

نام و نام خانوادگی بسیار زیاده (علی) پاسخنامه تشریحی تکلیف شماره ۵ ... کلاس ...

الف) $y = u^3 - 3u^2 + 3u \rightarrow y = u^3 - 3u^2 + 3u + 1 - 1 \rightarrow y = (u-1)^3 + 1 \rightarrow y-1 = (u-1)^3$
 $\rightarrow \sqrt[3]{y-1} = u-1 \rightarrow u = \sqrt[3]{y-1} + 1 \rightarrow R_f = \mathbb{R} \rightarrow$ جواب

* اتحاد کوب استفاده می کنیم
 $(u-y)^3 = u^3 + 3uy^2 - 3u^2y - y^3$

ب) $y = \frac{1}{u^2-2u} \rightarrow yu^2 - 2u = 1 \rightarrow yu^2 - 2u - 1 = 0 \rightarrow u = \frac{2 \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y^2 + 4y \geq 0$
 $2y \neq 0$

$\rightarrow (y(y+1)) \geq 0$
 $y \leq -1 \text{ یا } y \geq 0$
 $\rightarrow R_f = (-\infty, -1] \cup (0, +\infty) \rightarrow$ جواب

الف) $y = u^2 - 2u + 10 \xrightarrow{a>0} \begin{cases} u_{\min} = \frac{-b}{2a} = \frac{2}{2} = 1 \\ y_{\min} = (1)^2 - 2 \times 1 + 10 = 2 - 2 + 10 = 10 \end{cases} \rightarrow R_f = [10, +\infty) \rightarrow$ جواب

ب) $y = -u^2 + 4u + 3 \xrightarrow{a<0} \begin{cases} u_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ y_{\max} = -(2)^2 + 4 \times 2 + 3 = -4 + 8 + 3 = 7 \end{cases} \rightarrow R_f = (-\infty, 7] \rightarrow$ جواب

ج) $y = \sqrt{u^2 - 2u - 3} \rightarrow y = u^2 - 2u - 3 \xrightarrow{a>0} \begin{cases} u_{\min} = \frac{-b}{2a} = \frac{-(-2)}{2} = 1 \\ y_{\min} = (1)^2 - 2 \times 1 - 3 = -4 \end{cases} \rightarrow R_f = [-4, +\infty)$
 $\rightarrow y = \sqrt{u^2 - 2u - 3} \Rightarrow R_f = \sqrt{[-4, +\infty)} = [0, +\infty) \rightarrow$ جواب

د) $y = \sqrt{4u - u^2} \Rightarrow y = -u^2 + 4u \xrightarrow{a<0} \begin{cases} u_{\max} = \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ y_{\max} = -(2)^2 + 4 \times 2 = -4 + 8 = 4 \end{cases} \rightarrow R_f = (-\infty, 4]$
 $\rightarrow y = \sqrt{-u^2 + 4u} \Rightarrow R_f = \sqrt{(-\infty, 4]} = [0, 4] \rightarrow$ جواب

الف) $y = u^3 - 5u^2 + 2u + 1 \rightarrow R_f = \mathbb{R} \rightarrow$ درجه فرد است و درجه اول $\mathbb{R}$ است

ب) $y = u^4 - 4u^2 + 3u + 2 \rightarrow R_f = \mathbb{R} \rightarrow$ درجه زوج است و درجه اول $\mathbb{R}$ است

ج) $y = \sqrt{u^4 - 4u^2 + 5u + 1} \rightarrow y = u^4 - 4u^2 + 5u + 1 \rightarrow R_f = \mathbb{R} \Rightarrow y = \sqrt{u^4 - 4u^2 + 5u + 1} \rightarrow R_f = \sqrt{\mathbb{R}} = [0, +\infty)$ جواب

د) $y = (u^5 - 2u^2 + 3u + 1)^2 \rightarrow y = u^5 - 2u^2 + 3u + 1 \rightarrow R_f = \mathbb{R} \rightarrow y = (u^5 - 2u^2 + 3u + 1)^2$
 $\rightarrow R_f = [(-\infty, +\infty)]^2 = [0, +\infty) \rightarrow$ جواب

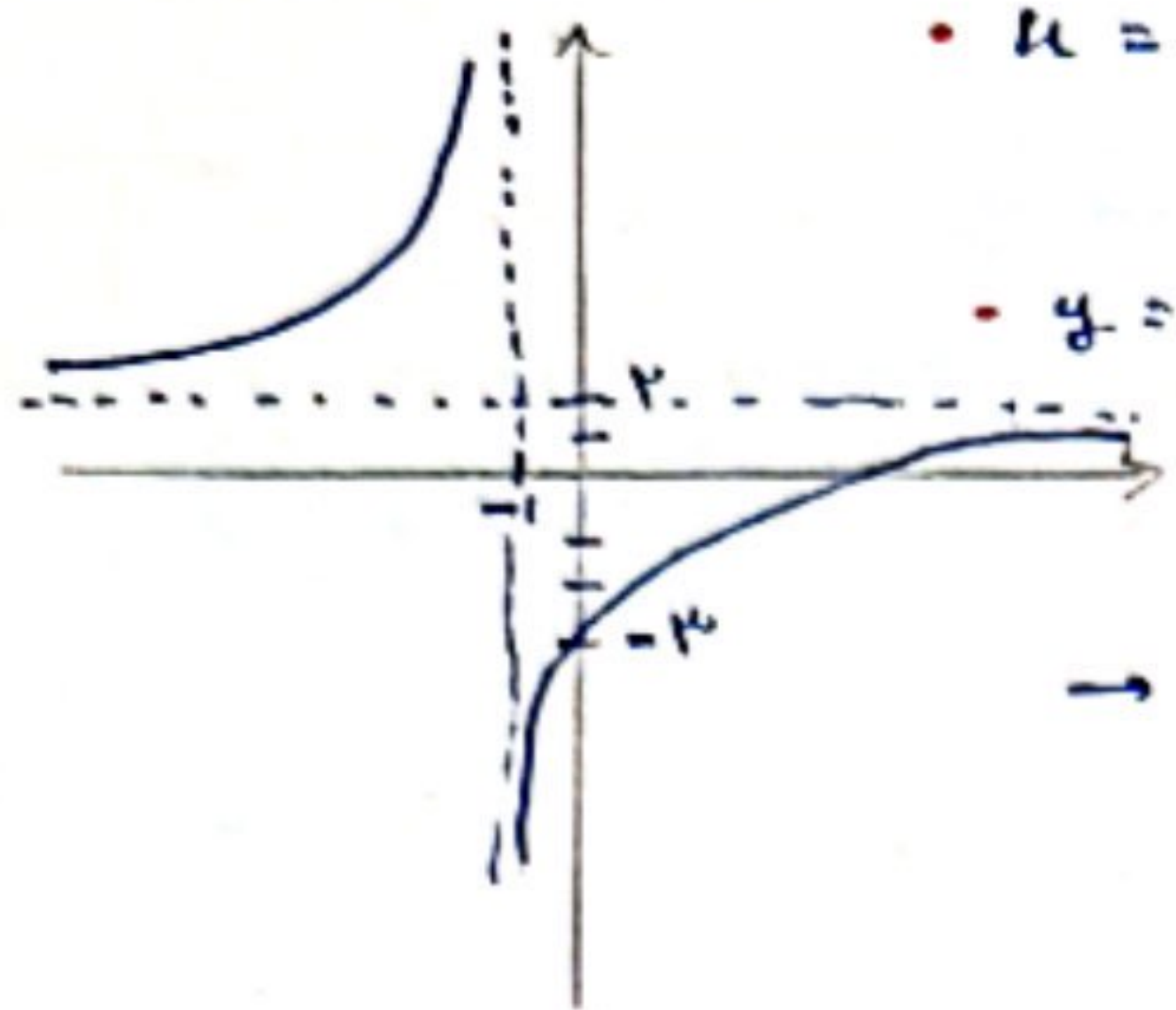
الف) $y = \frac{3u+1}{u-2} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow R_f = \mathbb{R} - \left\{ \frac{3}{1} \right\} \Rightarrow R_f = \mathbb{R} - \{3\} \rightarrow$ جواب

ب) $y = \frac{2u+1}{u+1} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow R_f = \mathbb{R} - \left\{ \frac{2}{1} \right\} \Rightarrow R_f = \mathbb{R} - \{2\} \rightarrow$ جواب

الف) $y = \sqrt{\frac{3u+2}{u+1}} \Rightarrow$
 $\hookrightarrow y = \frac{3u+2}{u+1} \rightarrow R_f = \mathbb{R} - \left\{ \frac{a}{c} \right\} \rightarrow y = \sqrt{\frac{3u+2}{u+1}} \Rightarrow R_f = \sqrt{\mathbb{R} - \left\{ \frac{a}{c} \right\}} = [0, +\infty) - \left\{ \sqrt{\frac{a}{c}} \right\} \rightarrow$ جواب

ب) $y = \sqrt{\frac{3u+1}{2-u}} \Rightarrow y = \frac{3u+1}{-u+2} \rightarrow R_f = \mathbb{R} - \left\{ -\frac{a}{c} \right\} \Rightarrow R_f = \sqrt{\mathbb{R} - \left\{ -\frac{a}{c} \right\}} = R_f = [0, +\infty) \rightarrow$ جواب

$$2) \text{ الف) } y = \frac{2u-3}{u+1}$$



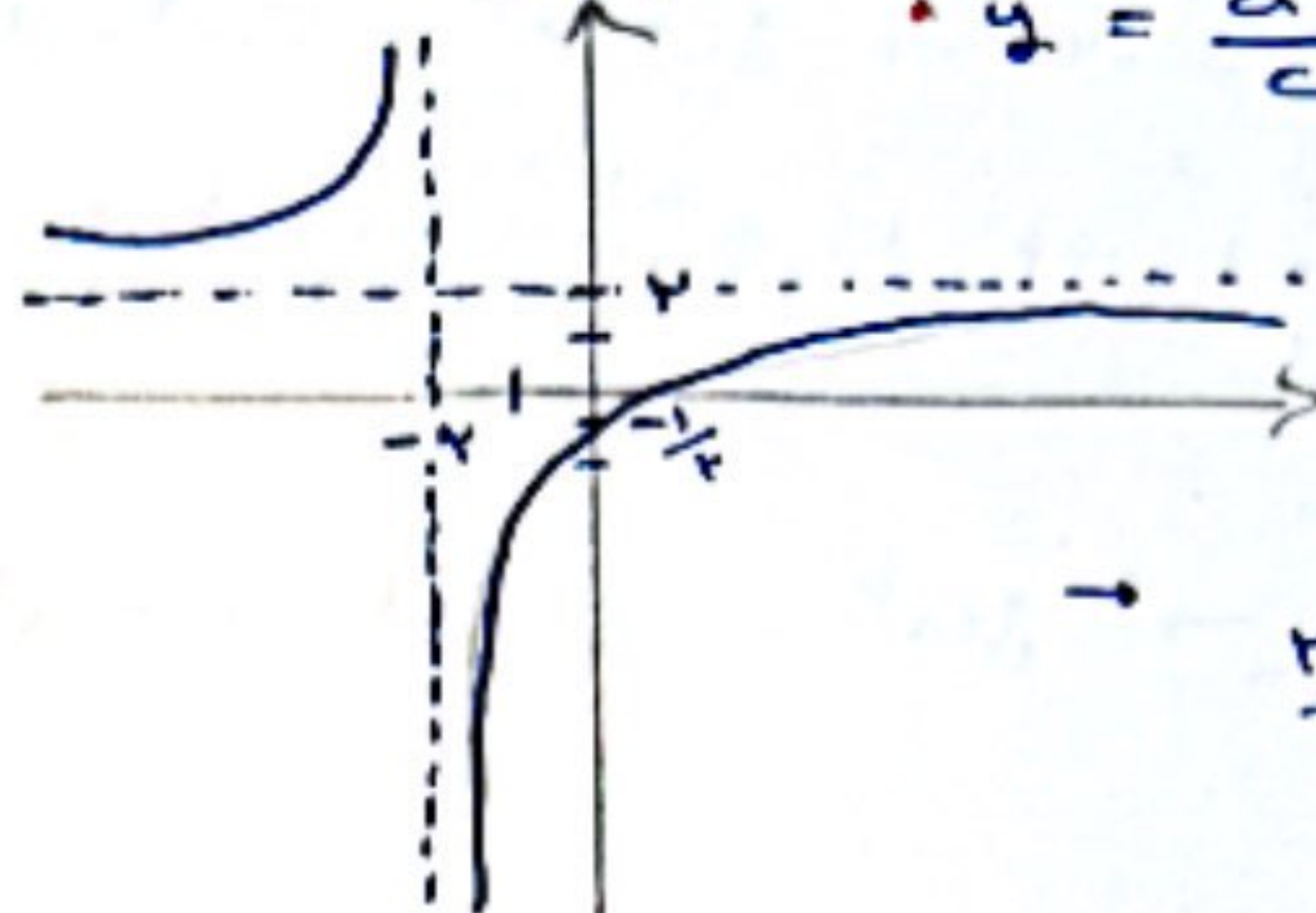
• $u = -1 = \frac{1}{\text{دست}}$
به جانب قالی

• $y = \frac{9}{2} = 4.5$ جانب
افتخ

$$\frac{4 \times 0 - 4}{0 + 1} = -4$$

مثال ۱۵: دو تابع $f(x) = x^2 + 2x - 3$ و $g(x) = x^2 - 4x + 6$ را در نظر بگیرید.

$$\rightarrow y = \frac{pu-1}{u+p}$$



• $u = -v = 2$ → دوسرا خارج

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

(d) $y = \sin u + \frac{1}{\sin u} \rightarrow a + \frac{1}{a} \rightarrow \begin{cases} a \geq 1 \\ a < 0 \end{cases} \rightarrow R_y = [1, \infty) \cup (-\infty, -1] -$ جواب
 $\sin u = -1 + \text{یک ربع}$ $\sin u$ x x x

ج) $y = \frac{u^4 + 1}{u^2} \xrightarrow{\text{تقسیم}} u^2 + \frac{1}{u^2} \rightarrow a + \frac{1}{a} \rightarrow \begin{cases} a \geq 0 \\ a < 0 \end{cases} \rightarrow R_y = (-\infty, -2] \cup [2, +\infty) \rightarrow \text{جواب}$

$$c) y = \frac{\sqrt{u^2+1}}{\sqrt{u}} \xrightarrow{\text{فصل}} \frac{\sqrt{u^2}}{\sqrt{u}} + \frac{1}{\sqrt{u}} = \sqrt{\frac{u^2}{u}} + \frac{1}{\sqrt{u}} = \sqrt{u} + \frac{1}{\sqrt{u}} \rightarrow a + \frac{1}{a} \rightarrow \begin{cases} a > 0 \\ a < 0 \end{cases}$$

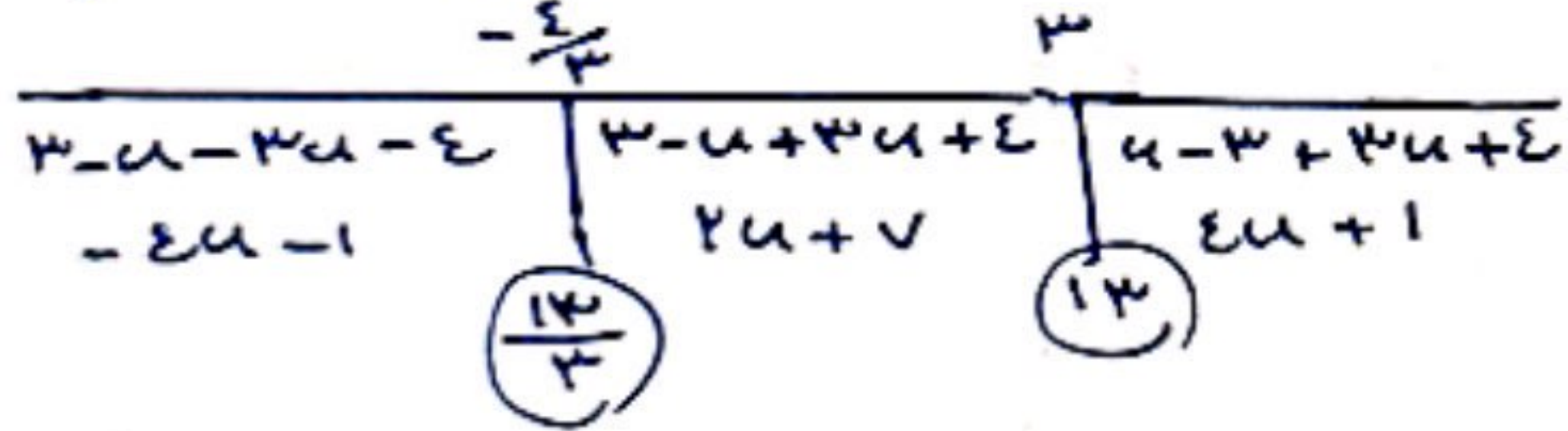
$$\rightarrow R_f = (-\infty, -r] \cup [r, +\infty) \rightarrow \text{جواب}$$

$$\Rightarrow \frac{1}{x} = \sqrt{a} + \frac{1}{\sqrt{a}} \rightarrow a + \frac{1}{a} \rightarrow \begin{cases} a > 0 \\ a < -x \end{cases} \rightarrow R_f = [x_0 + \infty) \rightarrow \text{نقطة}$$

جواب: $\rightarrow R_y = \left(\frac{1}{4}g + b \right) \rightarrow \frac{1}{4} = \frac{1}{0+4} + 0 \rightarrow$ کو چاروں میں مقادری $\rightarrow$ $\frac{1}{u^2+v}$ $y = u^2 + \frac{1}{u^2+v}$ (لاف)

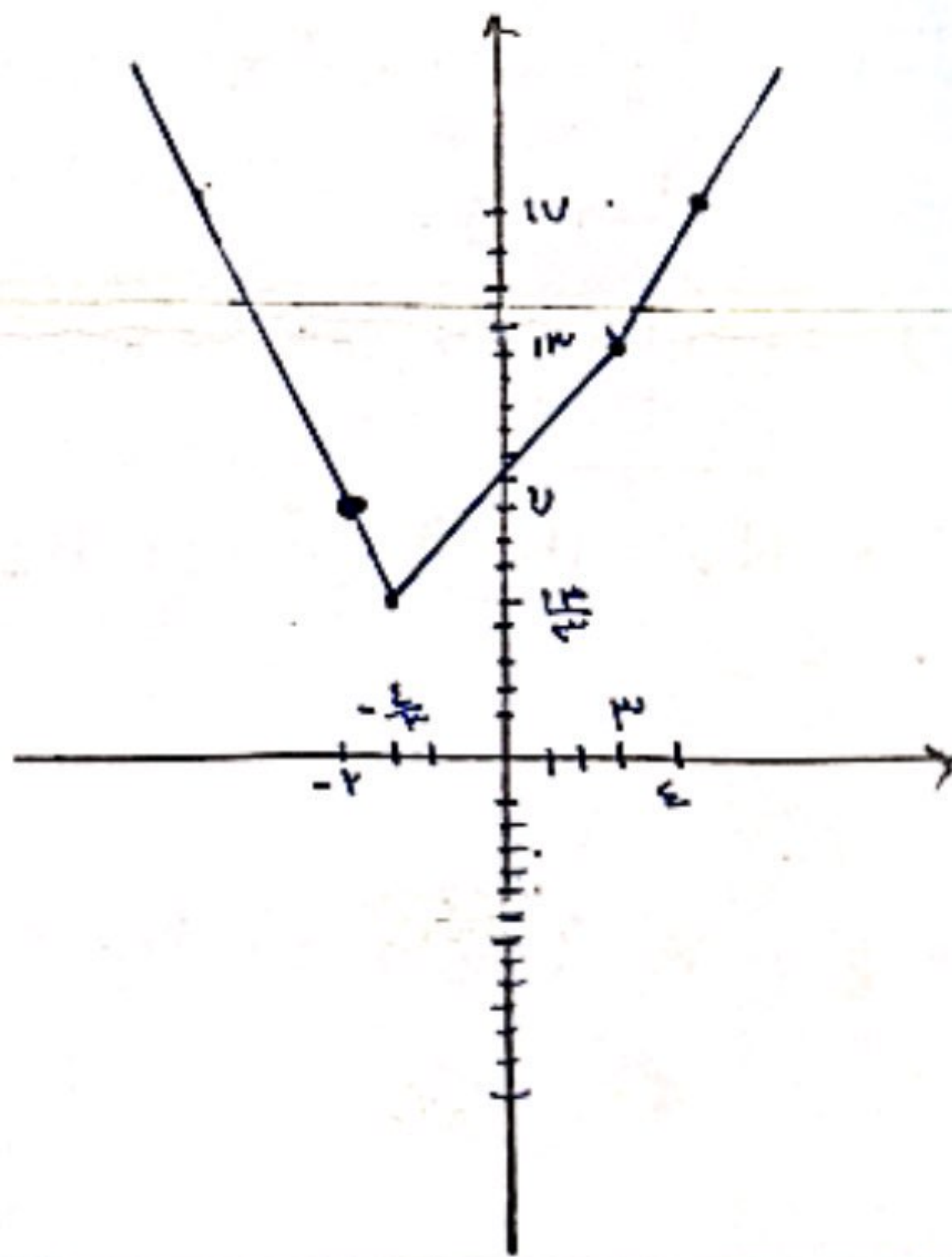
$$b) y = \frac{a^2 + \omega}{\sqrt{a^2 + \varepsilon}} \rightarrow \text{کمیون مقادیر} \rightarrow \frac{a^2 + \omega}{\sqrt{a^2 + \varepsilon}} = \frac{\omega}{\sqrt{\varepsilon}} = \frac{\omega}{\varepsilon} \rightarrow R_y = [\frac{\omega}{\varepsilon}, +\infty) \rightarrow \text{جواب}$$

$$y = |u - v| + |vu + z|$$



$$\bullet u \leq \Sigma \rightarrow \Sigma x \Sigma + 1 = 14$$

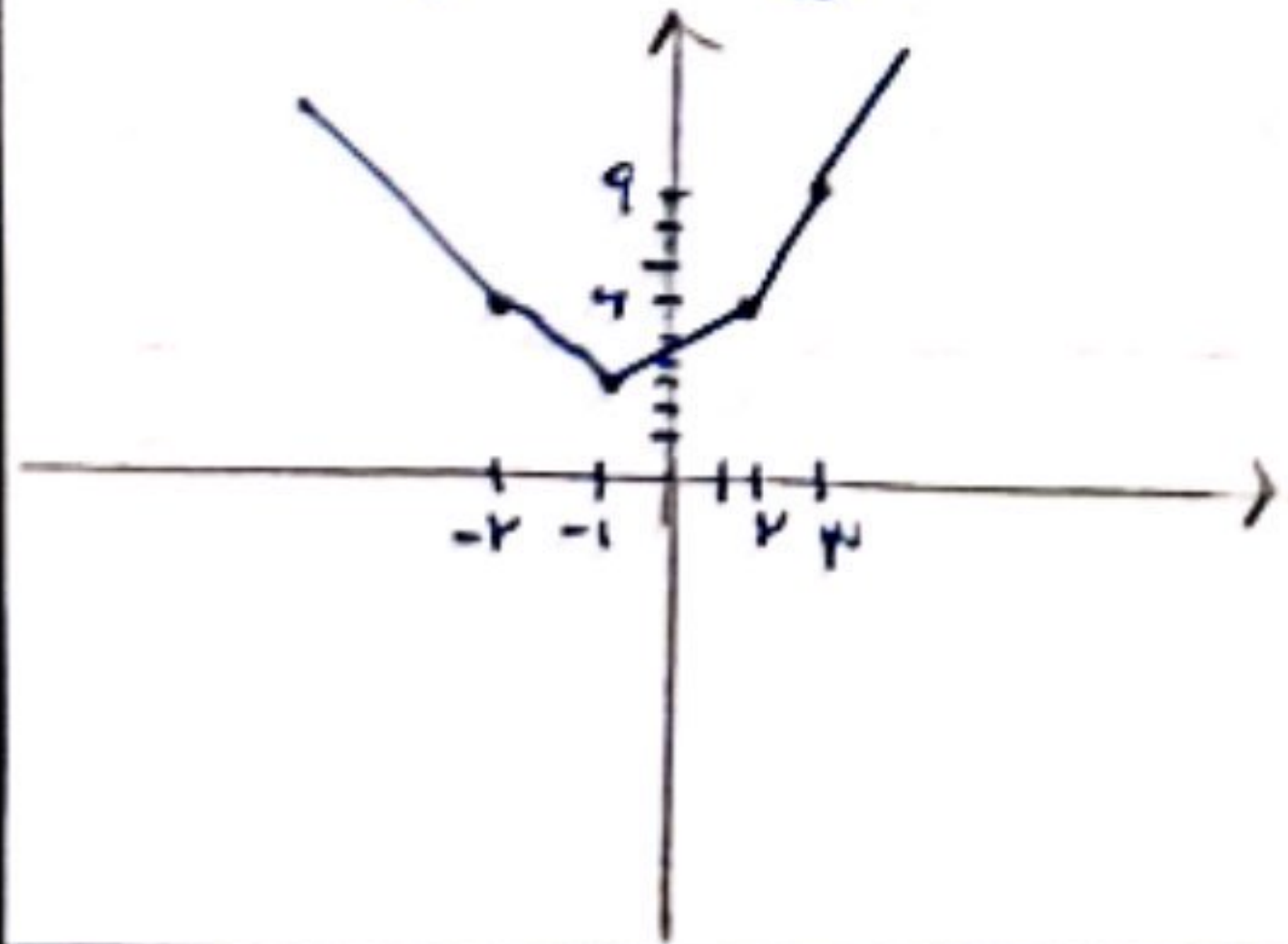
$$\bullet u = -Y \rightarrow -\sum x - Y - 1 = V$$



د) $y = |u - v| + |vu + v|$ • $u = v \rightarrow vu + v = 9$

- $\mu_{E-Y} \rightarrow -\mu_{X-Y} = 4$

$$\begin{array}{c}
 -u + r - r + r \quad r - u + r + r \quad u - r + r + r \\
 -ru \quad u + \Sigma \quad ruu
 \end{array}$$



$$R_y = [y_9 + \infty) \}$$

ب) $y = |2x - 2| - |x + 1|$

- $u = \gamma \rightarrow \gamma - \gamma = -1$
 $u = -\gamma \rightarrow -(-\gamma) + \gamma = \infty$

$$\begin{array}{c|c|c} & -1 & 1 \\ \hline -x+1 & -x+1 & x-1 \\ -u+v & -1-x & u-v \\ \hline & \textcircled{+1} & \textcircled{-1} \end{array}$$

$$R_f = [-1, +\infty)$$

