

18, 25

4

سید علی

$$x^3 - 3x^2 + 3x - 1 + 1 = (x-1)^3 + 1 = y$$

$$x = \sqrt[3]{y-1} + 1$$

$$R_f = \mathbb{R} \quad \checkmark$$

(الف)

(2)

$$yx^2 - 2xy = 1$$

$$yx^2 - 2xy - 1 = 0$$

(ب)

$$b^2 - 4ac \geq 0$$

$$\varepsilon y^2 + \varepsilon y \geq 0$$

$$\begin{array}{c} -1 \\ + \quad - \quad - \quad + \end{array}$$

$$y(\varepsilon y + \varepsilon) \geq 0$$

$$R_f = (-\infty, -1] \cup [0, +\infty) \quad \checkmark$$

$$x_{\min} = \frac{-b}{2a} = \frac{\varepsilon}{\varepsilon} = 1$$

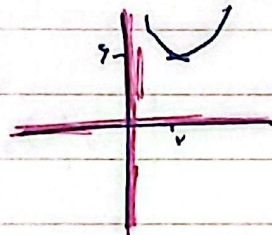
$$y = x^2 - 2x + 1$$

(2-الف)

$$y_{\min} = 1 - 2 + 1 = 0$$

$$\varepsilon - 2 + 1 = 0$$

(2)

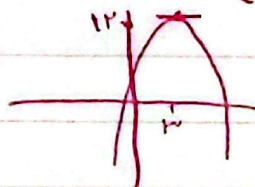


$$R_f = [0, +\infty) \quad \checkmark$$

$$y = \sqrt{x^2 + 4x + 4}$$

$$x_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2$$

$$y_{\max} = -9 + 12 + 4 = 12$$



(ب)

$$R_f = (-\infty, 12] \quad \checkmark$$

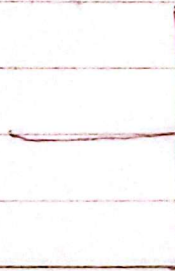
$$\sqrt{x^2 - 2x + 1}$$

$$x_{\min} = \frac{\varepsilon}{\varepsilon} = 1$$

(ج)

$$y_{\min} = 1 - 2 + 1 = 0$$

$$\sqrt{[-1, +\infty)} \Rightarrow R_f = [0, +\infty) \quad \checkmark$$



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Date

No

$$y = \sqrt{-x^2 + 4x}$$

$$x_{\max} = \frac{-4}{-2} = 2$$

$$y_{\max} = -9 + 18 = 9$$

$$\sqrt{(-\infty, 9]} \Rightarrow R_f = [0, 3] \checkmark$$

٣- الف) $R_f = \mathbb{R}$ ✓ زیرا عبارت مرتبه اول است.

٢) ب) $R_f = \mathbb{R}$ ✓

$$\sqrt{\mathbb{R}} \Rightarrow R_f = [0, +\infty) \checkmark$$

٢

(2)

$$(\mathbb{R})^+ \Rightarrow R_f = [0, +\infty) \checkmark$$

(2)

$$R_f = \mathbb{R} - \{2\} \checkmark \quad \frac{x^2 + 1}{x - 2}$$

$$\mathbb{R} - \left\{\frac{c}{a}\right\}$$

٣- الف)

٢)

$$R_f = \mathbb{R} - \{2\} \checkmark$$

$$\frac{x^2 + 1}{x + 1}$$

ب)

$$y = \sqrt{\frac{x^2 + 1}{x + 1}} \Rightarrow \mathbb{R} - \{2\} \xrightarrow{\sqrt{\cdot}} R_f = [0, +\infty) - \{\sqrt{2}\} \checkmark$$

$R_f =$

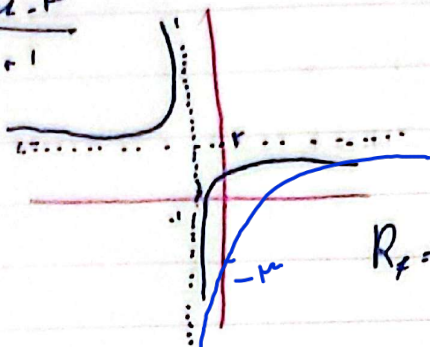
٤- الف)

٢)

$$y = \sqrt{\frac{x^2 + 1}{x - 2}} \Rightarrow \mathbb{R} - \{2\} \Rightarrow R_f = [0, +\infty) \checkmark$$

ب)

$$y = \frac{2x-3}{x+1}$$



$$x+1=0 \\ x=-1$$

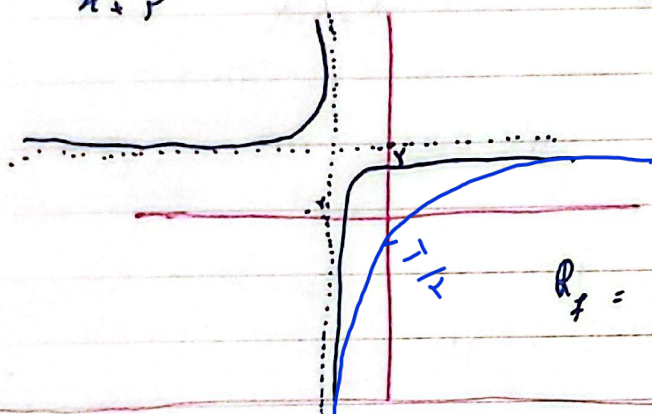
الف) جانب قائم = -1

جانب افقی = 2 $\frac{a}{c} = 2$

۱,۵

$$R_f = \mathbb{R} - \{-1\}$$

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



$$x+2=0 \\ x=-2$$

جانب قائم = -2

جانب افقی = 2

محل بر حفره نمودار با
محورها خنثی و خط افقی
و سه نهایی

$$R_f = \mathbb{R} - \{-2\}$$

$$\sin x + \frac{1}{\sin x} = R_f = (-\infty, -2] \cup [2, +\infty)$$

الف) ۲

$$\frac{x^{r+1}}{x^r} = x^r + \frac{1}{x^r} \Rightarrow R_f = (-\infty, -2] \cup [2, +\infty)$$

ب

$$\sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow R_f = (-\infty, 2] \cup [2, +\infty)$$

ج

$$\sqrt{x} + \frac{1}{\sqrt{x}} \Rightarrow R_f = [2, +\infty)$$

د

$$g = x^r + \frac{1}{x^{r+1}} + r - r \Rightarrow R_f = \left[\frac{1}{r}, +\infty \right)$$

(col. 1)

$$\left(\frac{1}{r} + \infty \right) + r$$

$$y + r = x^{r+1} \frac{1}{x^{r+1}}$$

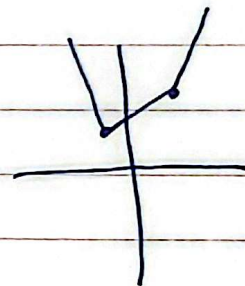
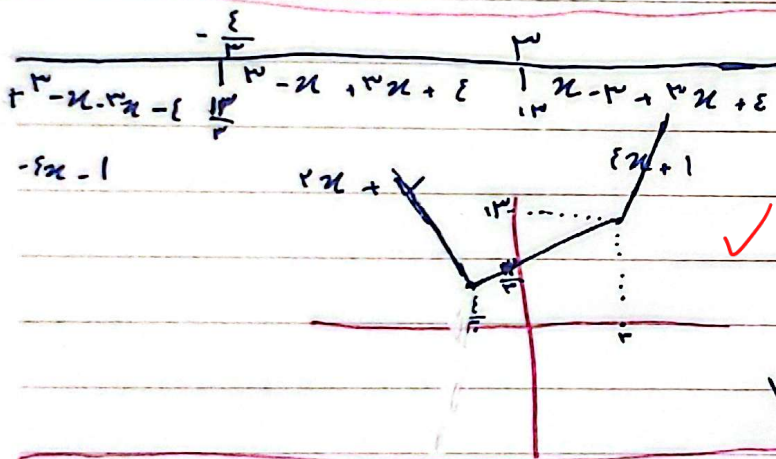
(1.5)

$$\frac{x^r + \varepsilon + 1}{\sqrt{x^r + \varepsilon}} = \sqrt{x^r + \varepsilon} + \frac{1}{\sqrt{x^r + \varepsilon}}$$

$$x=0 \Rightarrow r + \frac{1}{r}$$

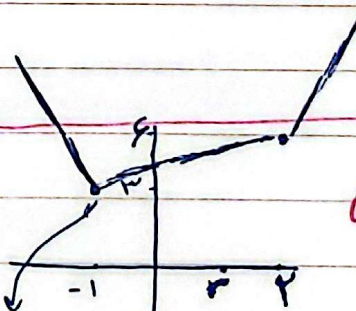
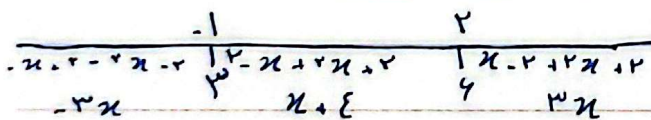
$$\Rightarrow R_f = \left[r + \frac{1}{r}, +\infty \right)$$

✓



-9

(2)

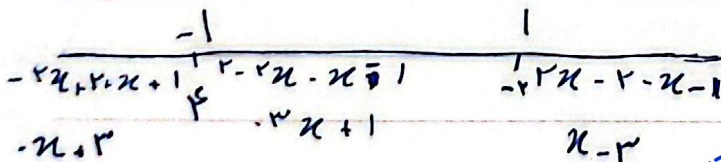


(10 - الف)

(1.75)

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

✓



شبه هاتية

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

✓