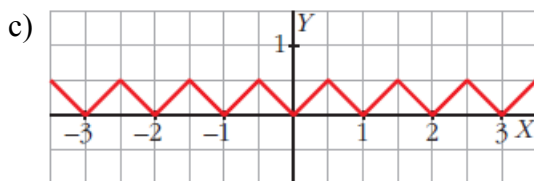
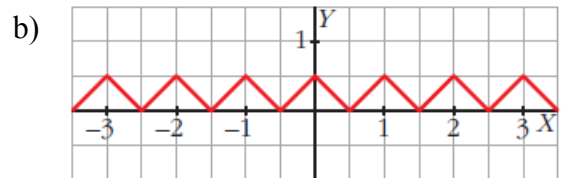
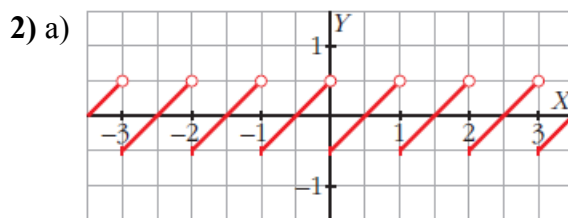
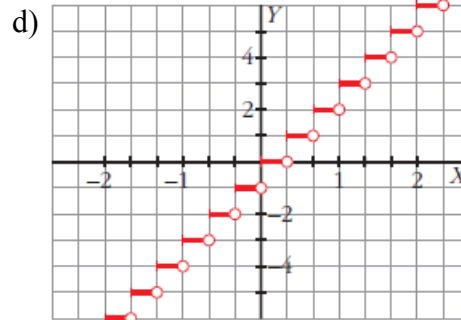
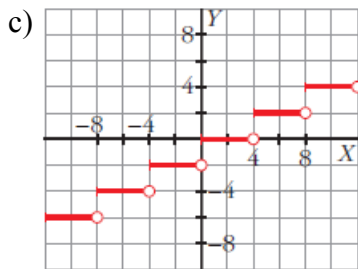
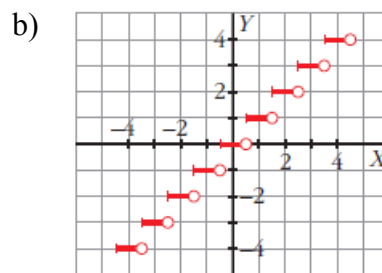
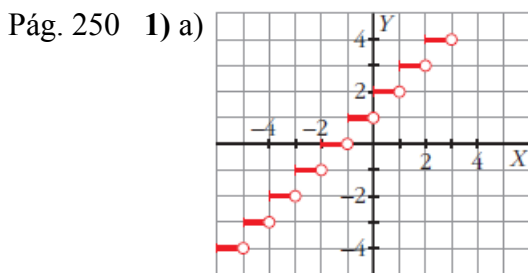
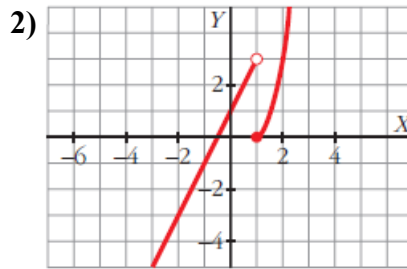
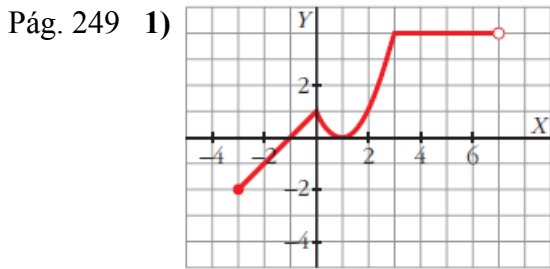


Soluciones Tema 10 FUNCIONES ELEMENTALES

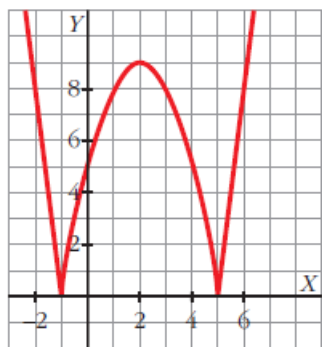
Pág. 245 1) $A \rightarrow L_4, B \rightarrow R_3, C \rightarrow L_2, D \rightarrow C_4, E \rightarrow PI_2, F \rightarrow E_3, G \rightarrow C_1, H \rightarrow E_1$
 $I \rightarrow L_1, J \rightarrow PI_4, K \rightarrow PI_2, L \rightarrow R_2L_1, J \rightarrow PI_4, K \rightarrow PI_2, L \rightarrow R_2$

2) $1 \rightarrow D, 2 \rightarrow E, 3 \rightarrow F, 4 \rightarrow H, 5 \rightarrow A, 6 \rightarrow J$

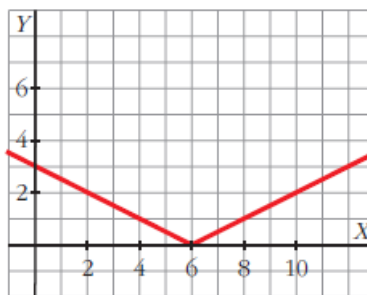
Pág. 248 1) a) \mathbb{R} b) $[1, +\infty)$ c) $(-\infty, 1]$ d) $[-2, 2]$ e) $(-\infty, -2] \cup [2, +\infty)$
 f) $(-\infty, -1) \cup (1, +\infty)$ g) \mathbb{R} h) $\mathbb{R} - \{0\}$ i) $\mathbb{R} - \{0\}$ j) $\mathbb{R} - \{-2, 2\}$
 k) $(0, +\infty)$



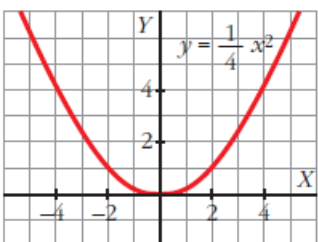
Pág. 251 1)



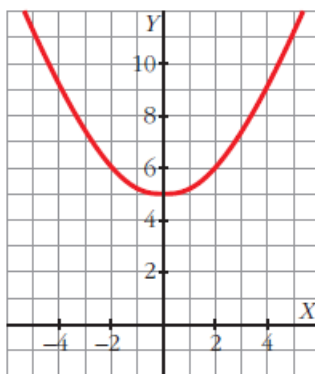
2)



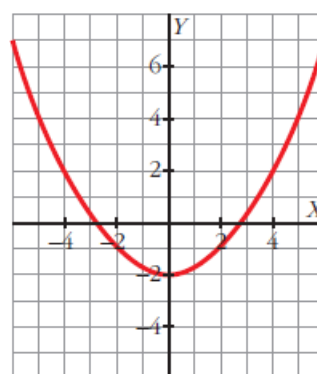
Pág. 252 1)



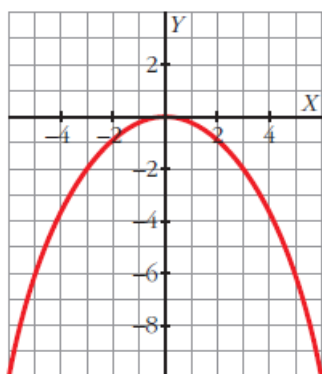
a)



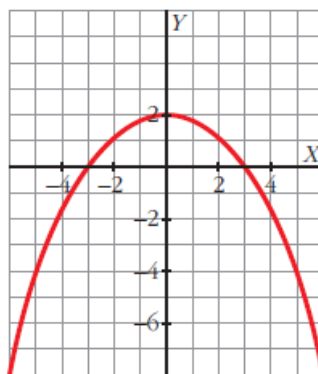
b)



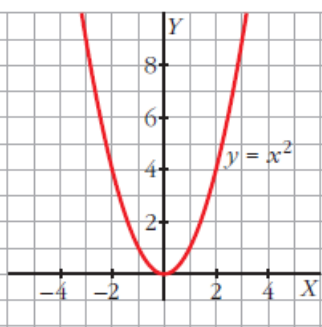
2) a)



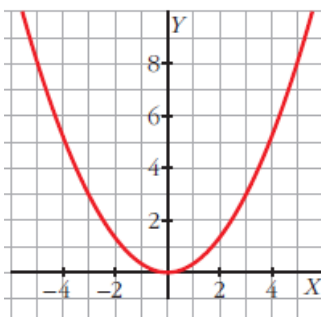
b)



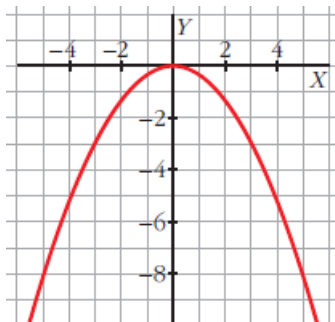
Pág. 253 3)



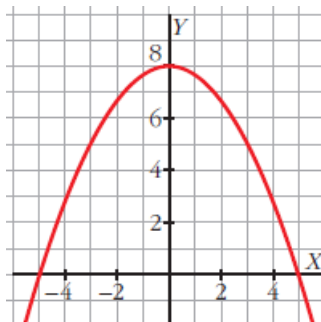
a)



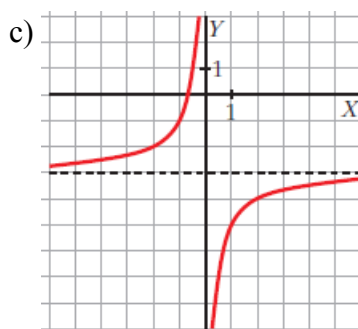
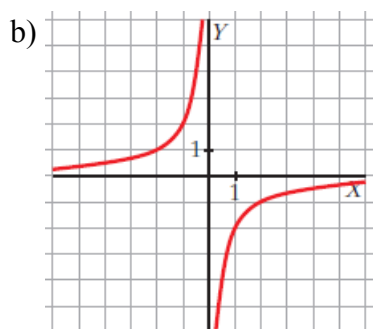
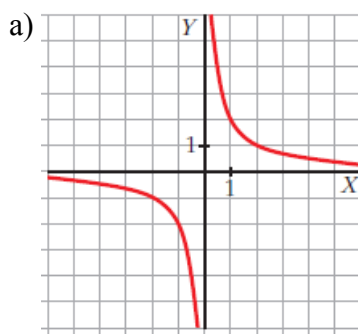
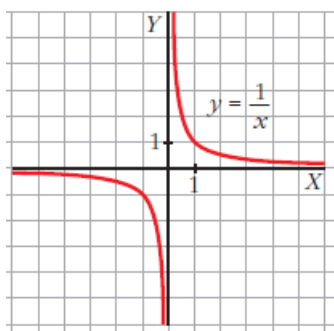
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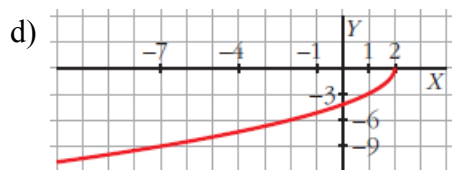
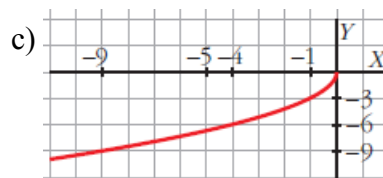
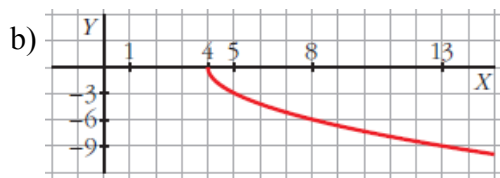
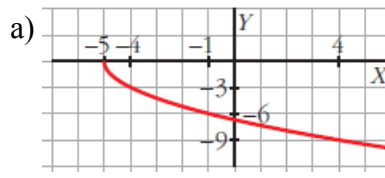
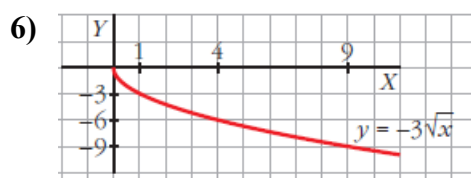
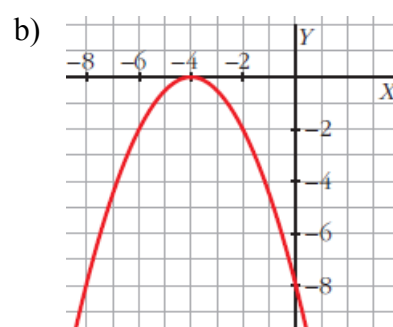
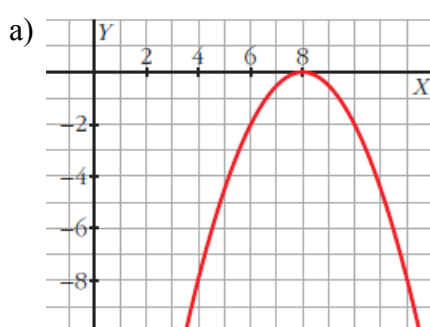
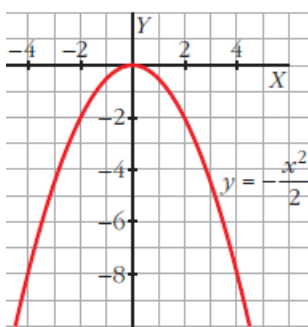
c)



Pág. 253 4)

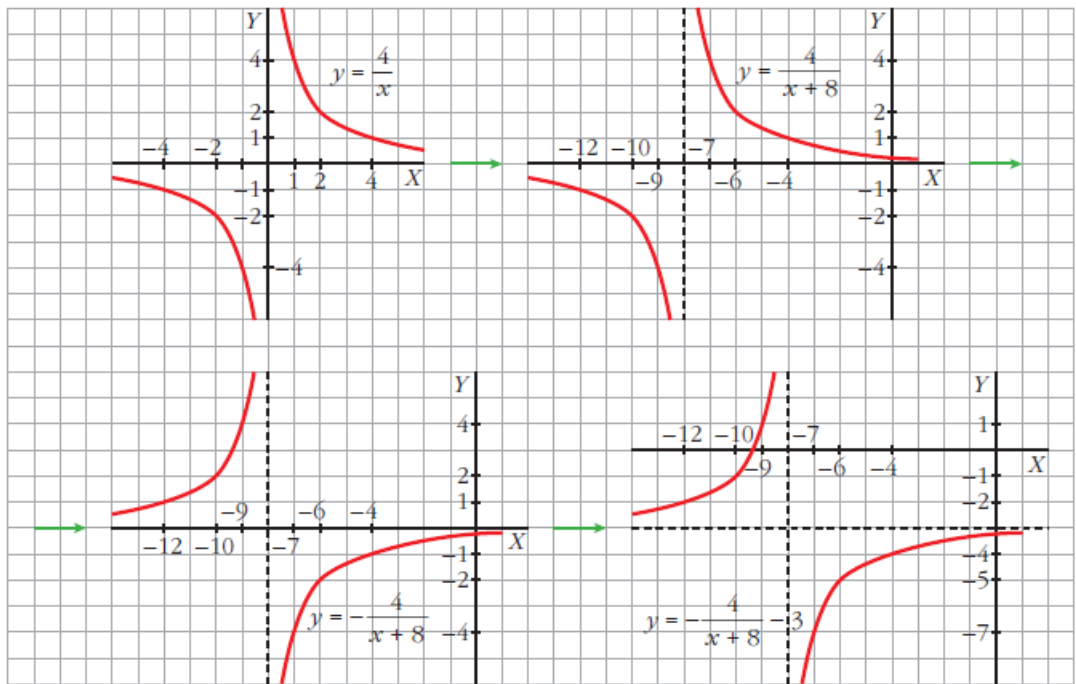


Pág. 254 5)

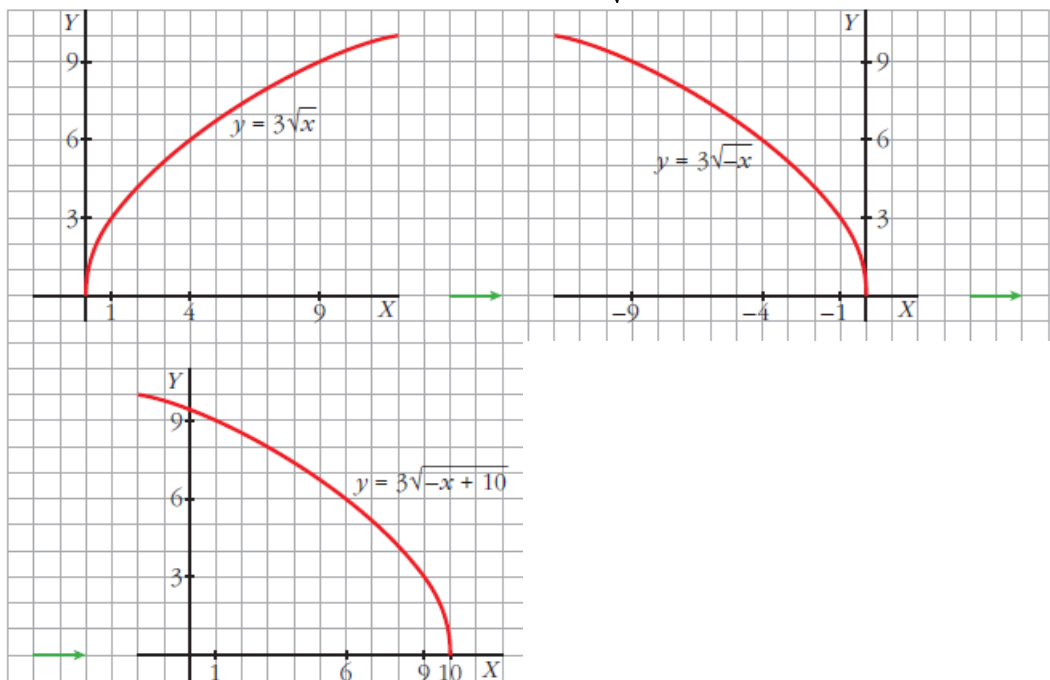


Pág. 255 7) a) (3, 2) b) (-1, 8) c) (3, 4) d) (3, 16) e) (3, -8) f) (-3, 8) g) (-3, -13)

Pág. 255 8) a) Representamos $y = \frac{4}{x} \rightarrow y = \frac{4}{x+8} \rightarrow y = -\frac{4}{x+8} \rightarrow y = -\frac{4}{x+8} - 3$



b) Representamos $y = 3\sqrt{x} \rightarrow y = 3\sqrt{-x} \rightarrow y = 3\sqrt{-(x-10)} = 3\sqrt{-x+10}$



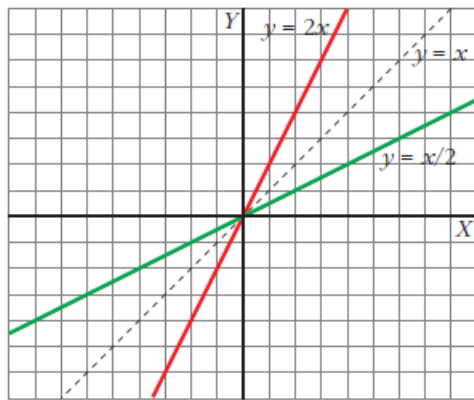
Pág. 256 1) $f[g(x)] = x^4 - 5x^2 + 3$; $g[f(x)] = (x^2 - 5x + 3)^2$; $f[g(4)] = 179$; $g[f(4)] = 1$

2) $f \circ g(x) = \text{sen}(x^2 + 5)$; $g \circ f(x) = \text{sen}^2 x + 5$; $f \circ f(x) = \text{sen}(\text{sen} x)$

$g \circ g(x) = x^4 + 10x^2 + 30$; $f \circ g(0) = -0'96$; $f \circ g(2) = 0'41$; $g \circ f(0) = 5$

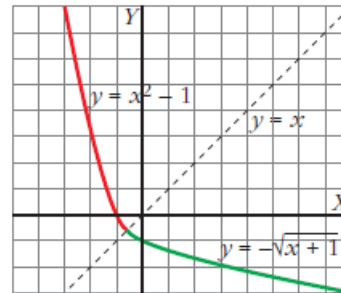
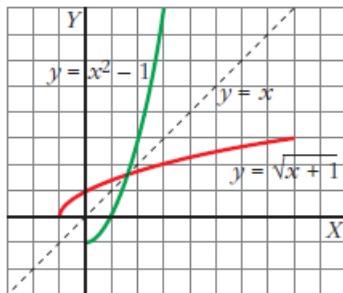
$g \circ f(2) = 5'83$; $f \circ f(0) = 0$; $f \circ f(2) = 0'79$; $g \circ g(0) = 30$; $g \circ g(2) = 86$

Pág. 257 1)

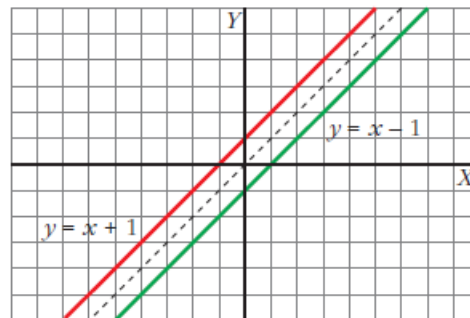


2) $y^{-1} = \sqrt{x+1}$, si $x \geq 0$

$y^{-1} = -\sqrt{x+1}$, si $x < 0$



3) Son inversas



Pág. 259 1) a) año 2127; año 1473 b) 1'4, 1'9, 1'96, 0'51, 0'43

Pág. 267 1) a) $\mathbb{R} - \{-1, 0\}$ b) $\mathbb{R} - \{2\}$ c) $\mathbb{R} - \left\{-\frac{1}{2}\right\}$ d) \mathbb{R} e) $\mathbb{R} - \{0, 5\}$ f) $\mathbb{R} - \{\pm\sqrt{2}\}$

2) a) $(-\infty, 3]$ b) $\left[\frac{1}{2}, +\infty\right)$ c) $(-\infty, -2]$ d) $(-\infty, 0]$

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

4) Dominios: $[-2, 2]$; $(-\infty, 2) \cup (2, +\infty)$; $[-1, +\infty)$
Recorridos: $[0, 2]$; $(0, +\infty)$; $[0, +\infty)$

5) a) $16 - x^2$ b) Dominio: $(0, 2)$; Recorrido: $(8, 16)$

6) a) x^3 b) Dominio: $(0, 10)$; Recorrido: $(0, 1000)$

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

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

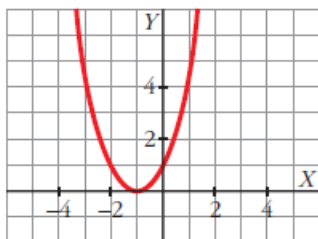
Pág. 268 9) a) $V(-1,0)$, Corte con los ejes: $(-1,0)$, $(0,1)$

b) $V\left(-3, -\frac{7}{2}\right)$, Corte con los ejes: $(-3+\sqrt{7}, 0)$, $(-3-\sqrt{7}, 0)$, $(0,1)$

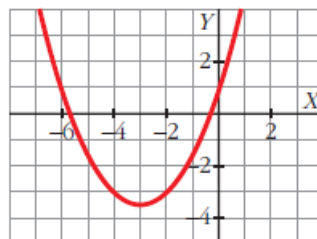
c) $V\left(\frac{3}{2}, -\frac{11}{4}\right)$, Corte con los ejes: $(0, -5)$

d) $V\left(-\frac{9}{2}, -\frac{3}{4}\right)$, Corte con los ejes: $(-6,0)$, $(-3,0)$, $(0,6)$

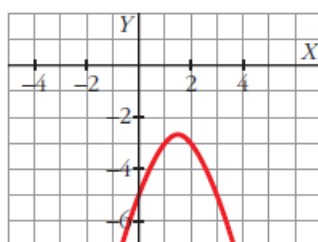
Gráficas: a)



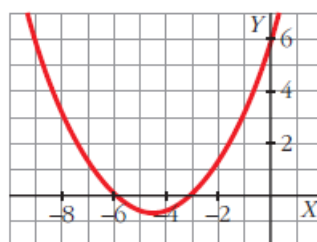
b)



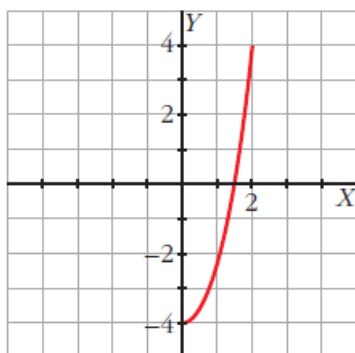
c)



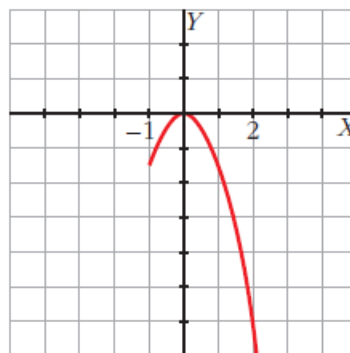
d)



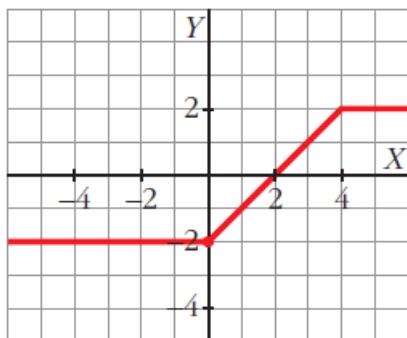
10) a)



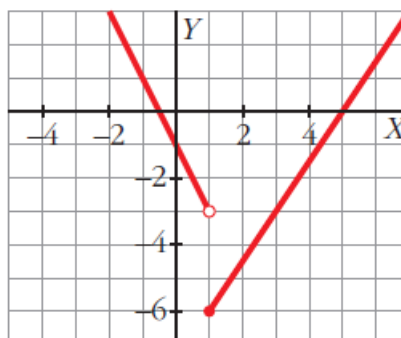
b)



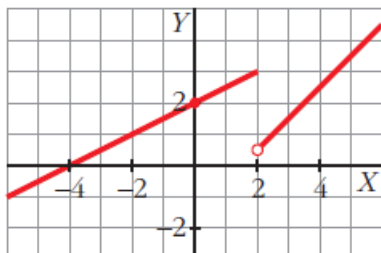
11) a)



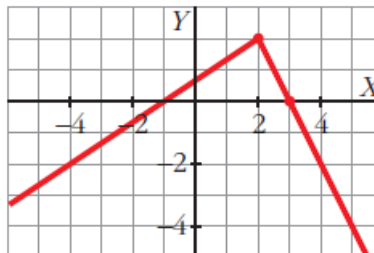
b)



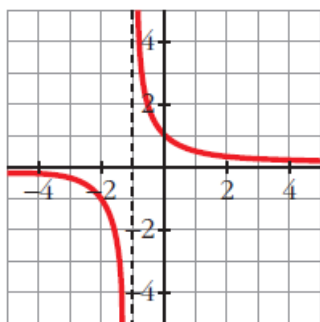
12) a)



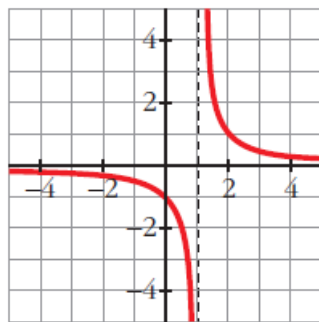
b)



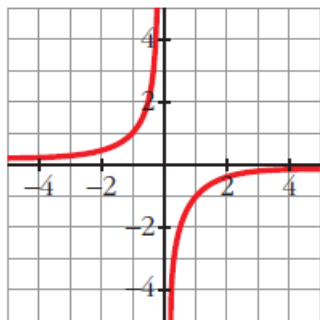
Pág. 268 13) a)



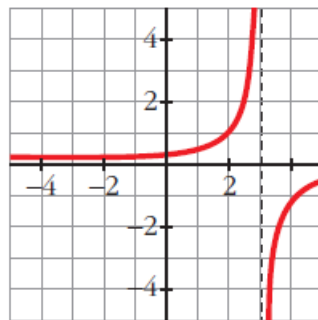
b)



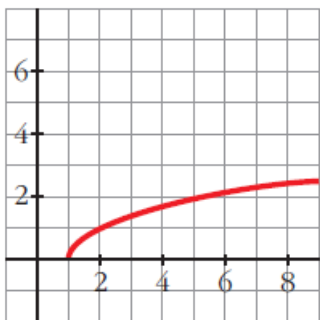
c)



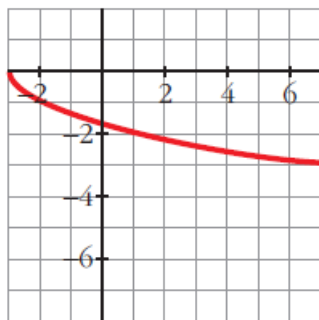
d)



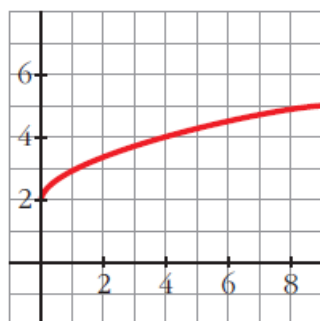
14) a)



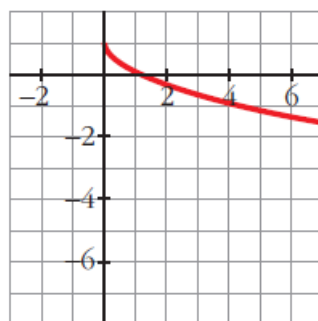
b)



c)

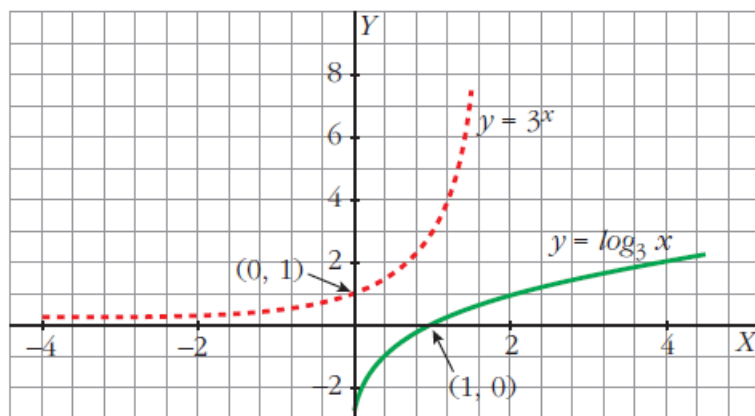


d)



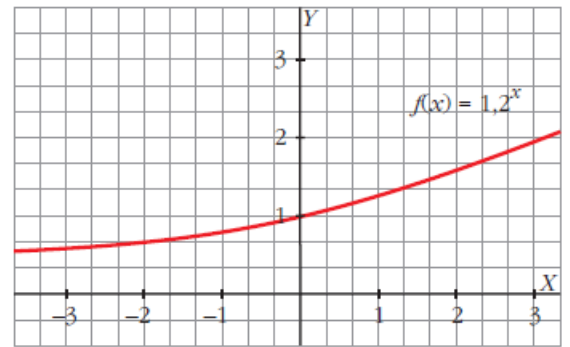
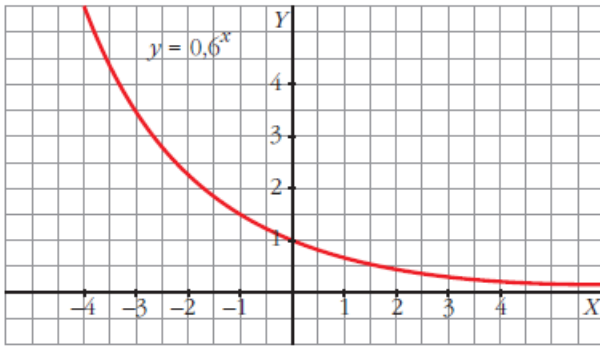
15)

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



Pág. 268 16) a)

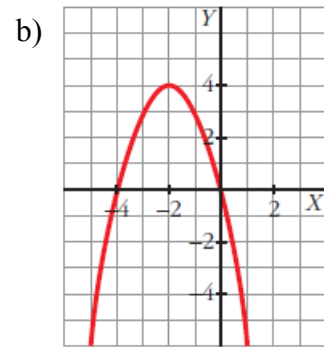
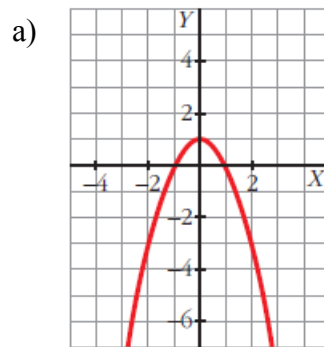
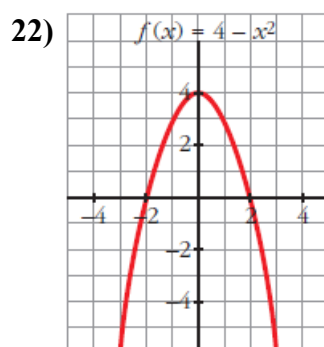
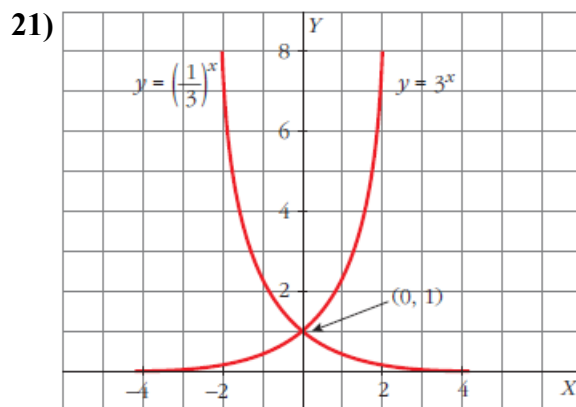
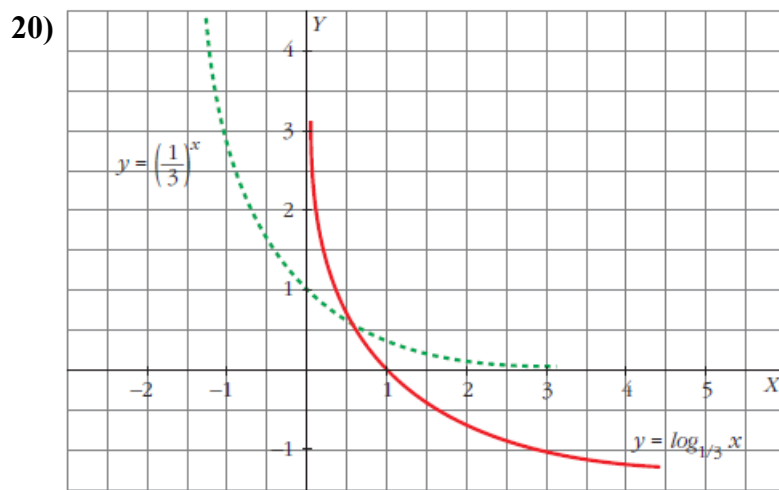
b)

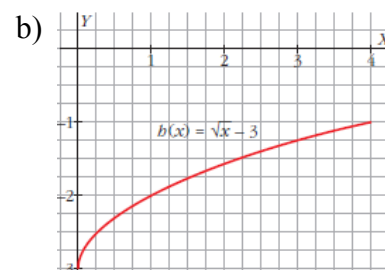
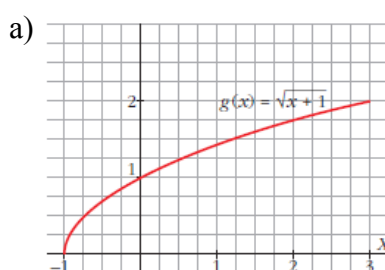
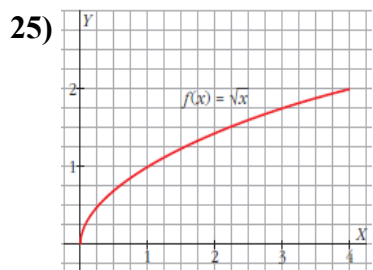
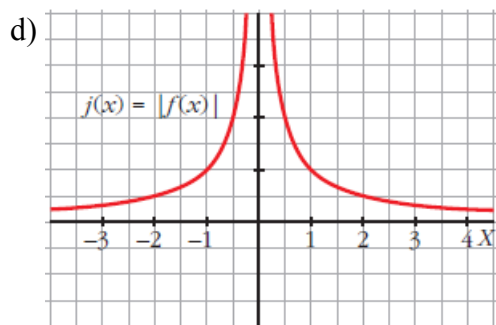
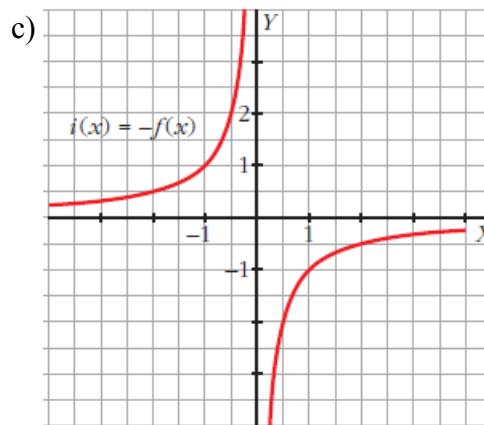
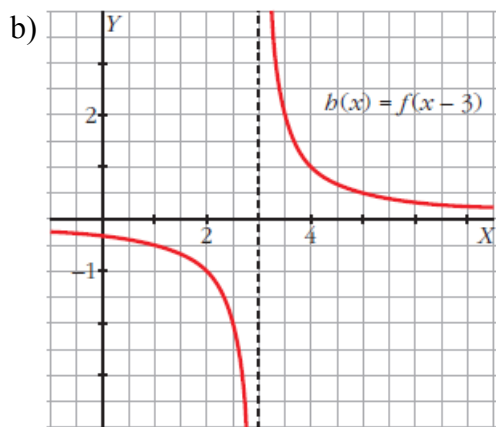
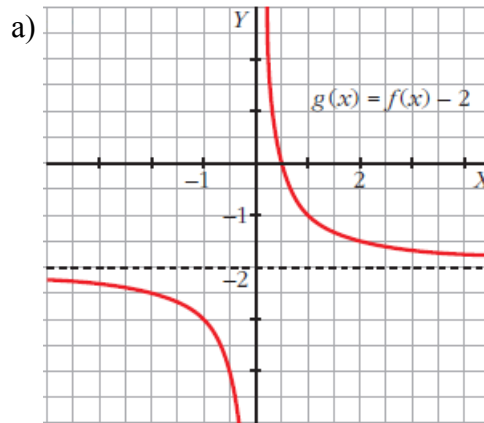
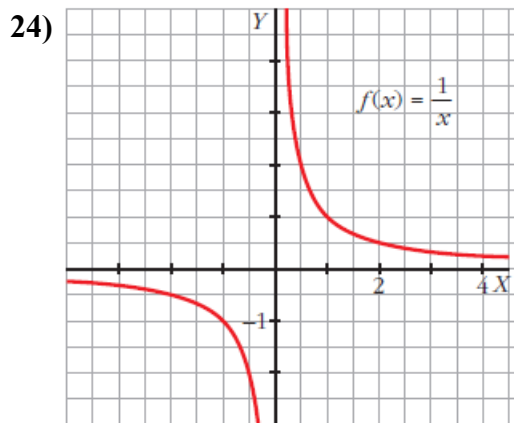
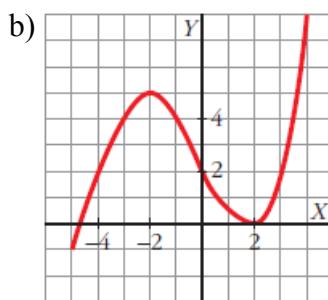
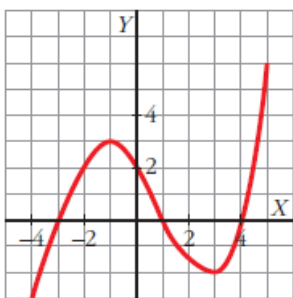


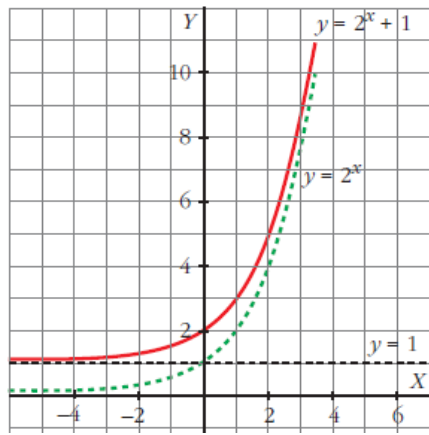
17) a) $\frac{5}{4}$ b) $\frac{1}{10}$ c) x d) $\frac{1+x^2}{x^2}$

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

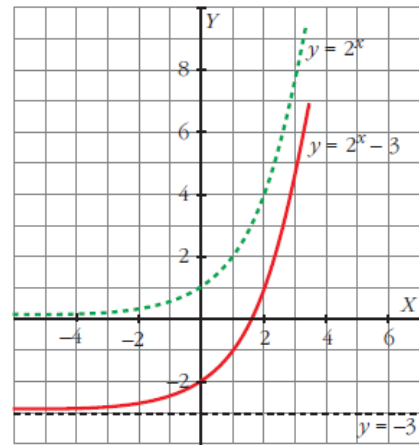
19) a) $y^{-1} = \frac{x}{3}$ b) $y^{-1} = x - 7$ c) $y^{-1} = \frac{x+2}{3}$



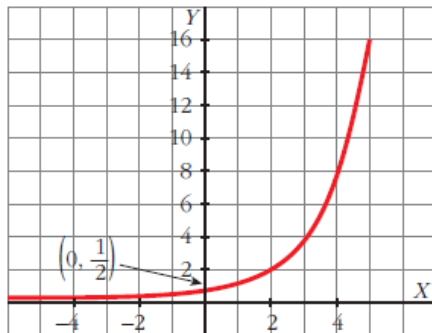




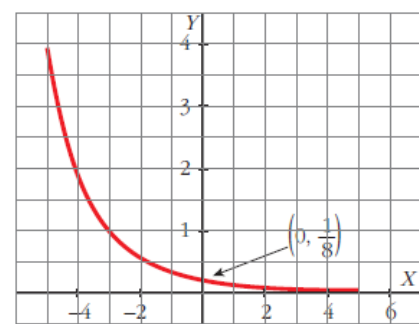
b)



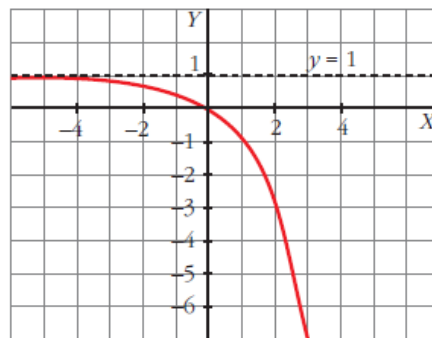
27) a)



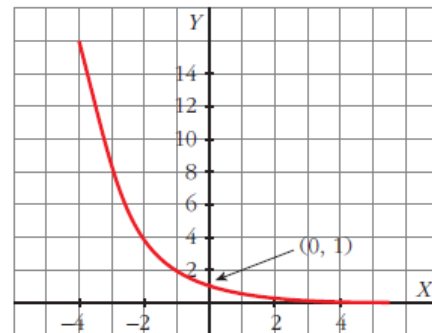
b)



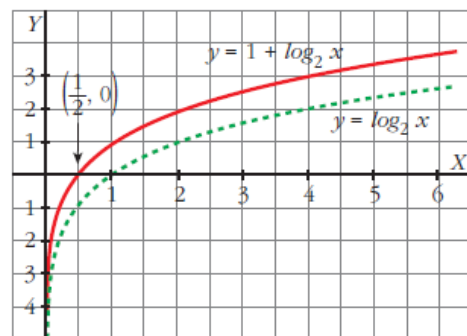
c)



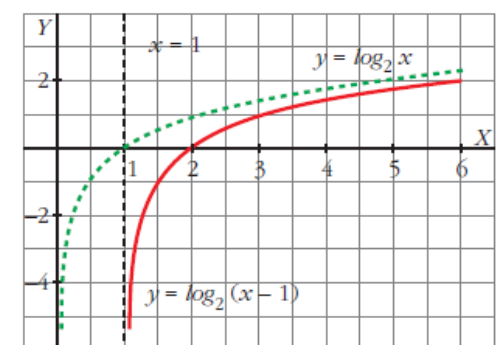
d)



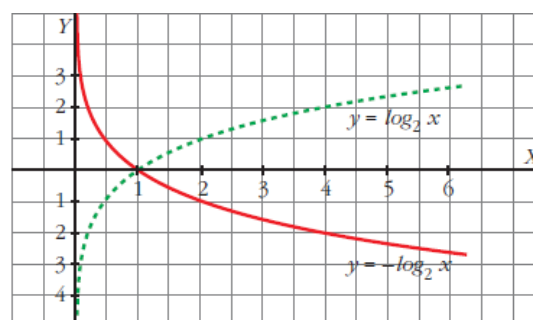
28) a)



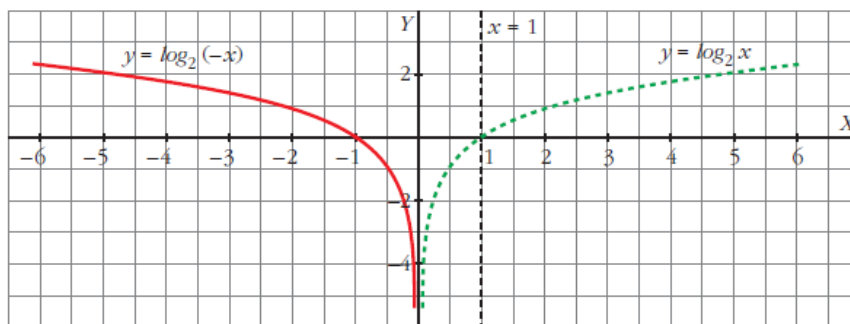
b)



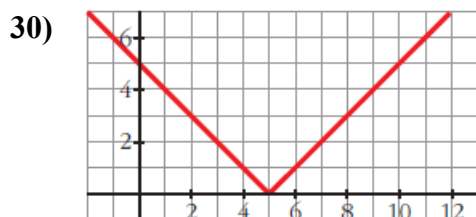
c)



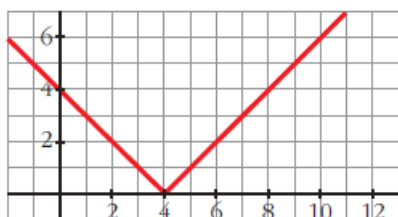
Pág. 269 28) d)



29) a = 2, b = 1



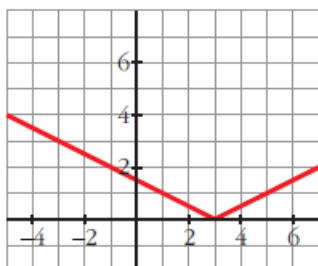
31) a) $y = \begin{cases} 4 - x & \text{si } x < 4 \\ -4 + x & \text{si } x \geq 4 \end{cases}$



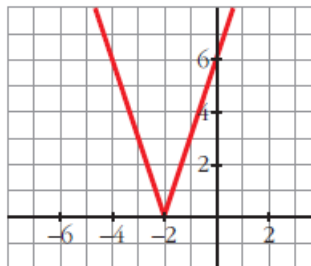
b) $y = \begin{cases} -x + 3 & \text{si } x < 3 \\ x - 3 & \text{si } x \geq 3 \end{cases}$



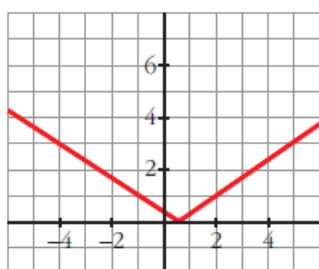
32) a) $y = \begin{cases} -\frac{x-3}{2} & \text{si } x < 3 \\ \frac{x-3}{2} & \text{si } x \geq 3 \end{cases}$



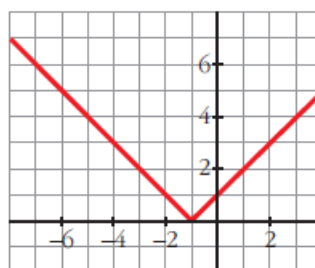
b) $y = \begin{cases} -3x - 6 & \text{si } x < -2 \\ 3x + 6 & \text{si } x \geq -2 \end{cases}$



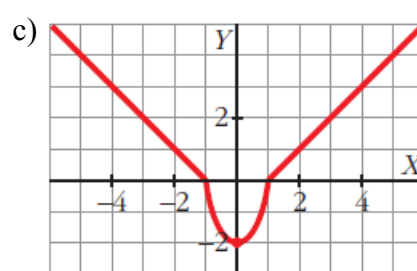
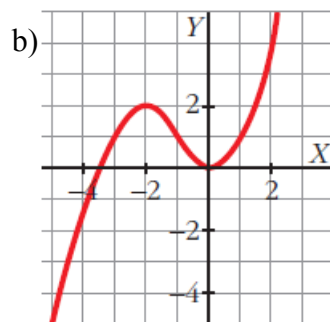
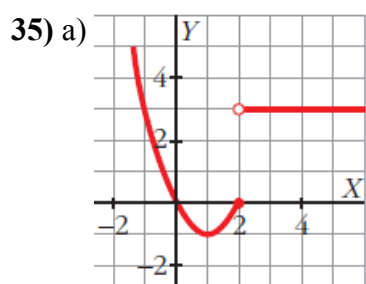
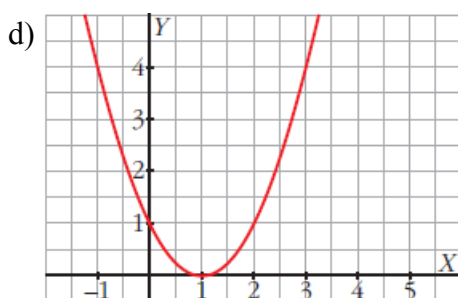
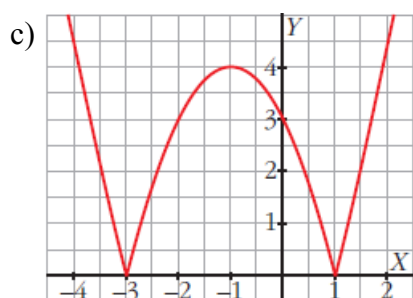
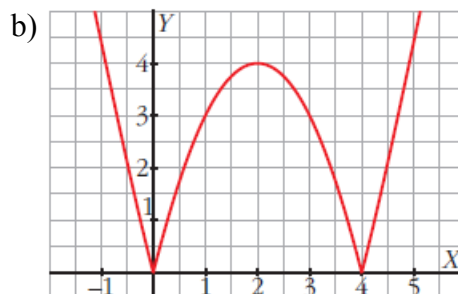
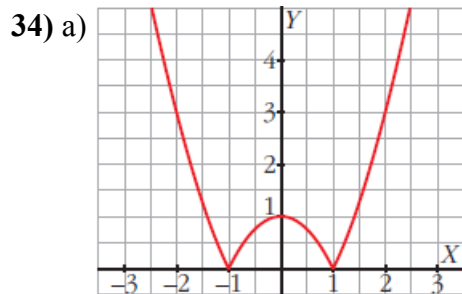
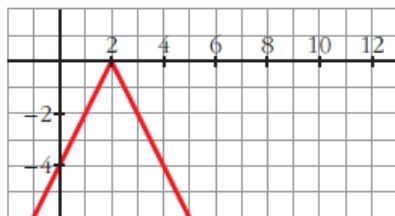
c) $y = \begin{cases} -\frac{2x-1}{3} & \text{si } x < \frac{1}{2} \\ \frac{2x-1}{3} & \text{si } x \geq \frac{1}{2} \end{cases}$



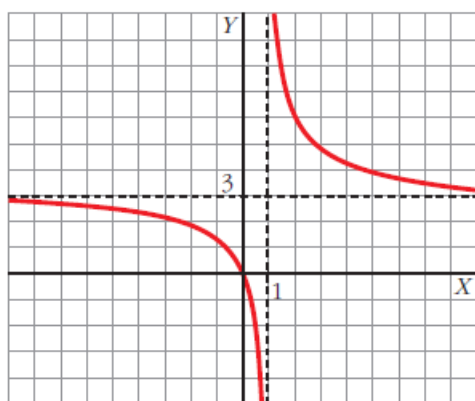
d) $y = \begin{cases} -x - 1 & \text{si } x < -1 \\ x + 1 & \text{si } x \geq -1 \end{cases}$



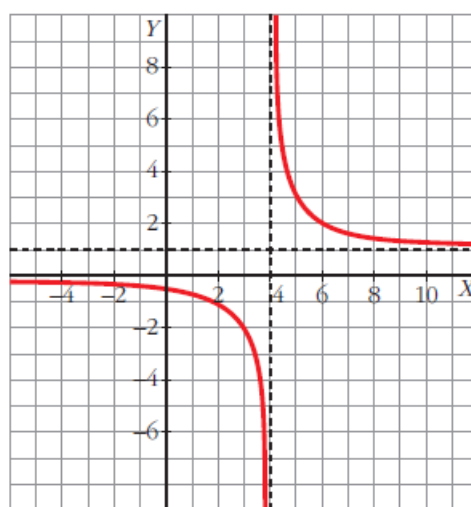
Pág. 269 33) $y = -|2x - 4|$



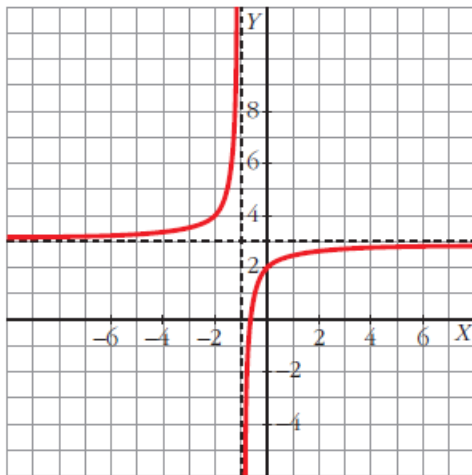
37) a) $y = 3 + \frac{3}{x-1}$



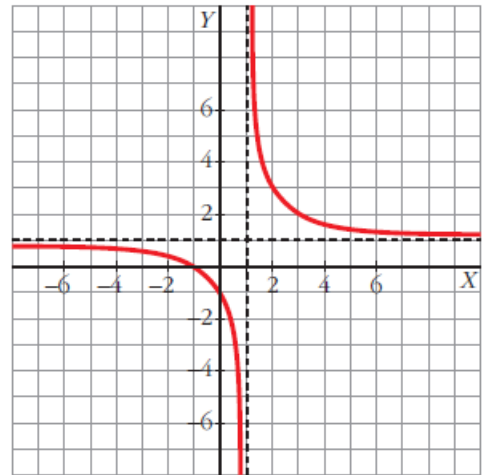
b) $y = 1 + \frac{2}{x-4}$



Pág. 269 37) c) $y = 3 + \frac{-1}{x+1}$

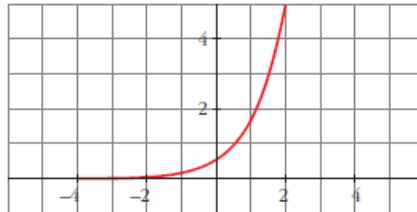


d) $y = 1 + \frac{2}{x-1}$



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

39) $k = 0'5$, $a = 3'4$



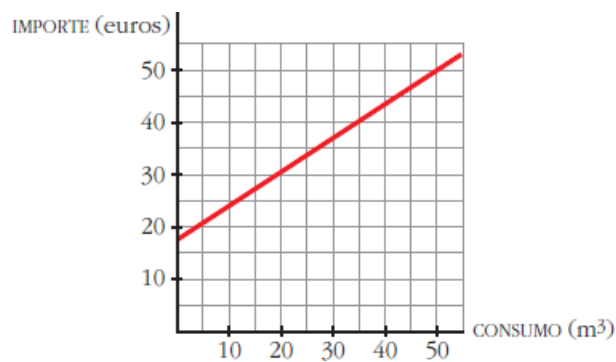
40) a) $y^{-1} = 1 + \log_2\left(\frac{x}{3}\right)$ b) $y^{-1} = \log_3(x-1)$

Pág. 270 41) a) $f(x) = \begin{cases} -x-1 & \text{si } x \leq 3 \\ 2 & \text{si } x > 3 \end{cases}$ b) $f(x) = \begin{cases} x^2 & \text{si } x \leq 2 \\ 4 & \text{si } x > 2 \end{cases}$

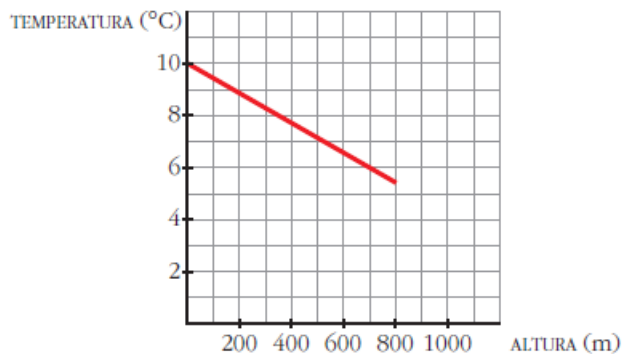
42) a) 0'93 b) -1'12 c) 1'2 d) 2'42 e) 1'29 f) -1'43

43) a) 60° b) 60° c) 45° d) -90° e) 120° f) 60°

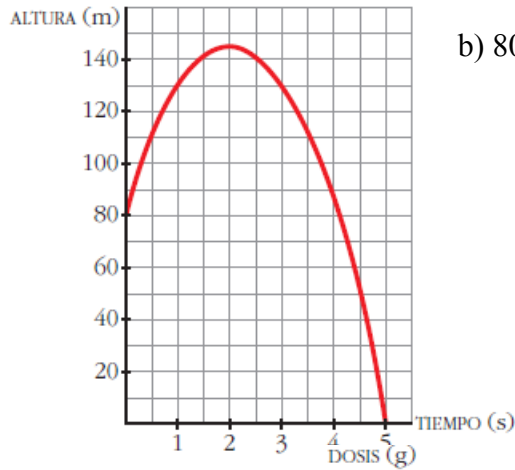
44) a) $y = 0'633x + 17'22$
b) $y(28) = 34'94$



45) 5'56°C; $y = 10 - \frac{x}{180}$

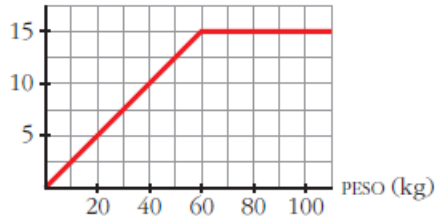


Pág. 270 46) a)



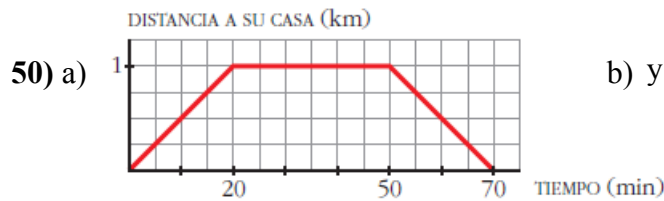
b) 80 m c) 2 s

$$47) y = \begin{cases} 0.25x & \text{si } x < 60 \\ 15 & \text{si } x \geq 60 \end{cases}$$



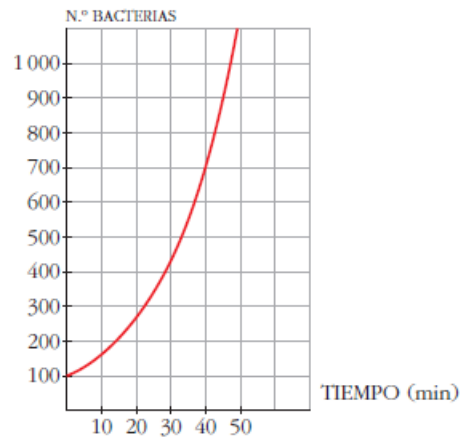
48) a) $y = -\frac{x^2}{2} + 15x - 25$ b) 15 unidades

49) a) 40.500€ b) $y = -\frac{x^2}{5} + 20x + 40000$ c) 50€

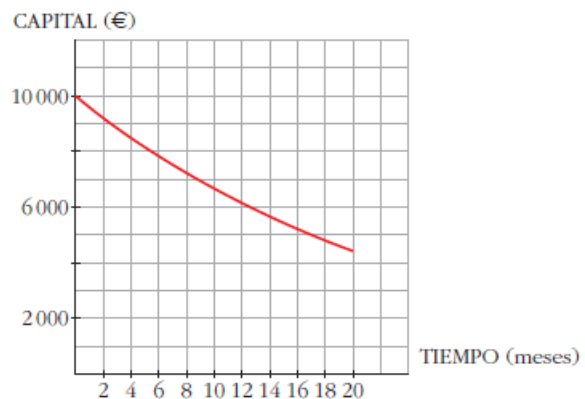


$$50) a) \quad b) y = \begin{cases} \frac{x}{20} & \text{si } 0 \leq x \leq 20 \\ 1 & \text{si } 20 < x \leq 50 \\ -\frac{x}{20} + 3.5 & \text{si } 50 < x \leq 70 \end{cases}$$

51) $k = 100$, $a = 1.05$
5.000 bacterias en 80'18 minutos

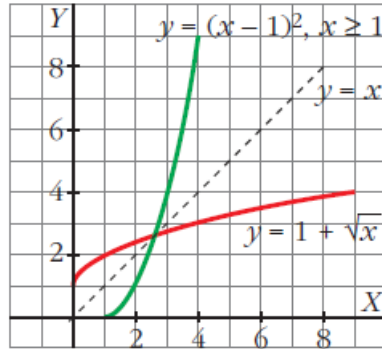


52) $y = 10000 \cdot (0.96)^x$
En 17 meses se reduce a la mitad



Pág. 271 53) $f \circ g(x) = g \circ f(x) = x$

54) $f^{-1}(x) = (x - 1)^2$



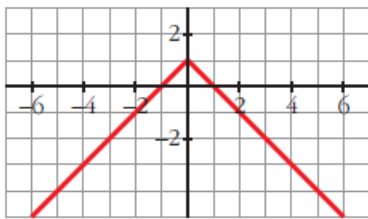
55) a) $y > 0, x \in \mathbb{R}$ b) $a > 1$ c) $(0,1)$ d) $x < 0$

56) a) $\frac{\sqrt{2}}{2}$ b) $\frac{\sqrt{3}}{2}$ c) $-3'078$ d) $0'966$ e) $\frac{1}{2}$ f) $14'101$

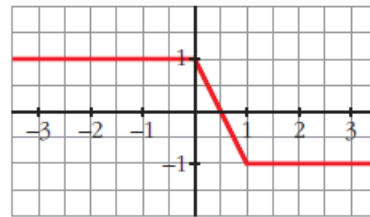
57) $y = 4x^2 - 16x + 12$

58) a) $(-\infty, -3] \cup (2, +\infty)$ b) $(-\infty, 0) \cup [9, +\infty)$

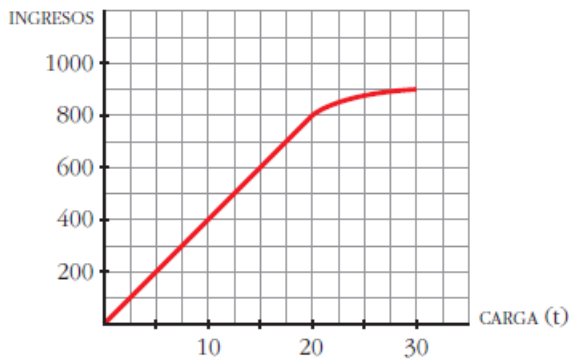
59) a) $y = \begin{cases} 1+x & \text{si } x \leq 0 \\ 1-x & \text{si } x > 0 \end{cases}$



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



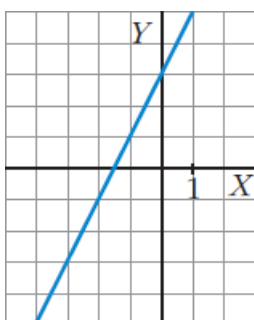
60) a)



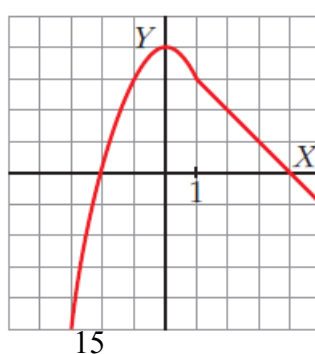
b) $y = \begin{cases} 40x & \text{si } 0 < x \leq 20 \\ 60x - x^2 & \text{si } 20 < x \leq 30 \end{cases}$

Autoevaluación: 1) a) $(-\infty, 0] \cup [2, +\infty)$ b) $\mathbb{R} - \{0,1\}$

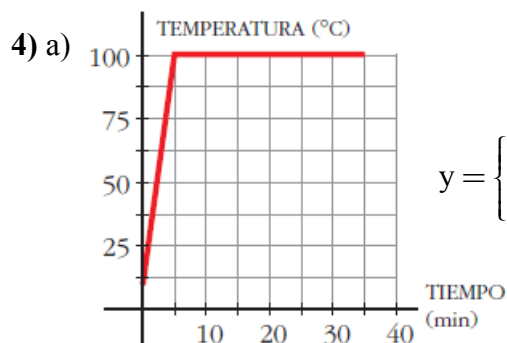
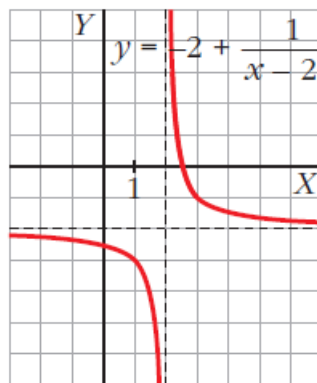
2) a)



b)



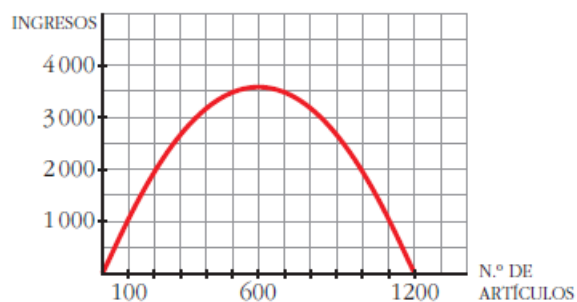
Pág. 209 3) $y = \frac{-2x+5}{x-2} = \frac{1}{x-2} - 2$



$$y = \begin{cases} 18x + 10 & \text{si } 0 \leq x \leq 5 \\ 100 & \text{si } 5 < x \leq 35 \end{cases}$$

b) Dominio: $[0, 35]$; Recorrido: $[10, 100]$

5) a) 350.000€ b) $I(x) = 12x - 0'01 \cdot x^2$
c) 600 artículos



6) a) $C(t) = 5000 \cdot (1'06)^t$ b) en $11'9 \approx 12$ años

7) a) 0 b) 1 c) $\sqrt{\frac{x-2}{x-3}}$ d) $\frac{1}{\sqrt{x+1}-3}$

