

$$f(-x) - xf(x) = 2|x| + 1$$

$$f(x) + xf(-x) = 2|x| + 1$$

$$f(-x) - xf(x) = f(x) + xf(-x)$$

$$f(-x) - xf(-x) = f(x) + xf(x)$$

$$f(-x)(1-x) = f(x)(1+x)$$

$$f(-x) = \frac{f(x)(1+x)}{1-x}$$

$$\frac{f(x)(1+x)}{1-x} - xf(x) = 2|x| + 1$$

$$f(x) \left(\frac{1+x}{1-x} - x \right) = 2|x| + 1$$

$$f(x) \left(\frac{1+x^2}{1-x} \right) = 2|x| + 1$$

$$f(x) = \frac{(2|x| + 1)(1-x)}{x^2 + 1}$$

$$2f(0) = 2$$

$$f(0) = 1$$

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

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

$$yx - y = x^2 + x + 2 \quad x^2 + x - yx + y + 2 = 0 \quad x^2 + x(1-y) + y + 2 = 0$$

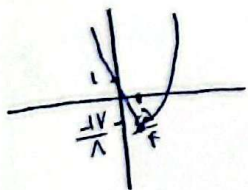
$$\Delta \geq 0 \quad (1-y)^2 - 4(y+2) \geq 0 \quad y^2 + 1 - 2y - 4y - 8 \geq 0$$

$$y^2 - 6y - 7 \geq 0 \quad (y-7)(y+1) \geq 0$$

$$\frac{-1}{+} \quad \frac{7}{-}$$

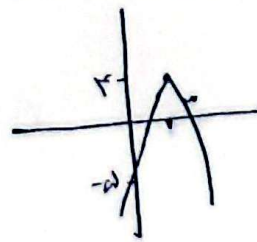
$$R_f = (-\infty, -1] \cup [7, +\infty)$$

الف:



$$R = [-1/2, +\infty)$$

$$R = [0, 2]$$



ج:

$$[0, +\infty)$$

د:

$$R = (-\infty, +\infty)$$

$$\text{الف: } R_f = R - \{2\}$$

$$\text{ب: } R_f = [0, +\infty) - \{2\}$$

$$\text{ج: } \frac{x^2 + 2}{\sqrt{x^2 + 2}} + \frac{1}{\sqrt{x^2 + 2}} = \sqrt{x^2 + 2} + \frac{1}{\sqrt{x^2 + 2}}$$

$$\sqrt{2} + \frac{1}{\sqrt{2}} \quad R_f = \left[\frac{2}{\sqrt{2}}, +\infty \right)$$

$$\text{د: } x^2 + 2 + \frac{1}{x^2 + 2} \rightarrow R_f \Rightarrow 2 + \frac{1}{2} - 2 = \frac{1}{2}$$

$$R_f = \left[\frac{1}{2}, +\infty \right)$$

$$\textcircled{1} \quad y n^2 - y = 3n^2 + 4$$

$$y n^2 - 3n^2 = y + 4$$

$$n^2(y - 3) = y + 4$$

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

$$n = \pm \sqrt{\frac{y + 4}{y - 3}}$$

$$\frac{-4}{+1} \quad \frac{3}{-1}$$

$$\textcircled{2} \quad +\infty \rightarrow \frac{3}{1} = 3$$

$$0 \rightarrow \frac{4}{-1} = -4$$

$$R_f = (-\infty, -4] \cup [3, +\infty)$$

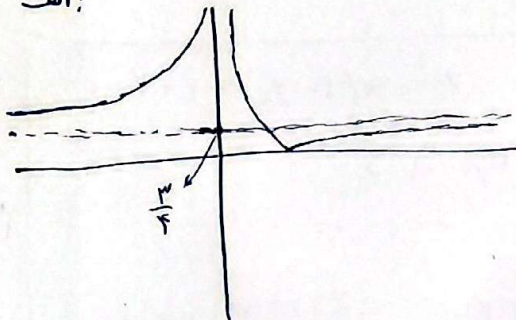
$$1 \rightarrow \frac{4 + 4}{1 - 3} = \frac{8}{-2} = -4$$

$$-1 \rightarrow \frac{-4 + 4}{-1 - 3} = \frac{0}{-4} = 0$$

$$R_f = [-4, 0]$$

مخرج صفر نمی شود

الف:

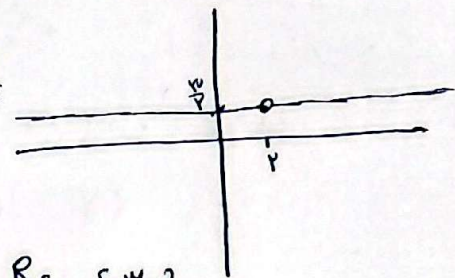


$$R_f = [0, +\infty)$$

ب:

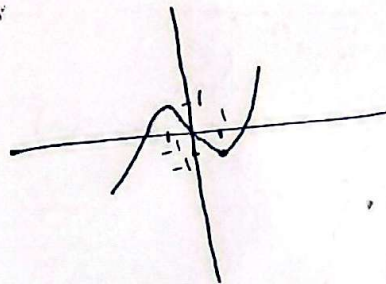
$$\frac{9(x-2)}{4(x-2)} = \frac{9}{4}$$

$$\sqrt{\frac{9}{4}} = \frac{3}{2}$$



$$R_f = \left\{ \frac{3}{2} \right\}$$

$$\frac{0}{-n^2 - 2n} \quad \frac{0}{n^2 - 2n}$$



$$R_f = \mathbb{R}$$

$$f(x)$$

$$f(x+1)$$

$$|f(x+1)|$$

