2)(x-4)$

$f(2) = 30 \Rightarrow p = 30$

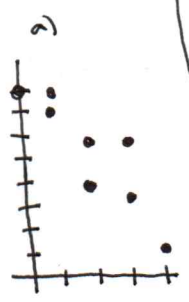
$f(4) = 50 \Rightarrow 30 + 2m = 50 \Rightarrow m = 10$

$f(8) = 50 \Rightarrow 30 + 60 + n \cdot 24 = 50 \Rightarrow n = -\frac{5}{3}$

$f(x) = 30 + 10(x-2) - \frac{5}{3}(x-2)(x-4) = 30 + 10x - 20 - \frac{5}{3}(x^2 - 6x + 8) =$
 $= 10 + 10x - \frac{5}{3}x^2 + 10x - \frac{40}{3} = -\frac{5}{3}x^2 + 20x - \frac{10}{3}$

$f(5) = -\frac{5}{3} \cdot 25 + 20 \cdot 5 - \frac{10}{3} = -\frac{125}{3} + 100 = \underline{\underline{55}}$

PS. 234
no 18



x_i	y_i	x_i^2	y_i^2	$x_i y_i$
0	8	0	64	0
2	6	4	36	12
1	8	1	64	8
3	6	9	36	18
4	1	16	1	4
2	4	4	16	8
1	7	1	49	7
3	3	9	9	9
16	43	44	275	66

$\bar{x} = \frac{\sum x_i}{n} = \frac{16}{8} = 2; \bar{y} = \frac{\sum y_i}{n} = \frac{43}{8} = 5,375$

$\sigma_x = \sqrt{\frac{\sum x_i^2}{n} - \bar{x}^2} = \sqrt{\frac{44}{8} - 2^2} = 1,22 \text{ (A)}$

$\sigma_y = \sqrt{\frac{\sum y_i^2}{n} - \bar{y}^2} = \sqrt{\frac{275}{8} - 5,375^2} = 2,34 \text{ (B)}$

$\sigma_{xy} = \frac{\sum x_i y_i}{n} - \bar{x} \bar{y} = \frac{66}{8} - 2 \cdot 5,375 = -2,5$

b) $r = \frac{\sigma_{xy}}{\sigma_x \sigma_y} = \frac{-2,5}{1,22 \cdot 2,34} = -0,87$

c) $y = \bar{y} + \frac{\sigma_{xy}}{\sigma_x^2} (x - \bar{x}) = 5,375 + \frac{-2,5}{1,5} (x - 2)$

d) $x = 3,5 \Rightarrow \hat{y} = 2,875 \approx 2,9; x = 5 \Rightarrow \hat{y} = 0,375 \approx 0,4$

PS. 197
ep1c

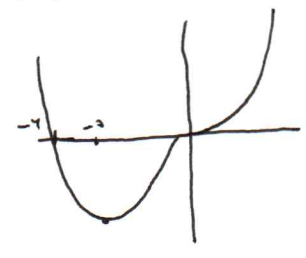
$$f(x) = x^4 + 4x^3$$

$$x=0 \Rightarrow y=0 \rightarrow (0,0) \quad || \quad y=0 \Rightarrow x = \begin{cases} 0 \\ -4 \end{cases} \rightarrow (-4,0)$$

$$\lim_{x \rightarrow +\infty} f(x) = \lim_{x \rightarrow -\infty} f(x) = +\infty$$

$$f'(x) = 4x^3 + 12x^2; \quad f'(x)=0 \Rightarrow x = \begin{cases} 0 \\ -3 \end{cases}$$

$$(0,0), (-3, -27)$$



PS. 207
no 39a

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

$$x=0 \Rightarrow y=2 \rightarrow (0,2)$$

$$y=0 \Rightarrow x^2 - 3x + 2 = 0 \Rightarrow$$

$$\Rightarrow (x-1)(x^2+x-2) = 0 \Rightarrow x = \begin{cases} 1 \\ -2 \end{cases} \rightarrow \text{pontos } (1,0), (-2,0)$$

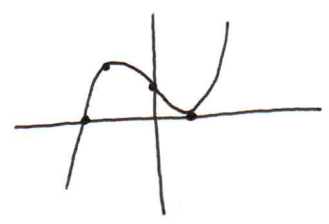
$$\begin{array}{r|rrrr} 1 & 1 & 0 & -3 & 2 \\ & & 1 & 1 & -2 \\ \hline & 1 & 1 & -2 & 0 \\ & & 1 & 2 & \\ \hline & 1 & 2 & & \end{array}$$

$$\lim_{x \rightarrow +\infty} f(x) = +\infty; \quad \lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$f'(x) = 3x^2 - 3; \quad f'(x)=0 \Rightarrow x = \begin{cases} -1 \\ 1 \end{cases}$$

$$f''(x) = 6x; \quad f''(-1) < 0 \rightarrow \text{mx. rd. } (-1, 4)$$

$$f''(1) > 0 \rightarrow \text{mn. rd. } (1, 0)$$



PS. 207
no 39d

$$f(x) = x^4 - 8x^2 + 2$$

$$x=0 \Rightarrow y=2 \rightarrow \text{ponto } (0,2)$$

$$y=0 \Rightarrow x^4 - 8x^2 + 2 = 0 \Rightarrow z^2 - 8z + 2 = 0 \Rightarrow z = \frac{8 \pm \sqrt{64-8}}{2} = \frac{8 \pm \sqrt{56}}{2} =$$

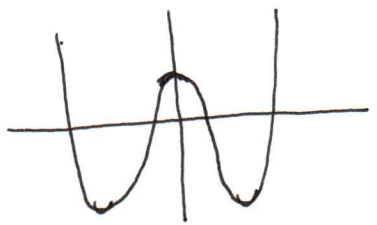
$$= \frac{8 \pm 2\sqrt{14}}{2} = 4 \pm \sqrt{14} = \begin{cases} 7.99 \\ 0.01 \end{cases} \rightarrow \text{pontos } (x, y) = (2.8, 0), (0.59, 0)$$

$$x = \pm\sqrt{14}, \quad x = \pm\sqrt{0.01} = \pm 0.01$$

$$\lim_{x \rightarrow +\infty} f(x) = \lim_{x \rightarrow -\infty} f(x) = +\infty$$

$$f'(x) = 4x^3 - 16x; \quad f'(x)=0 \Rightarrow x = \begin{cases} 0 \rightarrow \text{mx. rd. } (0,2) \\ 2 \rightarrow \text{mn. } (2, -14) \\ -2 \rightarrow \text{mn. } (-2, -14) \end{cases}$$

$$f''(x) = 12x^2 - 16$$



PS. 235
no 2

$$\sum x_i = 50; \quad \sum y_i = 60; \quad \sum x_i^2 = 328; \quad \sum y_i^2 = 432; \quad \sum x_i y_i = 371$$

$$\bar{x} = 5; \quad \bar{y} = 6; \quad \sigma_x = 2.79; \quad \sigma_y = 2.68; \quad \sigma_{xy} = 7.1; \quad r = 0.95$$

$$y = 6 + 0.91(x-5); \quad x=5 \Rightarrow \hat{y} = 6; \quad x=10 \Rightarrow \hat{y} = 10.6$$