

الف) $y = x^3 - x^2 + x - 1 + 1$

-1

$y = (x-1)^3 + 1 \quad (x-1)^3 = y-1$

$x-1 = \sqrt[3]{y-1} \quad x = \sqrt[3]{y-1} + 1 \quad R_f = \mathbb{R}$

ب) $y = \frac{1}{x^2 - x}$

$\frac{1}{x^2 - x + 1} = \frac{1}{(x-1)^2 - 1} \quad (x-1)^2 - 1 = \frac{1}{y}$

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

$\frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm \sqrt{-3}}{2}$

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

$(x-1)^2 = \frac{y+1}{y} \quad (x-1) = \pm \sqrt{\frac{y+1}{y}}$

الف) $y = x^2 - 4x + 1$

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

$R_f = [4, +\infty)$

ج) $y = \sqrt{x^2 - 4x + 3}$

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

ب) $y = -x^2 + 4x + 3$

$\frac{x}{y} = 3$

$R_f = (-\infty, 12]$

$\frac{x}{y} = -7$

$R_f = [0, +\infty)$

د) $y = \sqrt{4x - x^2}$

$\frac{x}{y} = 9$

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



الف) $y = x^2 - 6x^2 + 2x + 1 \rightarrow R_f = \mathbb{R}$

-3

ب) $y = x^4 - 4x^2 + 3x + 2 \rightarrow R_f = \mathbb{R}$

ج) $y = \sqrt{x^4 - 4x^2 + 5x + 1} \rightarrow R_f = [0, +\infty)$

د) $y = (x^5 - 4x^2 + 2x + 1)^2 \rightarrow \mathbb{R}^+ = \mathbb{R} \Rightarrow R_f = \mathbb{R}$

$R_f = \mathbb{R}$

الف) $y = \frac{x+1}{x-2} \quad R_f = \mathbb{R} - \{2\}$

ب) $\frac{x+1}{x-1} \quad R_f = \mathbb{R} - \{1\}$

-4

الف) $y = \sqrt{\frac{x+4}{x+1}}$

$R_f = [0, +\infty) - \{\sqrt{2}\}$

-5

ب) $y = \sqrt{\frac{x+1}{x-2}}$

$R_f = \sqrt{\mathbb{R} - \{-2\}} = [0, +\infty)$

$\sqrt{\mathbb{R} - \{نقطه\}} = [0, +\infty)$

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

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

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

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

$x = \frac{x^2 - 1}{2y^2} \rightarrow R = \text{مستقیم}$

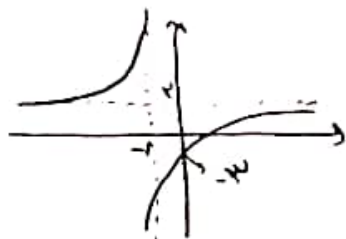
$$الف) y = \frac{x^2 - 1}{x + 1}$$

$$مجال تعالیم = [-1]$$

$$مجاہب افق = 1$$

$$مجاہب افق = \frac{9}{5}$$

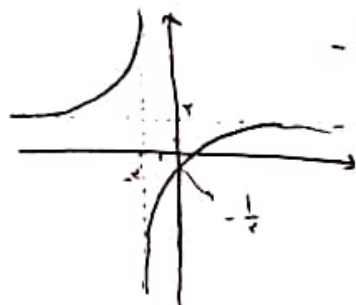
$$مجاہب قائم = 1$$



$$ب) y = \frac{x^2 - 1}{x + 1}$$

$$مجاہب قائم = 1$$

$$مجاہب افق = 1$$



-6

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

-V

$$ب) y = \frac{x^4 + 1}{x^2} = x^2 + \frac{1}{x^2} \rightarrow R_f = (-\infty, -1] \cup [1, +\infty)$$

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

$$د) y = \sqrt{x} + \frac{1}{\sqrt{x}} \rightarrow R_f = [1, +\infty)$$

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

نقارہ مثبت
بہا تعریف متعارف = 0

جو 0 کے لئے نقارہ مثبت

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

کمری مقدار

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

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

$$ب) y = \frac{x^2 + 1}{\sqrt{x^2 + 1}} = \frac{\sqrt{x^2 + 1}}{\sqrt{x^2 + 1}} + \frac{1}{\sqrt{x^2 + 1}} = \sqrt{x^2 + 1} + \frac{1}{\sqrt{x^2 + 1}}$$

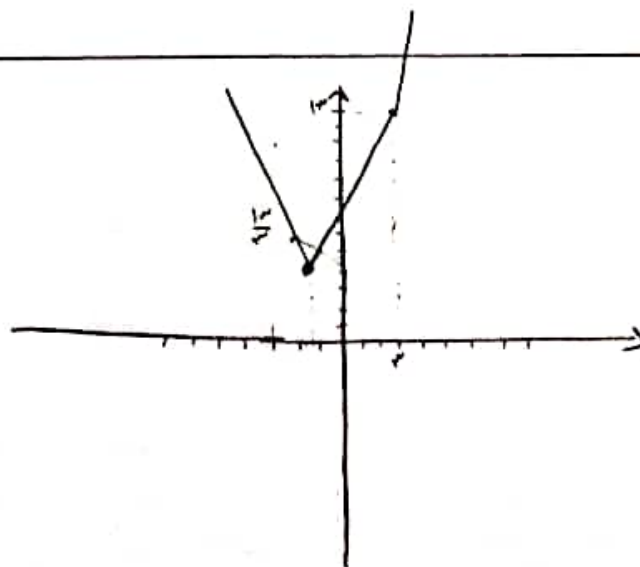
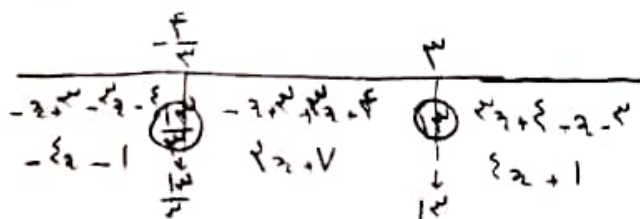
نقارہ مثبت
کمری مقدار = 0

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

$$\sqrt{x} + \frac{1}{\sqrt{x}} = \frac{1}{x}$$

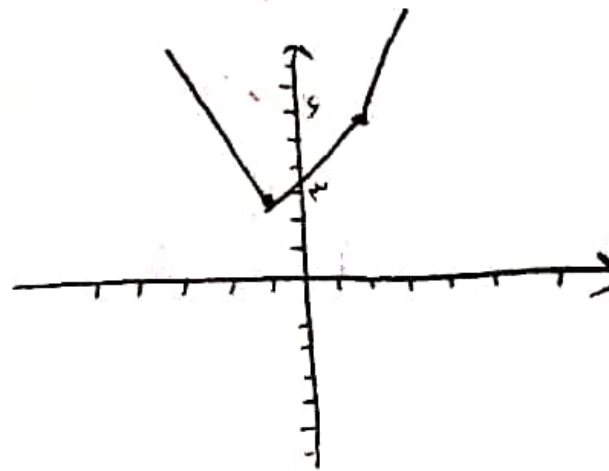
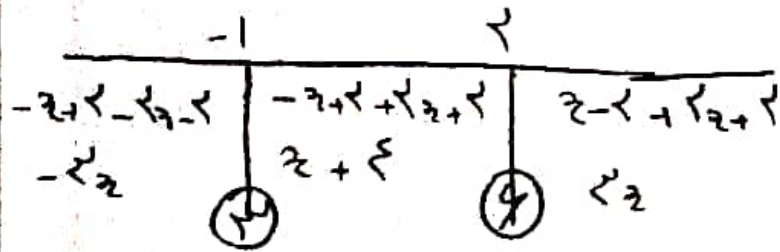
$$y = |x - 3| + |4x + 4|$$

-9



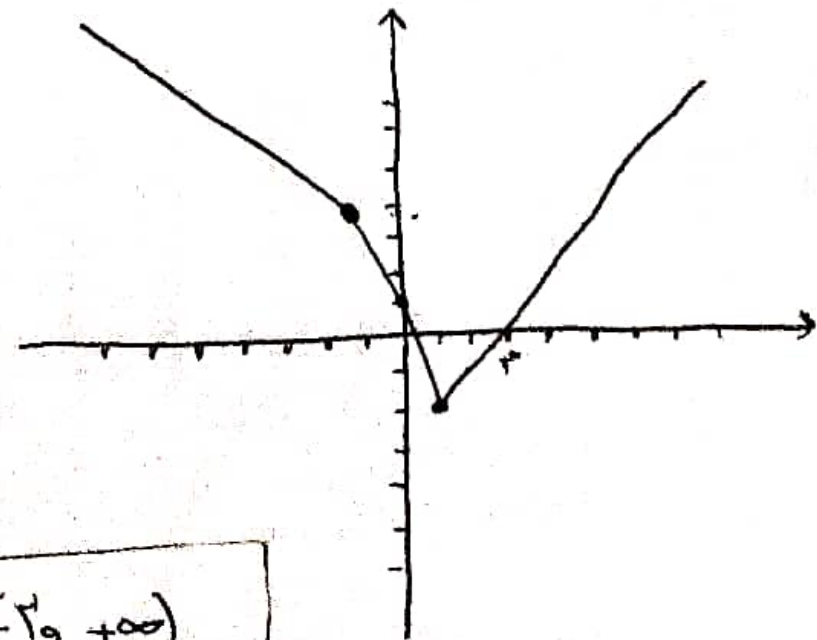
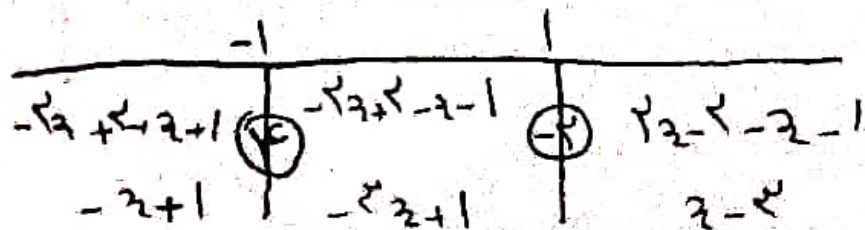
الف) $y = |x-2| + |x+2|$

-10



$R_f = [x_0 + \infty)$

ب) $y = |x-2| - |x+1|$



$R_f = [-x_0 + \infty)$