

TEMA 10 : FUNCIONS ELEMENTALS

1) Són funcions a, b, d.

2)

- a) $-2 ; 3,5; \sqrt{2}$
- b) Tots excepte -2 .
- c) Tots.
- d) Tots.
- e) $3,5$.
- f) Tots.

3)

- a) $\mathbb{R} - \{-1,0\}$
- b) $\mathbb{R} - \{2\}$
- c) $\mathbb{R} - \{-1/2\}$
- d) $\mathbb{R}$
- e) $\mathbb{R} - \{0,5\}$
- f) $\mathbb{R} - \{-2,2\}$

4)

- a) $(-\infty, 3]$
- b) $[1/2, +\infty)$
- c) $(-\infty, -2]$
- d) $(-\infty, 0]$

5)

- a) $(-\infty, -3] \cup [3, +\infty)$
- b) $\mathbb{R}$
- c) $[0, 6]$
- d) $(-\infty, -1] \cup [5, +\infty)$
- e) $(-\infty, 4)$
- f) $(-\infty, 0) \cup (3, +\infty)$
- g) $\mathbb{R} - \{0,1\}$
- h) $\mathbb{R} - \{-1,1\}$

6)

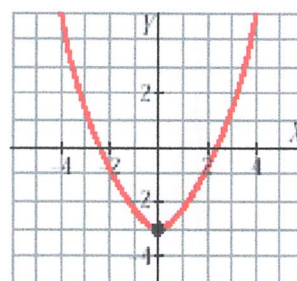
- a) $y = \frac{5}{3}x + \frac{10}{3}$
- b) $y = -\frac{1}{5}x + 8$
- c) $y = 0,025x - 0,05$
- d) $y = 12x - 30$

7)

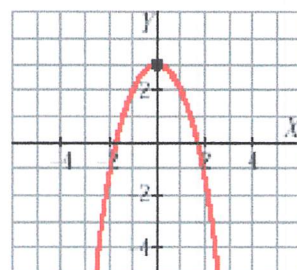
- a) II
- b) I
- c) IV
- d) III

8)

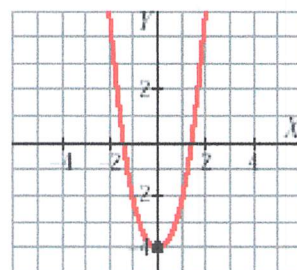
- a) Vèrtex: $(0, -3)$
Punts de tall: $(-\sqrt{6}, 0); (\sqrt{6}, 0); (0, -3)$



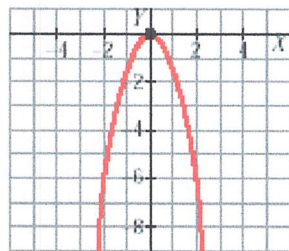
- b) Vèrtex: $(0, 3)$
Punts de tall: $(\sqrt{3}, 0); (-\sqrt{3}, 0); (0, 3)$



- c) Vèrtex: $(0, -4)$
Punts de tall: $(\sqrt{2}, 0); (-\sqrt{2}, 0); (0, -4)$

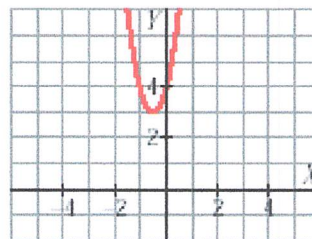


d) Vèrtex: $(0,0)$
Punts de tall: $(0,0)$



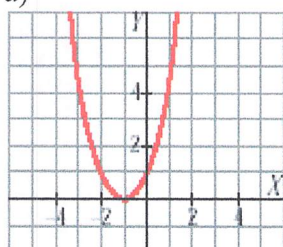
10)

a) Vèrtex: $(-\frac{1}{2}, 3)$

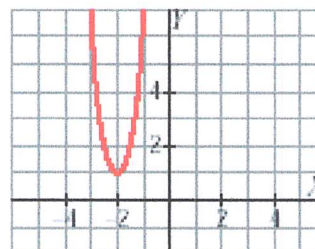


9)

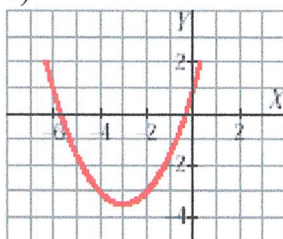
a)



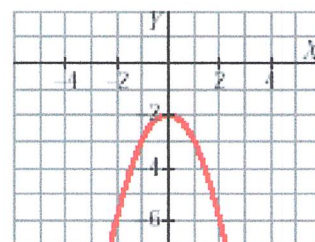
b) Vèrtex: $(-2,1)$



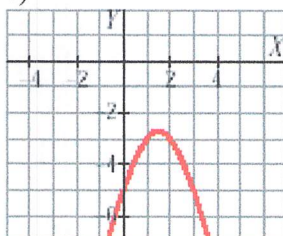
b)



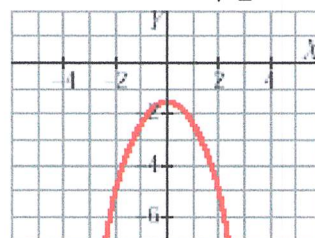
c) Vèrtex: $(0,-2)$



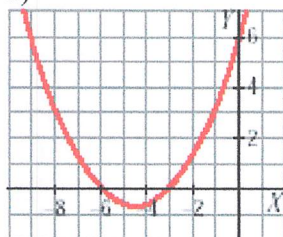
c)



d) Vèrtex: $(0, -\frac{3}{2})$



d)



11)

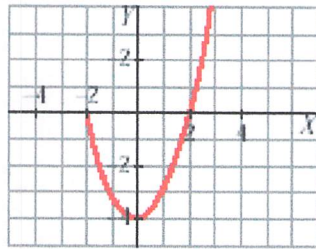
a) $[-2, 2]$

b) $(-\infty, 2) \cup (2, +\infty)$

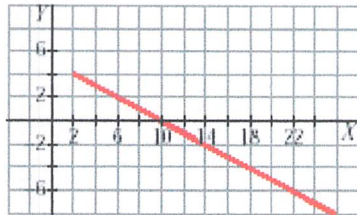
c) $[-1, +\infty)$

12)

a)



b)



13)

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

b) $(0, 2)$

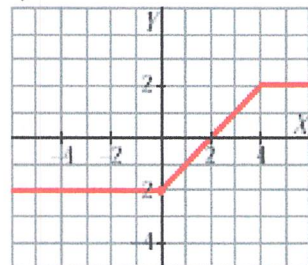
14)

a) x^3

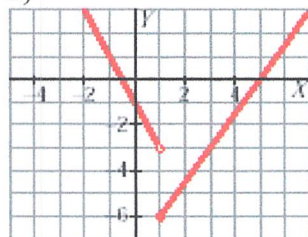
b) $(0, 10)$

15)

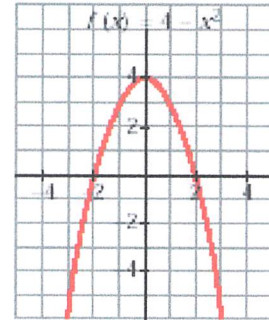
a)



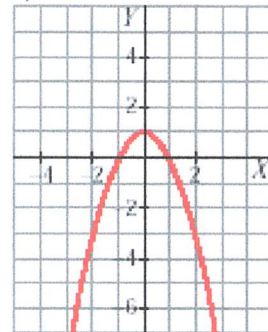
b)



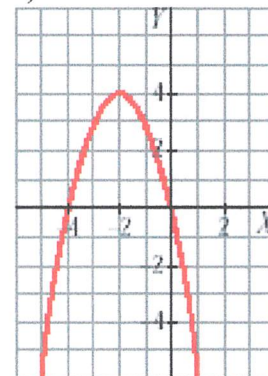
16)



a)



b)



17)

a) $(-\infty, 0] \cup [2, +\infty)$

b) $\mathbb{R}$

c) $[-\sqrt{5}, \sqrt{5}]$

d) $(-\infty, 1] \cup [2, +\infty)$

18)

a) II

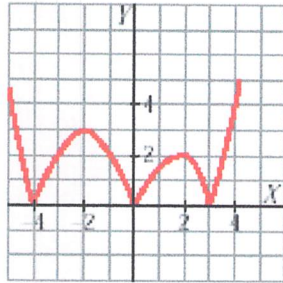
b) III

c) IV

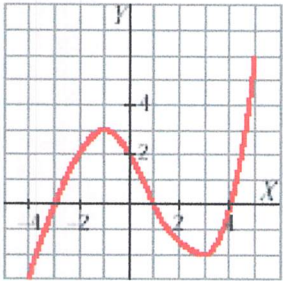
d) I

19)

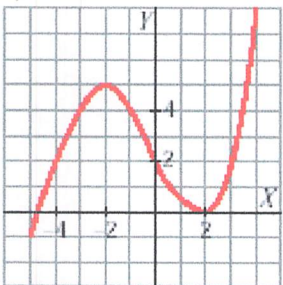
a)



b)



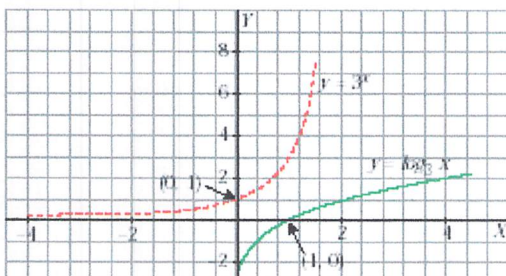
c)



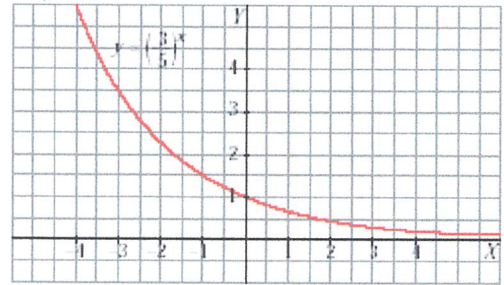
20)

x	-2	-1	0	1	2
3^x	1/9	1/3	1	3	9

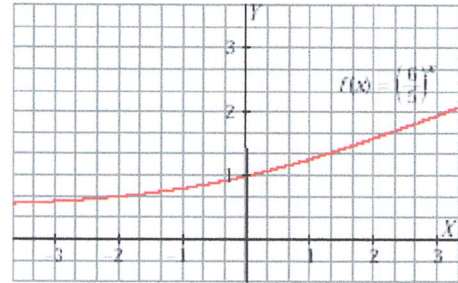
x	1/9	1/3	1	3	9
$\log_3 x$	-2	-1	0	1	2



21)



22) La funció és creixent en tot $\mathbb{R}$.



23)

- a) $\frac{5}{4}$
- b) $\frac{1}{10}$
- c) x
- d) $\frac{1+x^2}{x^2}$

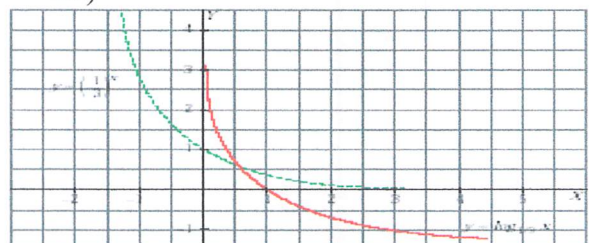
24)

- a) $\cos \sqrt{x}$
- b) $\sqrt{\cos x}$
- c) $\sqrt[4]{x}$

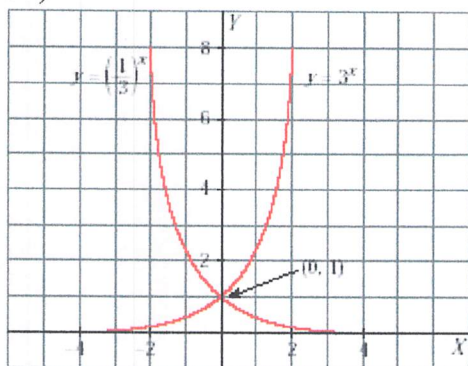
25)

- a) $f^{-1}(x) = \frac{x}{3}$
- b) $f^{-1}(x) = x - 7$
- c) $f^{-1}(x) = \frac{x+2}{3}$

26)

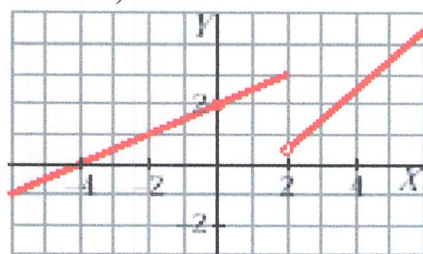


27)

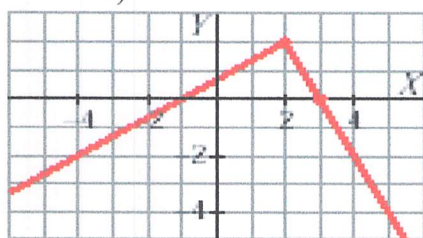


28)

a)

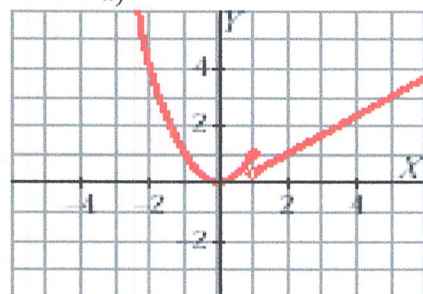


b)

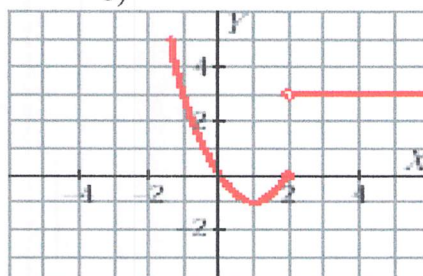


29)

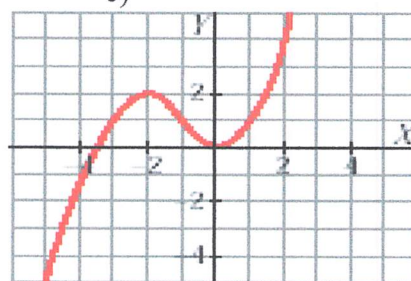
a)



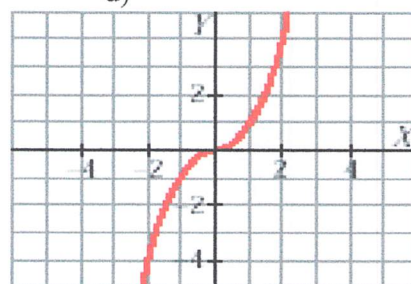
b)



c)

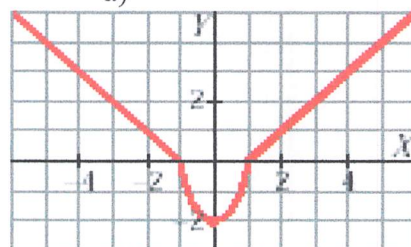


d)

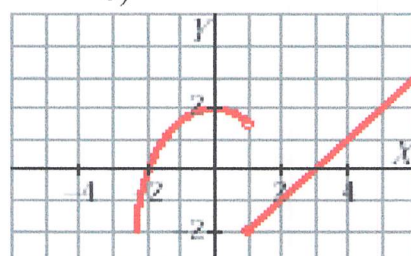


30)

a)

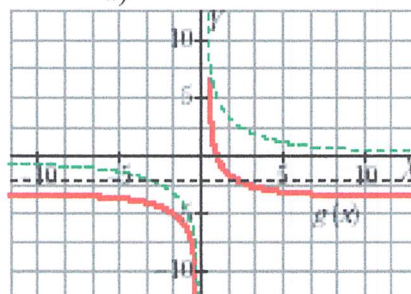


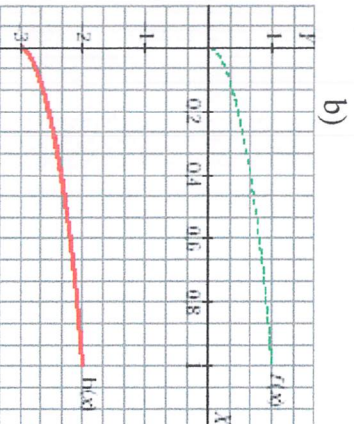
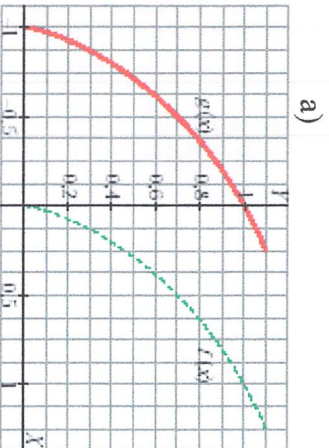
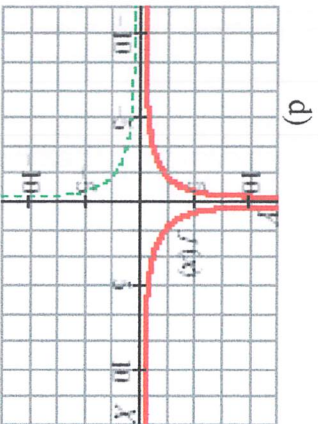
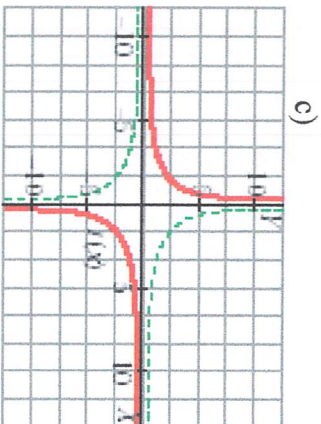
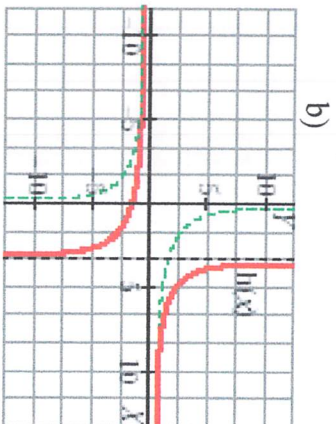
b)



31)

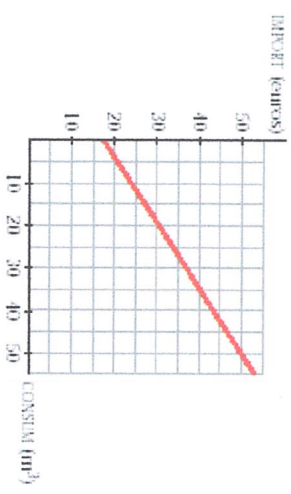
a)





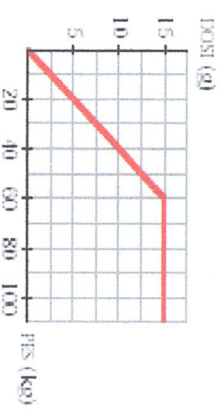
33)

- a) 34,94 euros
b) $y = 0,633x + 17,22$



34) $y = 0,095x - 2,565$

35)

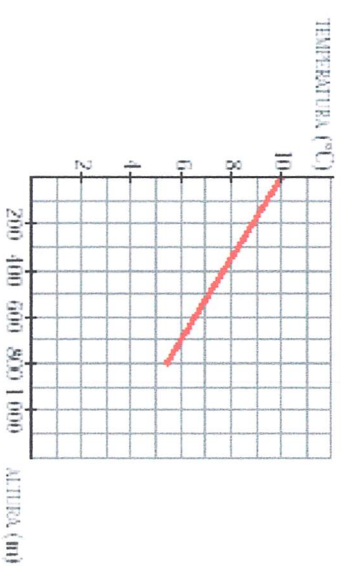


$$y = \begin{cases} 0,25x & 0 \leq x < 60 \\ 15 & x \geq 60 \end{cases}$$

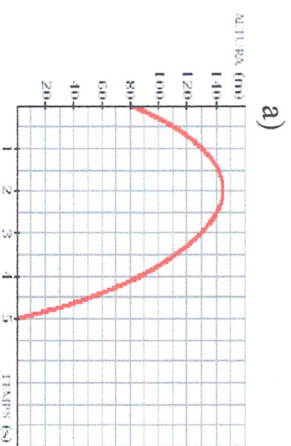
36) 625 televisions.

37) Temperatura als 800m és 5,56°C.

$$T(h) = 10 - h/180$$



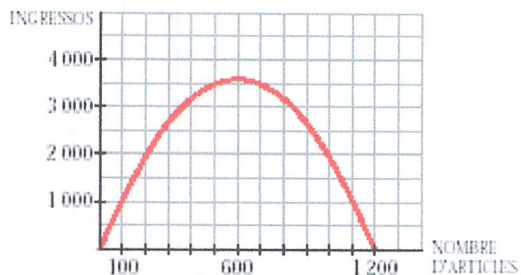
38)



- b) 80m
c) 2s

39)

- a) 350000 euros
b)



- c) 600 articles

40)

- a) 40500 euros amb 90 electrodomèstics
b) $I(x) = -20x^2 + 200x + 40000$
x = desenes d'euros
c) 50 euros

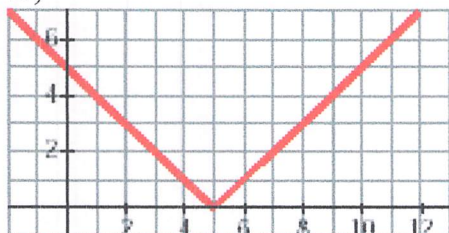
41)

- a) $B(x) = -\frac{x^2}{2} + 15x - 25$
b) S'han de vendre 15 unitats.

42)

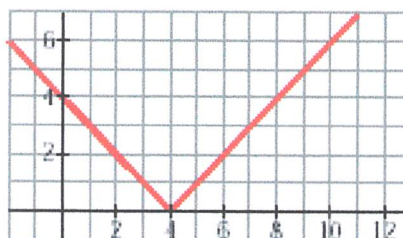
- a) $f(x) = \begin{cases} -x - 1 & \text{si } x \leq 3 \\ 2 & \text{si } x > 3 \end{cases}$
b) $f(x) = \begin{cases} x^2 & \text{si } x \leq 2 \\ 4 & \text{si } x > 2 \end{cases}$

43)

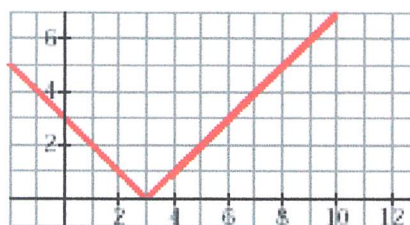


44)

- a) $y = \begin{cases} 4 - x & \text{si } x < 4 \\ -4 + x & \text{si } x \geq 4 \end{cases}$

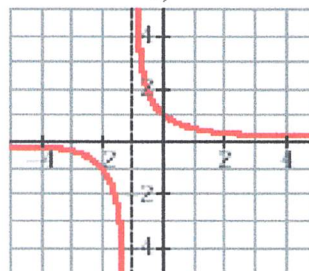


- b) $y = \begin{cases} -x + 3 & \text{si } x < 3 \\ x - 3 & \text{si } x \geq 3 \end{cases}$

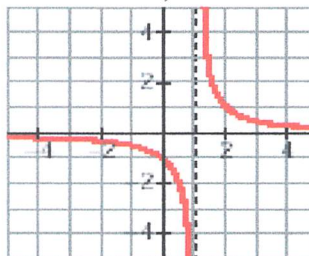


45)

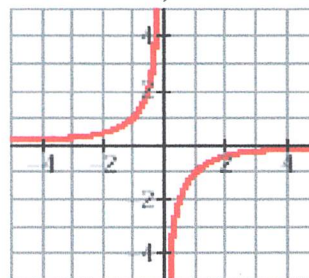
a)

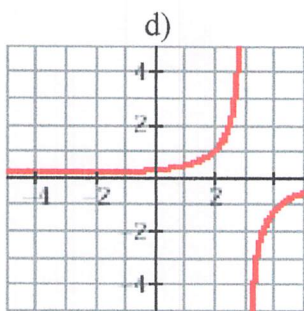


b)

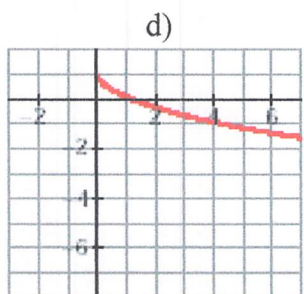
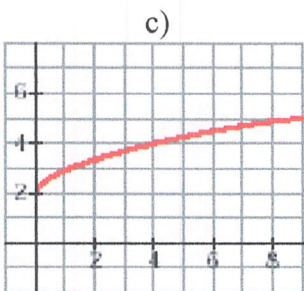
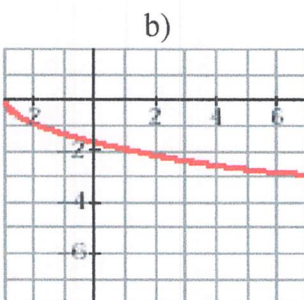
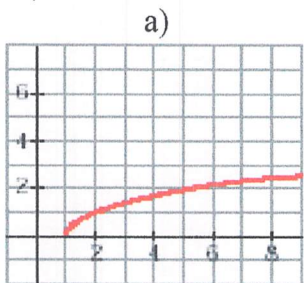


c)

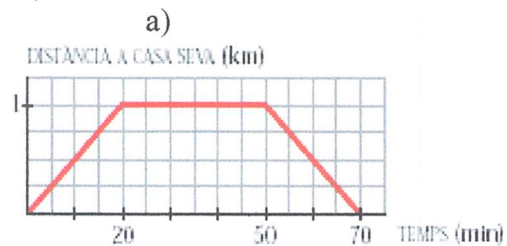




46)



47)



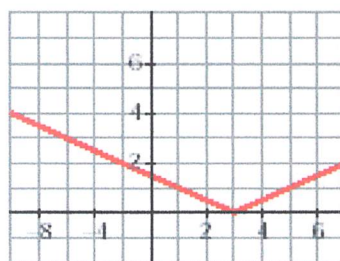
b)

$$f(x) = \begin{cases} (1/20)x & \text{si } 0 \leq x \leq 20 \\ 1 & \text{si } 20 < x \leq 50 \\ -1/20 (x - 70) & \text{si } 50 < x \leq 70 \end{cases}$$

48)

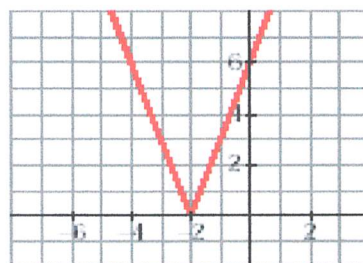
a)

$$y = \begin{cases} -\frac{x+3}{2} & \text{si } x < 3 \\ \frac{x+3}{2} & \text{si } x \geq 3 \end{cases}$$



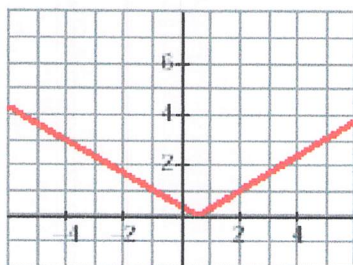
b)

$$y = \begin{cases} -3x - 6 & \text{si } x < -2 \\ 3x + 6 & \text{si } x \geq -2 \end{cases}$$

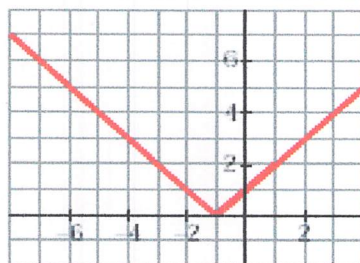


c)

$$y = \begin{cases} \frac{-2x+3}{3} & \text{si } x < \frac{1}{2} \\ \frac{2x+1}{3} & \text{si } x \geq \frac{1}{2} \end{cases}$$

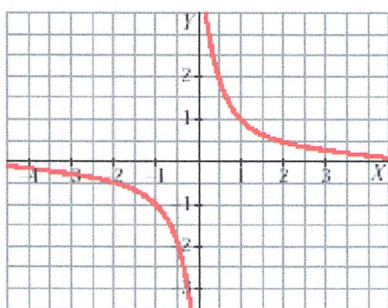


$$d) y = \begin{cases} -x - 1 & \text{si } x < -1 \\ x + 1 & \text{si } x \geq -1 \end{cases}$$

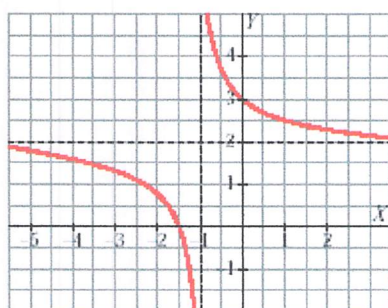


49)

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

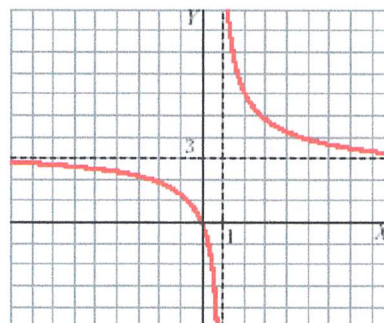


$$y = 2 + \frac{1}{x+1}$$

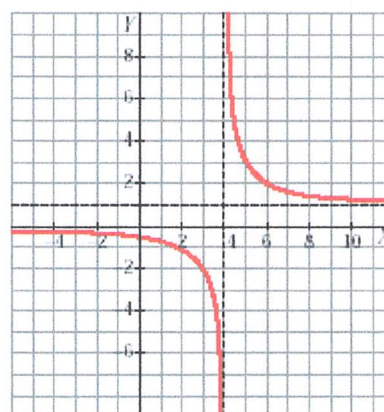


50)

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



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

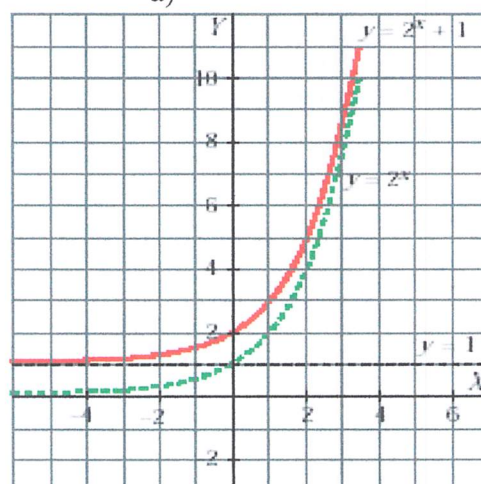


51)

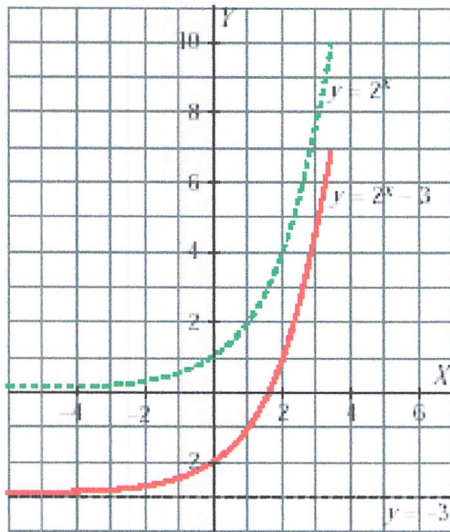
$$p = g \circ f, q = f \circ g, r = h \circ g$$

52)

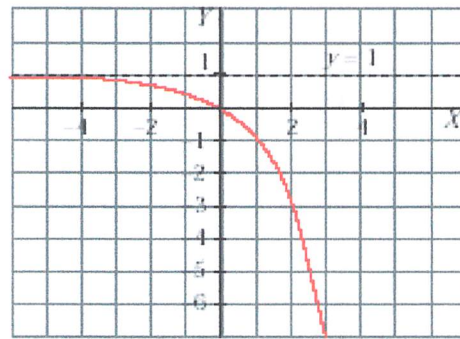
a)



b)



c)

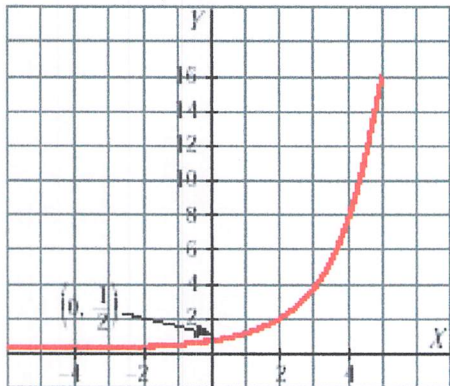


d)

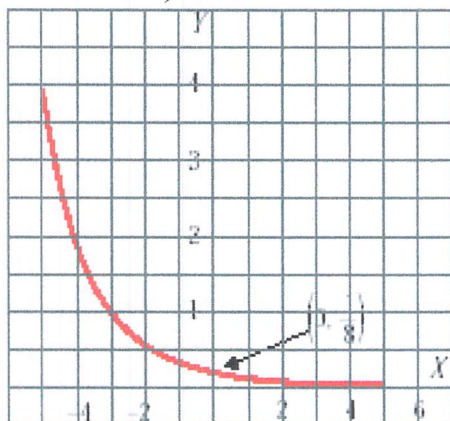


53)

a)



b)

54) $k = 5$; $a = 2$

55)

a) $f^{-1}(x) = 1 + \log_2 \frac{x}{3}$

b) $f^{-1}(x) = \log_3(x-1)$

56)

1) $y = \log_a x$, $0 < a < 1$;

2) $y = a^x$, $0 < a < 1$;

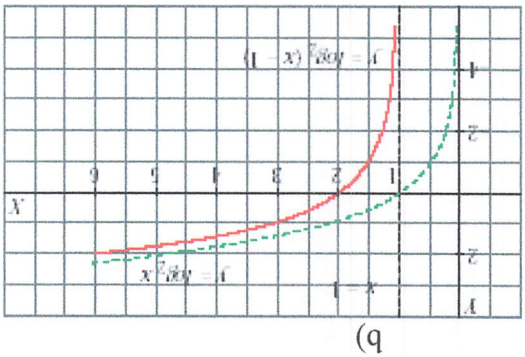
3) $y = \log_a x$, $a > 1$;

4) $y = a^x$, $a > 1$

57)

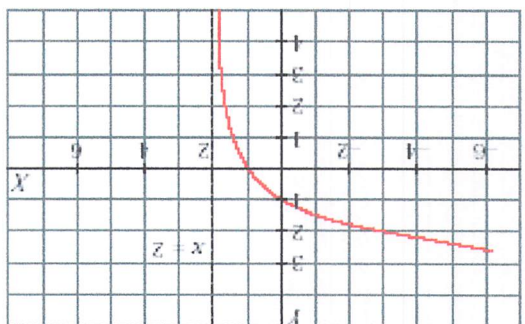
a)





b)

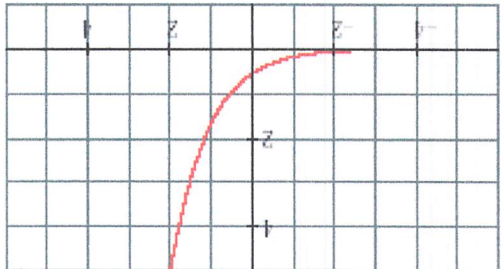
58) $Dom(y) = (-\infty, 2)$



59)

a) $k = \frac{1}{2}$; $a = 3,4$

b)



60) 7518 euros

61)

a) 17908,48 euros
b) 12 anys

62)

a) 0,93 rad
b) -1,12 rad
c) 1,2 rad
d) 2,42 rad
e) 1,29 rad
f) -1,43 rad
a) 60°

63)

$$y = \begin{cases} x^2 - 4 & \text{si } x < -2 \\ -x^2 + 4 & \text{si } -2 \leq x \leq 2 \\ x^2 - 4 & \text{si } x > 2 \end{cases}$$

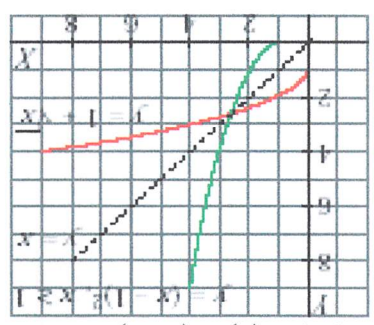
70)

69) a) $Dom(y) = (-\infty, -3] \cup (2, +\infty)$
b) $Dom(y) = (-\infty, 0) \cup [9, +\infty)$

68) $y = 4x^2 - 16x + 12$

a) La y no, la x sí.
b) $a > 1$
c) $(0,1)$
d) $x < 0$

67)



66) $f^{-1}(x) = (x-1)^2, x \geq 1$

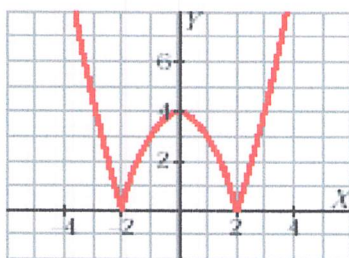
65) $(fog)(x) = (gof)(x) = x$

c) -3,078
d) 0,966
e) $\frac{1}{2}$
f) 14,101

a) $\sqrt{2}/2$
b) $\sqrt{3}/2$

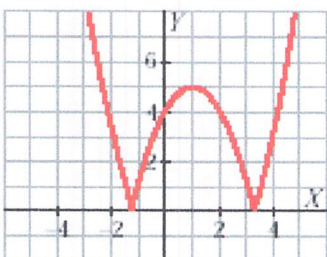
64)

b) 60°
c) 45°
d) 270°
e) 120°
f) 60°



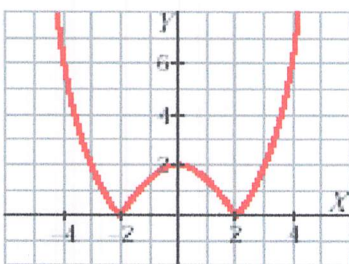
b)

$$y = \begin{cases} x^2 - 2x - 4 & \text{si } x < -1,2 \\ -x^2 + 2x + 4 & \text{si } -1,2 \leq x \leq 3,2 \\ x^2 - 2x - 4 & \text{si } x > 3,2 \end{cases}$$



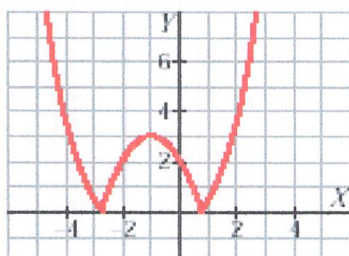
c)

$$y = \begin{cases} (x^2/2) - 2 & \text{si } x < -2 \\ (-x^2/2) + 2 & \text{si } -2 \leq x \leq 2 \\ (x^2/2) - 2 & \text{si } x > 2 \end{cases}$$



d)

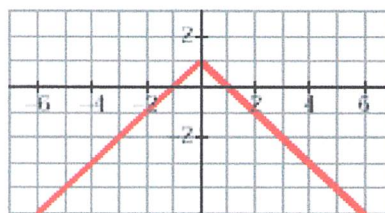
$$y = \begin{cases} x^2 + 2x - 2 & \text{si } x < -2,7 \\ -x^2 - 2x + 2 & \text{si } -2,7 \leq x \leq 0,7 \\ x^2 + 2x - 2 & \text{si } x > 0,7 \end{cases}$$



71)

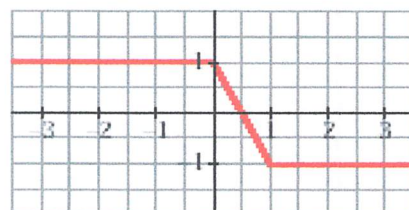
a)

$$y = \begin{cases} 1 - x & \text{si } x \geq 0 \\ 1 + x & \text{si } x < 0 \end{cases}$$



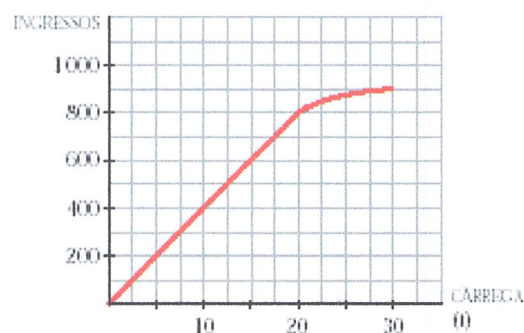
b)

$$y = \begin{cases} 1 & \text{si } x \leq 0 \\ 1 - 2x & \text{si } 0 < x < 1 \\ -1 & \text{si } x \geq 1 \end{cases}$$



72)

a)



b)

$$f(x) = \begin{cases} 40x & \text{si } 0 \leq x \leq 20 \\ 60x - x^2 & \text{si } 20 < x \leq 30 \end{cases}$$

73)

a) b = 9

$$b) y = -\frac{1}{4}(x-2)^2 + 9$$

