

→ الطرح حارنس

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

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

$$R \rightarrow a, b=1 \quad (x-1)^3 = x^3 - 3x^2 + 3x - 1$$

↓

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

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

$$\rightarrow y = \frac{1}{x^3 - 3x} \rightarrow \frac{1}{(x-1)^3 - 1}$$

$$x^3 - 3x = (x-1)^3 - 1$$

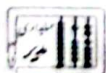
$$y(x-1)^3 - y = 1 \rightarrow y(x-1)^3 = 1+y \rightarrow (x-1)^3 = \frac{1+y}{y}$$

$$\frac{1+y}{y} \geq 0 \rightarrow \frac{1}{y} + \frac{y}{y} \geq 0 \rightarrow \frac{1}{y} + 1 \geq 0 \rightarrow \frac{1}{y} \geq -1$$

$$y \leq -1 \rightarrow y \in (-\infty, -1] \Rightarrow (x-1)^3 - 1 \in [-1, 0) \cup (0, +\infty)$$

↓

$$\rightarrow R \rightarrow (-\infty, -1] \cup (0, +\infty)$$



$$\text{ا) } x^2 - 8x + 10 \rightarrow \frac{-b}{2a} = \frac{8}{2} = 4 \rightarrow x_s = 4$$

$$\hookrightarrow 4 - 8 + 10 = 6 \rightarrow \min$$

$$R \rightarrow [6, +\infty)$$

$$\text{ب) } -x^2 + 4x + 5 \rightarrow \frac{-b}{2a} = \frac{-4}{-2} = 2 \rightarrow x_s = 2$$

$$\hookrightarrow \max = y_s = -4 + 8 + 5 = 9$$

$$R \rightarrow (-\infty, 9]$$

$$\text{ج) } \sqrt{x^2 - 8x - 4} \rightarrow \frac{-b}{2a} = \frac{8}{2} = 4 \rightarrow \min = y_s = -4$$

$$(\sqrt{-4}, +\infty) \rightarrow \sqrt{-4} \text{ غير موجود}$$

$$\hookrightarrow \text{كل قيم } x \text{ مسموحات } \rightarrow R = [0, +\infty)$$

$$\text{د) } \sqrt{4x - x^2} \rightarrow \sqrt{-x^2 + 4x}$$

$$x_s \rightarrow 2 \quad \max = 4 - 4 = 0$$

كل قيم x مسموحات

$$R = [0, 4]$$

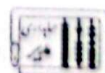
$$\text{ا) } y = x^2 - 8x^2 + 2x + 1 \rightarrow \text{مضروب } \rightarrow R = \mathbb{R}$$

$$\text{ب) } y = x^5 - 4x^4 + 2x + 2 \rightarrow \text{مضروب } \rightarrow R = \mathbb{R}$$

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

$$\text{د) } y = (x^2 - 8x^2 + 2x + 1)^2 \rightarrow \text{مضروب } \rightarrow R = [0, +\infty)$$

كل قيم x مسموحات



$$\text{ا) } y = \frac{2n+1}{n-2} \rightarrow yn - 2y = 2n+1 \rightarrow n(y-2) = 2y+1$$

$$n = \frac{2y+1}{y-2} \rightarrow y \neq 2 \rightarrow R \in \mathbb{R} - \{2\}$$

$$\text{ب) } y = \frac{2n+1}{n+1} \rightarrow yn + y = 2n+1 \rightarrow yn - 2n = -y+1$$

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

$$\hookrightarrow y \neq 2 \rightarrow R = \mathbb{R} - \{2\}$$

$$\text{ا) } y = \sqrt{\frac{2n+1}{n+1}} \rightarrow R = [0, +\infty) - \{2\}$$

من جانب اقصي

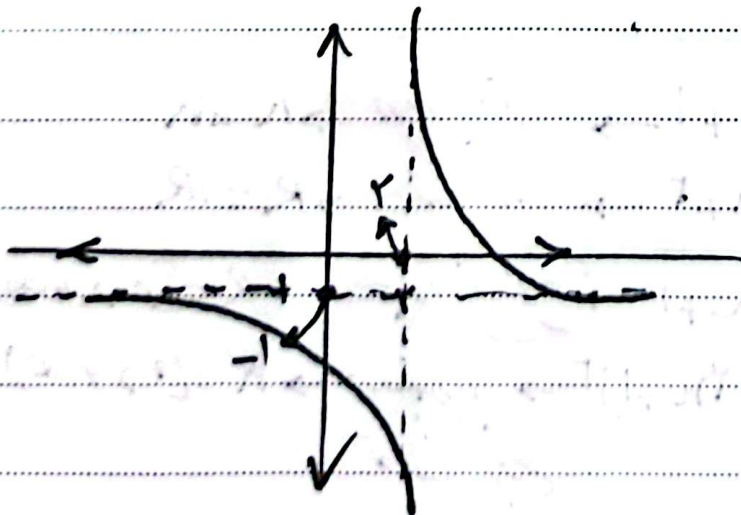
$$\text{ب) } y = \sqrt{\frac{2n+1}{-n+2}} \rightarrow R = [0, +\infty) - \{-2\}$$

$$\text{ا) } y = \frac{2n-2}{n+1} \rightarrow n+1=0 \rightarrow n=-1$$

قائم

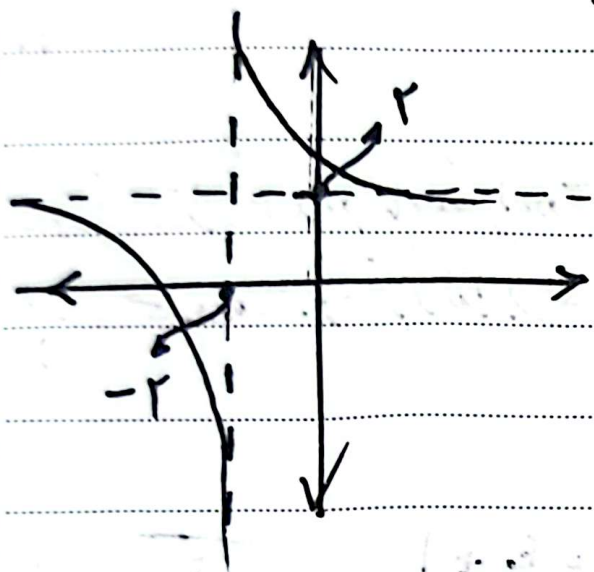
$$\hookrightarrow \frac{2}{1} = 2$$

اقص



$$\rightarrow) \frac{r n - 1}{n + r} = y \rightarrow n + r = 0 \rightarrow n = -r \quad \text{مقام}$$

$$\rightarrow \frac{r}{1} = r \rightarrow \text{افقی}$$



$$\text{مثال 1) } y = \sin n + \frac{1}{\sin n}$$

$$\begin{cases} \sin n > 0 \rightarrow R_y = [r, +\infty) \\ \sin n < 0 \rightarrow R_y = (-\infty, -r] \end{cases} \Rightarrow R_y = \textcircled{1} \cup \textcircled{2}$$

$$\rightarrow) y = \frac{n^4 + 1}{n^2} \rightarrow y = \frac{n^4}{n^2} + \frac{1}{n^2} \rightarrow y = n^2 + \frac{1}{n^2}$$

$$R = (-\infty, -r] \cup [r, +\infty)$$

$$\text{ع. 1) } y = \frac{\sqrt[3]{n^4 + 1}}{\sqrt[3]{n}} \rightarrow y = \frac{\sqrt[3]{n} \cdot \sqrt[3]{n}}{\sqrt[3]{n}} + \frac{1}{\sqrt[3]{n}}$$

$$\hookrightarrow \sqrt[3]{n} + \frac{1}{\sqrt[3]{n}} \rightarrow R = (-\infty, -r] \cup [r, +\infty)$$



$$1) \sqrt{x} + \frac{1}{\sqrt{x}} = y \rightarrow R = [2, +\infty)$$

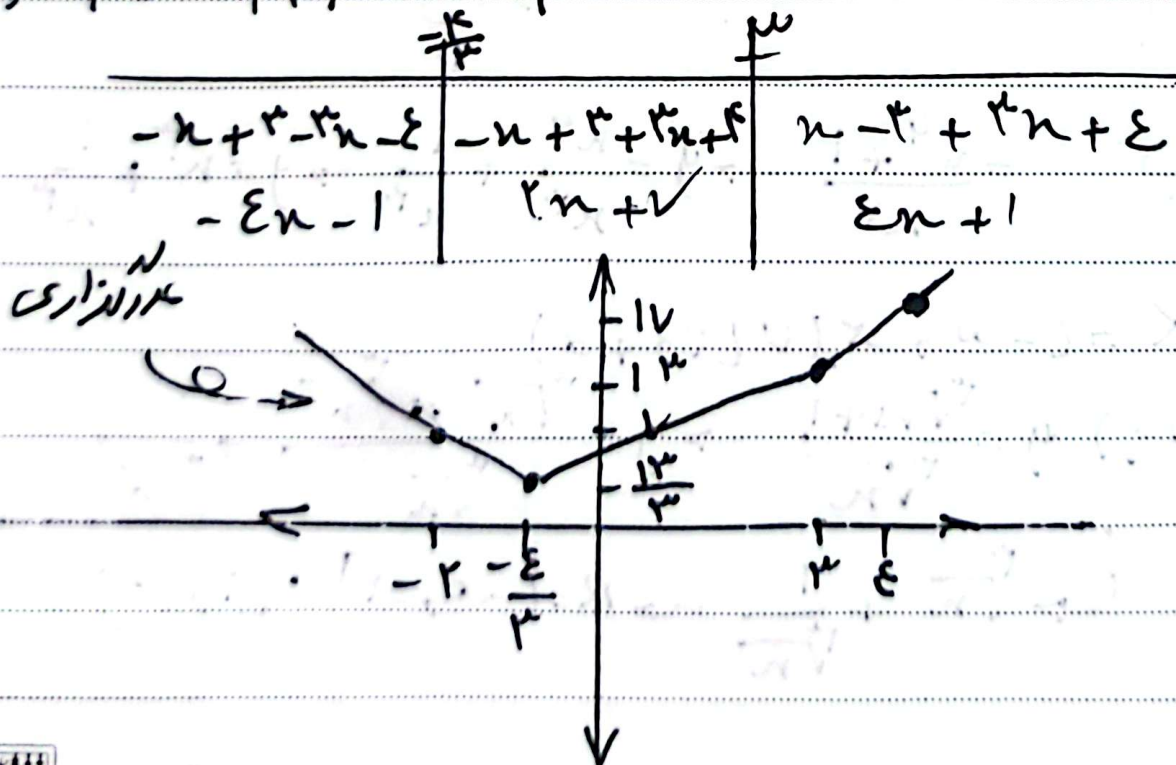
$$-A \quad y = x^2 + \frac{1}{x^2 + 3}$$

حاصل مقدار x^2 دایره با صفر است پس $\min$ عبارت دیگر $\rightarrow \min$
 $\frac{1}{x^2 + 3}$ و محدودیت و خورندار چون $x^2 \neq 3$
 $Ry = [\frac{1}{4}, +\infty)$

$$b) y = \frac{x^2 + 1}{\sqrt{x^2 + 4}} \rightarrow \frac{x^2 + \epsilon + 1}{\sqrt{x^2 + \epsilon}} \rightarrow \sqrt{x^2 + \epsilon} + \frac{1}{\sqrt{x^2 + \epsilon}}$$

$$\hookrightarrow R = [2, +\infty)$$

$$-A \quad y = |x - 2| + |3x + \epsilon|$$



۱۰۔ الف) $y = |x - 2| + |2x + 2| \rightarrow R = [4, +\infty)$

فصل سائنس

ب) $y = |2x - 2| - |x + 1| \rightarrow R = [-4, -2]$

فصل آئینہ

