

$$\frac{1}{n-1} = |n-1|$$

$$\frac{1}{n-1} = n-1 \rightarrow \frac{n^2 - 2n + 1}{n-1} = n-1 \rightarrow \frac{n^2 - 2n + 1}{n-1} = n-1 \rightarrow \frac{n^2 - 2n + 1}{n-1} = n-1$$

$$\frac{1}{n-1} = -(n-1)$$

$$-1 = n^2 - 2n + 1 \rightarrow n^2 - 2n + 2 = 0$$

$$\Delta = 4 - 8 = -4 \rightarrow \text{ریشه حقیقی ندارد}$$

$$| \frac{2n+1}{n} | < 2 \rightarrow | 2n+1 | < | 2n |$$

$$\downarrow$$

$$2n^2 - 2n + 1 < 2n^2$$

$$\downarrow$$

$$\frac{1}{2} < n \quad \checkmark$$

$$| \frac{n-2}{2n+1} | > 1 \rightarrow | n-2 | > | 2n+1 |$$

$$\downarrow$$

$$n^2 - 2n + 4 < 4n^2 + 4n + 1$$

$$\downarrow$$

$$3n^2 + 6n - 3 < 0 \rightarrow n^2 + 2n - 1 < 0$$

$$-2 < n < \frac{1}{3}$$

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

$$n^2 < |n+4|$$

$$\downarrow$$

$$n^2 - n - 4 < 0$$

$$\downarrow$$

$$(n-3)(n+2) < 0$$

$$\downarrow$$

$$-2 < n < 3 \quad (1)$$

$$n^2 + n + 4 < 0$$

$$\downarrow$$

$$\Delta = 1 - 16 = -15 < 0$$

$$\downarrow$$

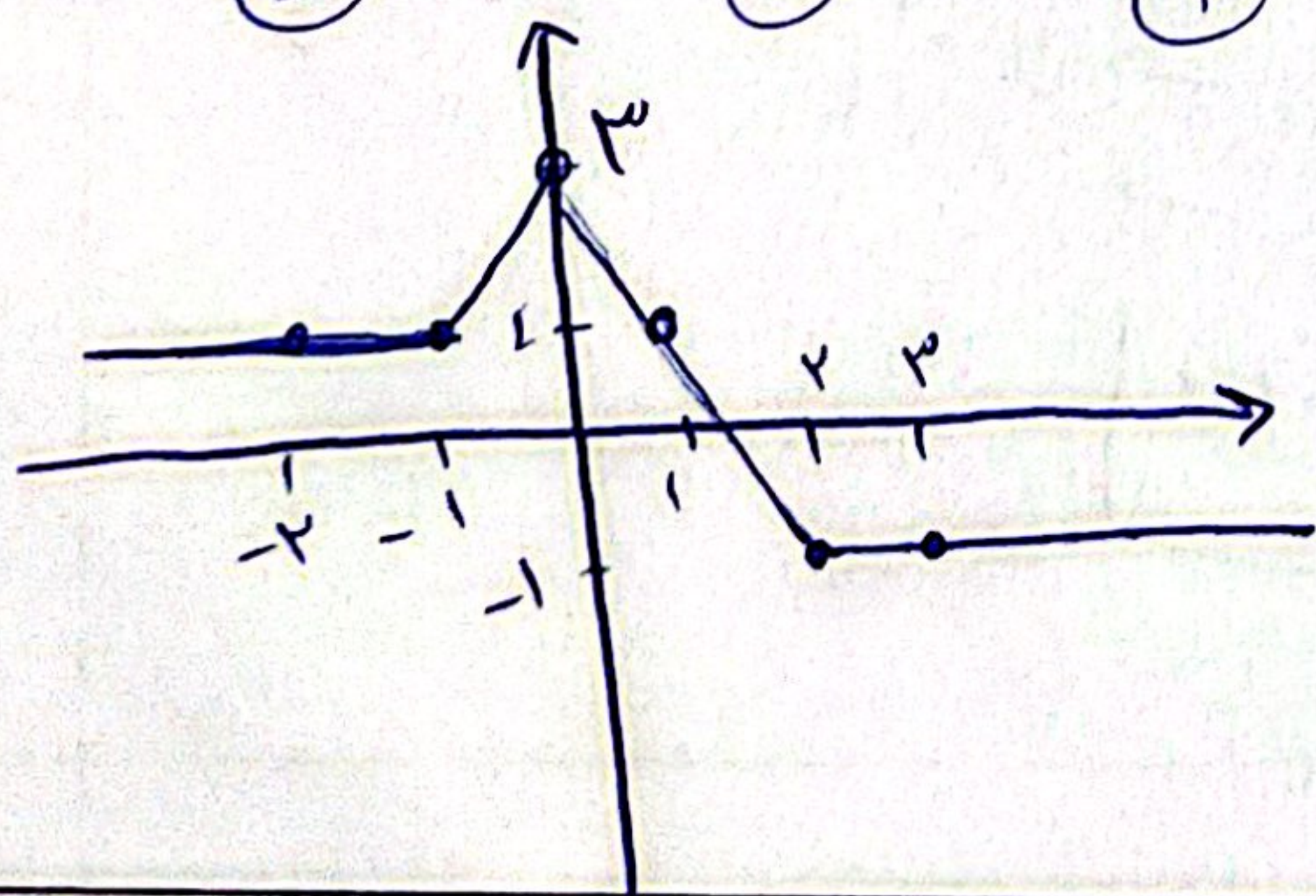
$$\emptyset \quad (2)$$

$$| n - \frac{3-2}{2} | < \frac{3+2}{2}$$

$$\downarrow$$

$$| n - \frac{1}{2} | < \frac{5}{2} \rightarrow \alpha = \frac{1}{2} \quad \checkmark$$

$$y = |n+1| - |2n| + |n-2|$$



$$y_{\max} = 3$$

$$y_{\min} = -1$$

$$\} y_{\max} + y_{\min} = 2 \quad \checkmark$$

$$y = | \frac{1}{2}n | - 2$$

$$y' = | \frac{1}{2}(n+2) | - 2 + 1 = | \frac{1}{2}n + 1 | - 1$$

$$y = y' \rightarrow | \frac{1}{2}n | - 2 = | \frac{1}{2}n + 1 | - 1$$

$$\downarrow$$

$$| \frac{1}{2}n | = | \frac{1}{2}n + 1 | + 1$$

$$\downarrow$$

$$|n| = |n+2| + 2$$

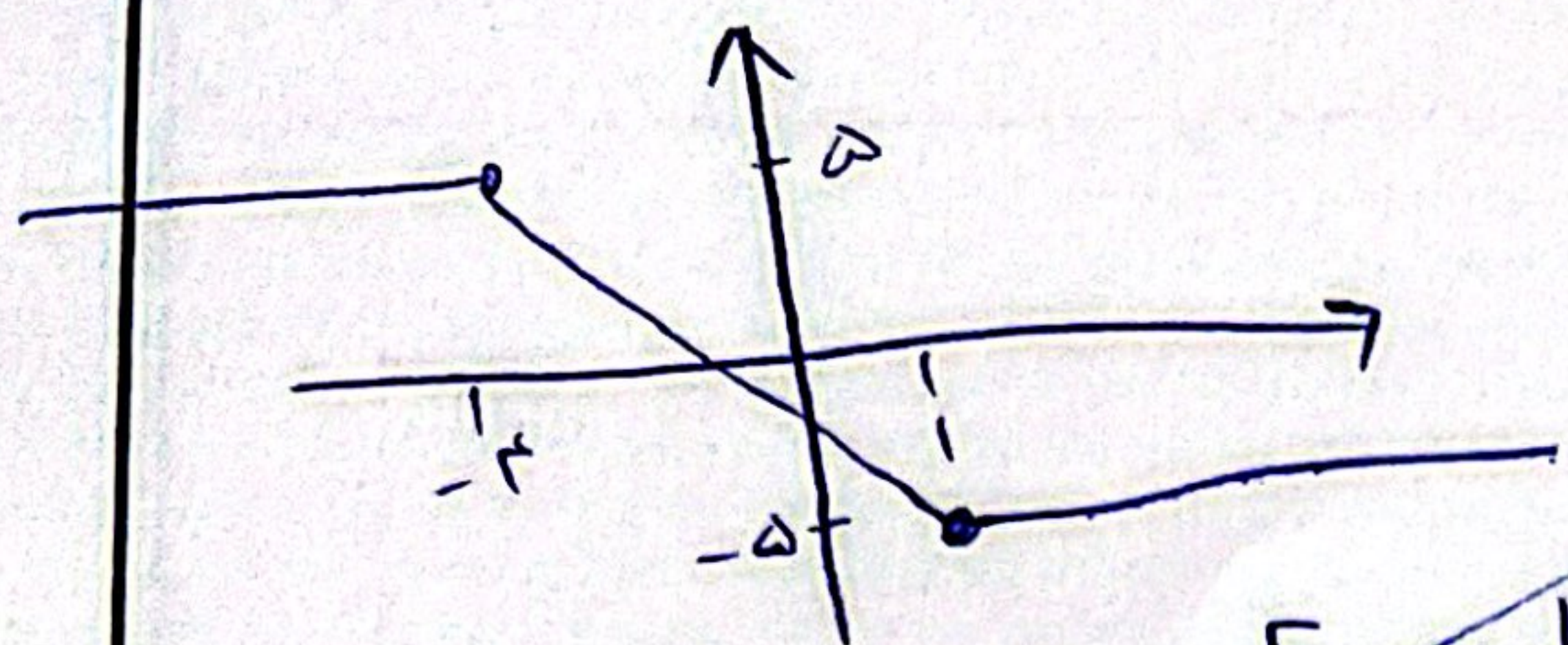
$$n = n+2 \rightarrow 0 = 2 \quad \times$$

$$-n = n+2 \rightarrow n = -1 \quad \checkmark$$

$$-n = -n-2 \rightarrow 0 = -2 \quad \times$$

$$-1 < n < 0 \rightarrow n = -1 \quad \checkmark$$

$$الف) f(n) = \left[\frac{|n-1|}{n} - |n+1| \right] \xrightarrow{R_1} [-\infty \leq y \leq \infty] \xrightarrow{R_2} \{-\infty, -1, 0, 1, \infty\}$$

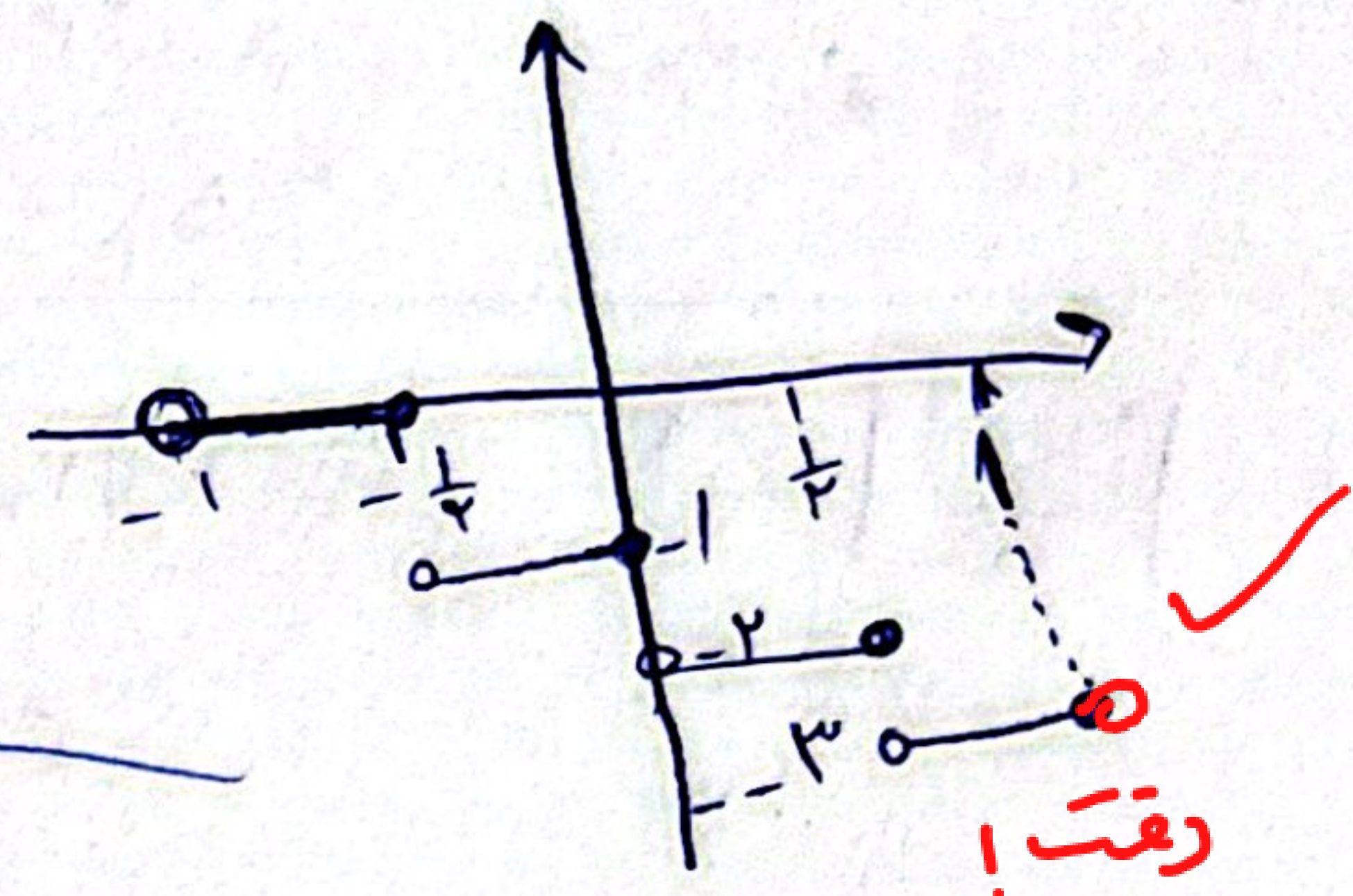


$$ب) f(n) = \frac{1}{n} - \left[\frac{n+1}{n} \right] = -1 + \frac{1}{n} - \left[\frac{1}{n} \right] \rightarrow R_2 [-1, 0)$$

$$الف) y = [-2n] - 1$$

$$n \in (-1, 1)$$

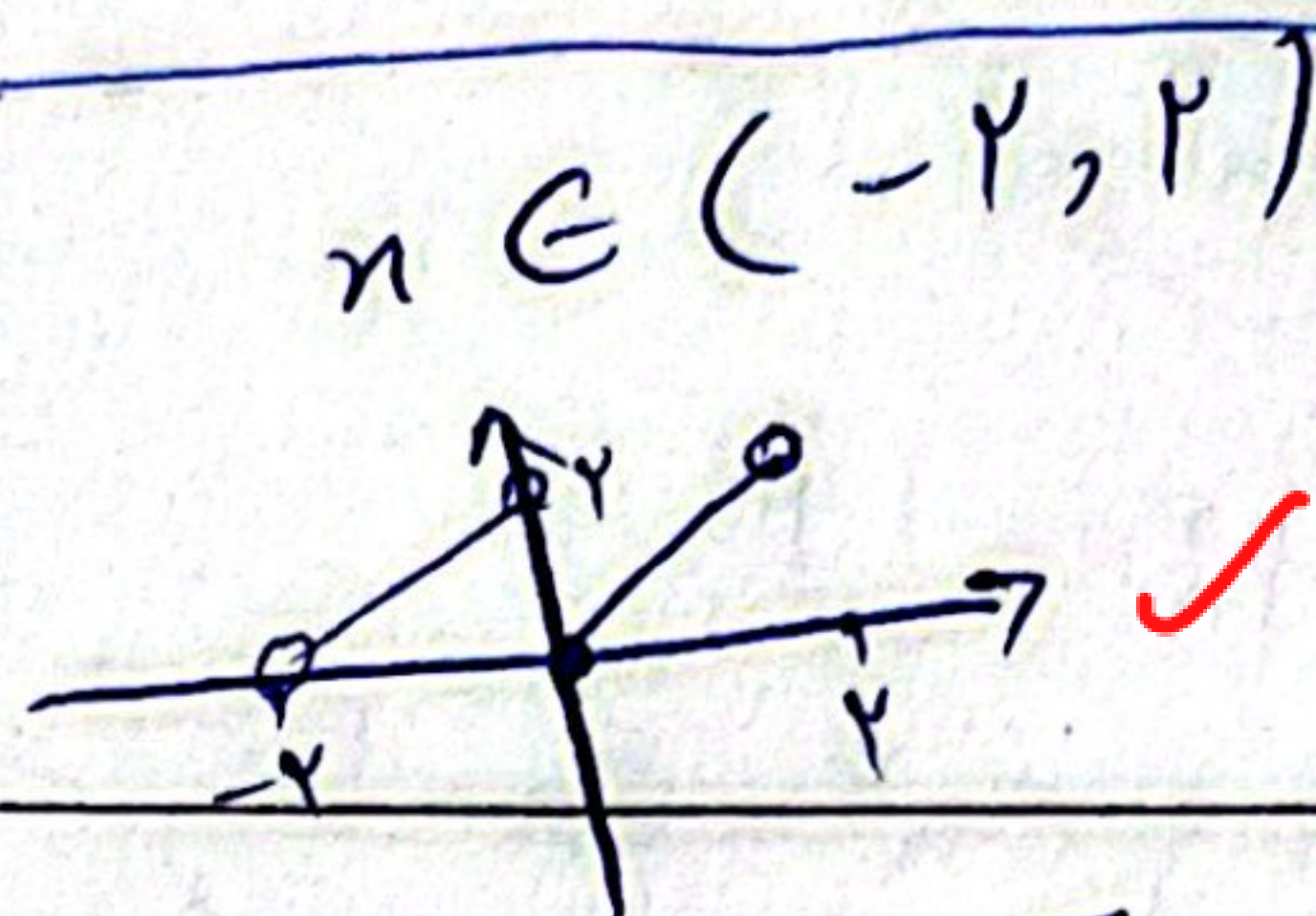
$$\begin{aligned} [-2n] - 1 &= 0 \\ [-2n] - 1 &= -1 \\ [-2n] - 1 &= -2 \\ [-2n] - 1 &= -3 \end{aligned}$$



$$\begin{aligned} -1 < n \leq -\frac{1}{2} &\rightarrow 1 \leq -2n < 2 \\ -\frac{1}{2} < n \leq 0 &\rightarrow 0 \leq -2n < 1 \\ 0 < n \leq \frac{1}{2} &\rightarrow -1 \leq -2n < 0 \\ \frac{1}{2} < n < 1 &\rightarrow -2 < -2n < -1 \end{aligned}$$

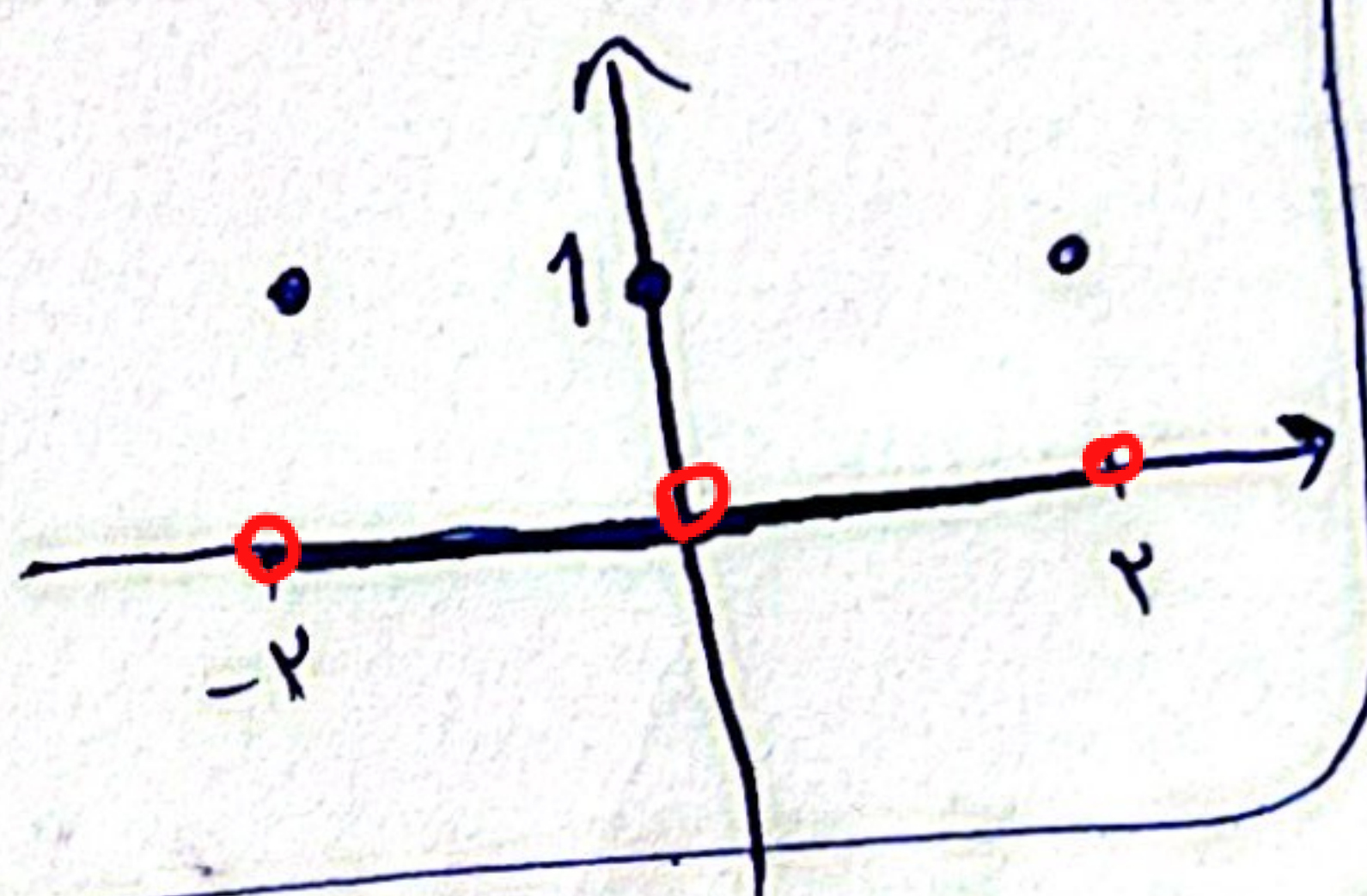
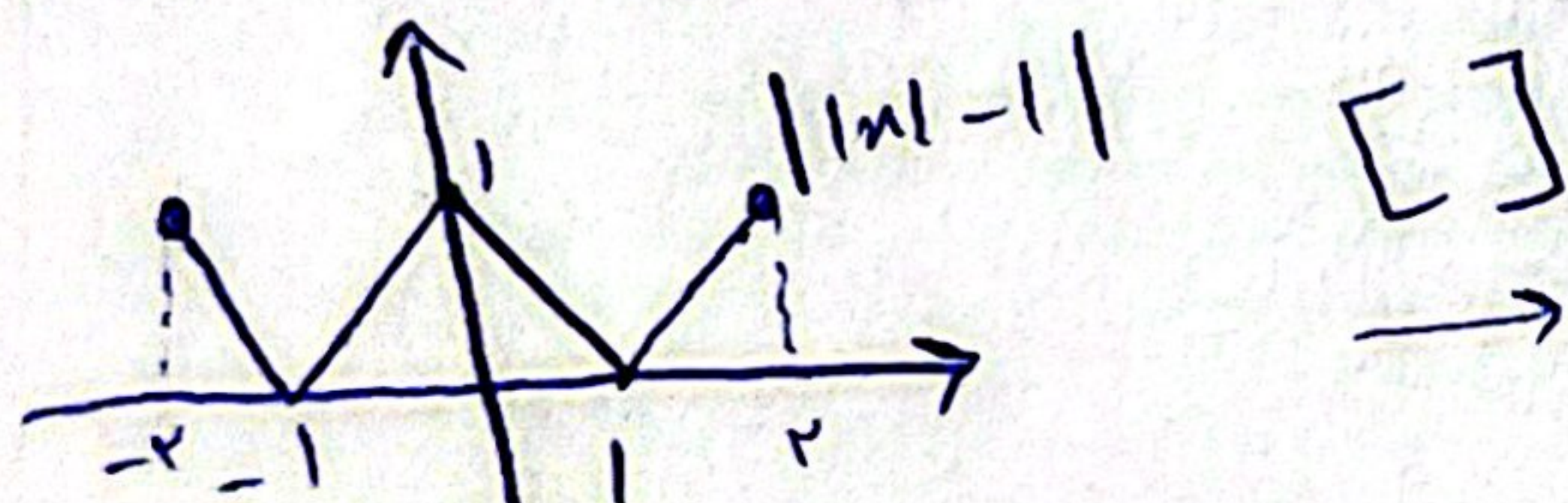
$$ب) y = n - 2 \left[\frac{n}{2} \right]$$

$$\begin{aligned} -2 < n < -1 &\rightarrow n + 2 \\ -1 < n < 0 &\rightarrow n \\ 0 < n < 1 &\rightarrow n \end{aligned}$$



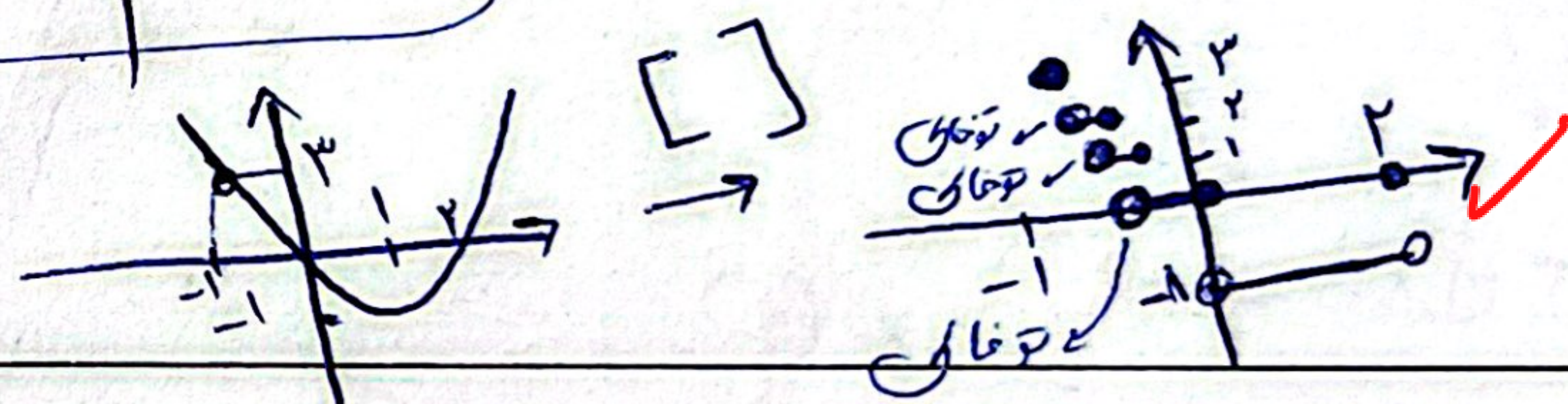
$$الف) y = [|n| - 1]$$

$$n \in [-2, 2]$$



$$ب) y = [n^2 - 2n]$$

$$n \in [-1, 2]$$



$$a + [b] = 5/4$$

$$a = 1/4$$

$$b - [a] = 2/5$$

$$b = 2/5$$

$$a + b = 1/4 + 2/5 = 13/20$$

$$\begin{cases} a + b = 5/4 \\ b - a = 2/5 \end{cases}$$

$$\rightarrow 2b = 9/4$$

$$b = 9/8$$

$$a = 1/4$$

$$a + b = 5/4$$

$$\begin{aligned} (1+\sqrt{2})^4 + (1-\sqrt{2})^4 &= 19\sqrt{2} \\ \sqrt{2} &= 1/\sqrt{2} \end{aligned}$$

$$[(1+\sqrt{2})^4] = ?$$

$$\rightarrow (1+\sqrt{2})^4 = 19\sqrt{2}$$

$$[(1+\sqrt{2})^4] = 19\sqrt{2}$$