

14, 15

پہلے اجائی

الف) $-1 \leq \sin t \leq 1 \rightarrow -1 \leq \sin\left(\frac{\pi}{3} + 2\pi\right) \leq 1 \rightarrow -1 \leq \sin^2\left(2\pi + \frac{\pi}{3}\right) \leq 1 \rightarrow$

$0 \leq \sqrt{\sin^2\left(2\pi + \frac{\pi}{3}\right)} \leq 1 \rightarrow -1 \leq \sqrt{\sin^2\left(2\pi + \frac{\pi}{3}\right)} \leq 1$

$R = [-1, 1]$

۲

ب) $-1 \leq \cos u \leq 1 \rightarrow (-1)^3 \leq \cos^3(u) \leq 1^3 \rightarrow -1 \leq \cos^3 u \leq 1 \rightarrow -3 \leq \sqrt[3]{\cos^3 u} \leq 3 \rightarrow$

$-1 \leq \sqrt[3]{\cos^3 u} \leq 1$

$R = [-1, 1]$

$-3 \leq x < -2 \Rightarrow -1 - 3 = -4$

$-2 \leq x < -1 \Rightarrow -1 - 2 = -3$

$-1 \leq x < 0 \Rightarrow -1 - 1 = -2$

$x = 0$

$0 \leq x < 1 \Rightarrow 1 + 0 = 1$

$1 \leq x < 2 \Rightarrow 1 + 1 = 2$

$2 \leq x < 3 \Rightarrow 2 + 1 = 3$

$x = 3 \Rightarrow 1 + 3 = 4$

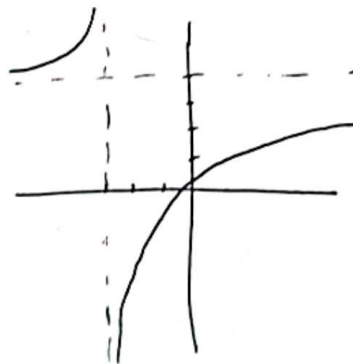


صفر تعریف شد است

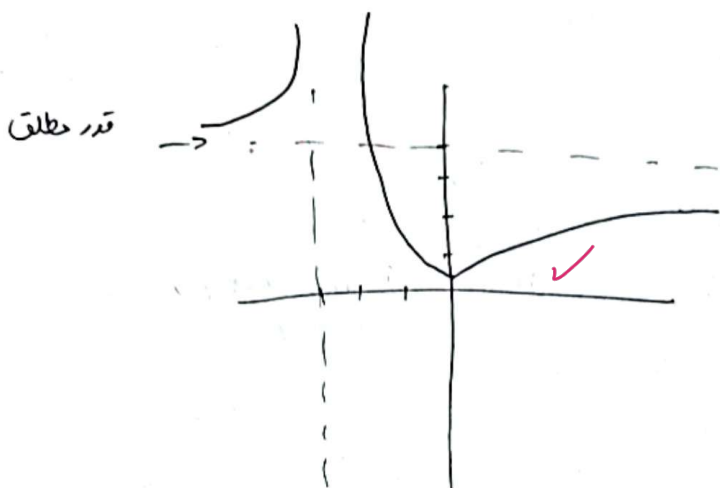
۲
14, 15

$$y = \left| \frac{x+1}{2+r} \right|$$

$$\frac{x+1}{2+r} \rightarrow$$



(2)



$$|x-1| + |y-1| = r$$

$$y \geq 1, x < 1$$

$$-x + r + y - 1 = r$$

$$y = x + 1$$

$$y \geq 1, x \geq 1$$

$$x - r + y - 1 = r \rightarrow y = -x + r + 1$$

$$-r$$

(2)

$$-x + r + y - 1 = r$$

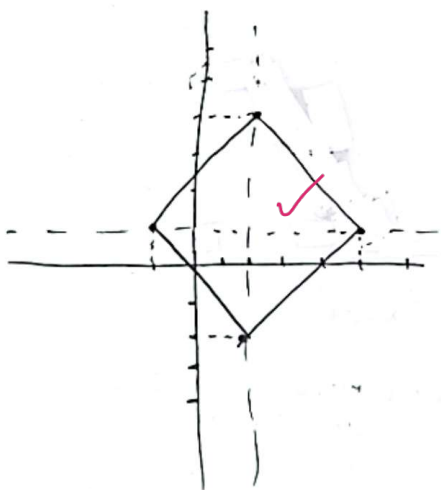
$$y = x$$

$$y < 1, x < 1$$

$$x - r + y - 1 = r$$

$$y = x - r + 1$$

$$y < 1, x \geq 1$$



(2)

$$\omega) 2 + \frac{1}{n} + r\sqrt{2 + \frac{1}{n}}$$

$$2 + \frac{1}{n} \geq 0 \rightarrow \underbrace{2 + \frac{1}{n}}_{D=(0, +\infty)} \geq r \xrightarrow{x(-1)} -\left(2 + \frac{1}{|2|}\right) \leq -r$$

$$2 + \frac{1}{n} = t \rightarrow t + r\sqrt{t} : \text{بح } (t \geq r)$$

$$t + r\sqrt{t} \rightarrow \text{الحد الأدنى } \frac{y_{\min}}{t \min=r} \rightarrow r + r\sqrt{r} = y_{\min}$$

$$\lim_{t \rightarrow +\infty} (t + r\sqrt{t}) = +\infty$$

$$R = [r + r\sqrt{r}, +\infty)$$

$$\text{ـ) } y = (r - \sin \alpha)(1 + \sin \alpha) = -\sin^2 \alpha - \sin \alpha + r \sin \alpha + r = -\sin^2 \alpha + r \sin \alpha + r$$

$$\min \min z = -1 \rightarrow -1 - r + r = 0$$

$$\begin{aligned} \min & \xrightarrow{-\frac{b}{2a}} \frac{-r}{-1} = 1 \rightarrow -1 + r + r = r \\ \max & 1 \rightarrow r \end{aligned}$$

$$R = [0, r]$$

$$f(\alpha) = -\frac{1}{r} \alpha + 1$$

$$\begin{aligned} 1 & \rightarrow \frac{r}{r} \\ r & \rightarrow \frac{r}{r} \\ r & \rightarrow \frac{r}{r} \\ r & \rightarrow \frac{r}{r} \\ r & \rightarrow \frac{r}{r} \\ r & \rightarrow \frac{r}{r} \end{aligned}$$

$$\begin{aligned} v & \rightarrow \frac{r}{r} \\ \wedge & \rightarrow \frac{r}{r} \\ q & \rightarrow v \end{aligned}$$

$$\frac{r_1 + r_2 + r_3 + r_4 + r_5 + r_6 + r_7 + r_8 + r_9}{r} = \frac{r r_5}{r} = r_5$$

(2) - 4

$$a > 0$$

$$n = r \rightarrow \text{نقطه بحرانی}$$

$$\frac{r}{-1 +}$$

- 5

$$a n^2 + b n + c = a(n - r)^2 = a(n^2 - \epsilon n + \epsilon) = a n^2 - \epsilon a n + \epsilon a$$

$$b = -\epsilon a, c = \epsilon a \xrightarrow{f(r)=1} \sqrt{9a + r^2 b + c} = 1 \rightarrow 9a + r^2 b + c = 1 \rightarrow a = 1, b = -r, c = r$$

$$\sqrt{b n^2 + a n - r} = \sqrt{-\epsilon n^2 + n - 1}$$

$$-\epsilon n^2 + n - 1 \geq 0 \Rightarrow \epsilon n^2 - n + 1 \leq 0$$

$$\Delta = b^2 - 4ac = 1 - 4(\epsilon)(1) = -4\epsilon$$

$$\Delta < 0, a < 0$$

همواره مثبتی ← تقریب نشود

صفحه آخر...

$$\frac{2^x - \varepsilon a}{a + x}$$

$$D = \mathbb{R} - \{a, b\}$$

$$R = [c, +\infty) - \{1\}$$

$$f\left(\frac{a+b}{x}\right) = ?$$

(1)

$$\frac{2^x - \varepsilon a}{a + x} \rightarrow \frac{2^x - \varepsilon a}{a + x} = \frac{2^x(a - x)(a + x)}{a + x}, \quad a \neq x \text{ بشر } \rightarrow 2^x - \varepsilon a$$

$$a = b = -x$$

$$f(a) = 2^x - \varepsilon a$$

$$0^+ \rightarrow a = -\frac{b}{x} = \frac{x}{x} = 1 \quad y = -1$$

$$f(-x) = \varepsilon + \varepsilon = 1 \quad \text{در هر دو طرف ضرب در } x$$

ریشه مربع

$$R = [-1, +\infty) - \{1\} \rightarrow c = -1$$

صفحه آخر...

$$f\left(\frac{a+b}{x}\right) = f\left(\frac{-x}{-x}\right) = f(x) = x^x - x(x) = x$$

$$y = \sqrt[3]{2^x + a2^x + b2^x - 1} \rightarrow \sqrt[3]{(2-x)^3} = 2-x$$

- 9
(2)

$$(2-x)^3 \rightarrow (2-x)^3 = 2^3 - 4 \cdot 2^2 + 12x - 1 \rightarrow b = 12, a = -4$$

$$D = [-4, 12] \quad \left. \begin{array}{l} \rightarrow 2 = -4 \rightarrow -4 - x = -1 \\ \rightarrow 2 = 12 \rightarrow 12 - x = 1 \end{array} \right\} R = [-1, 10]$$

$$y = [2x] + [2x + \frac{1}{x}] \quad [\frac{1}{x}, 2)$$

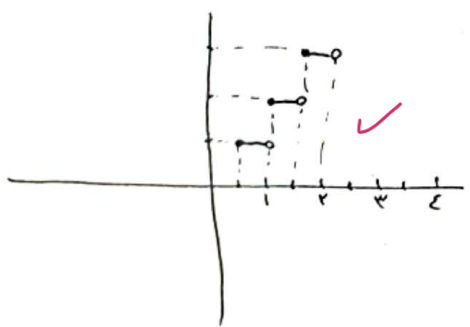
(3)

$$0 \leq x < \frac{1}{2} \rightarrow [2x] = 0, \quad \frac{1}{2} \leq 2x + \frac{1}{x} < 1 \rightarrow [2x + \frac{1}{x}] = 0 \rightarrow f(x) = 0 + 0 = 0$$

$$\frac{1}{2} \leq x < 1 \rightarrow [2x] = 0, \quad 1 \leq 2x + \frac{1}{x} < \frac{5}{2} \rightarrow [2x + \frac{1}{x}] = 1 \rightarrow f(x) = 0 + 1 = 1$$

$$1 \leq x < \frac{3}{2} \rightarrow [2x] = 1, \quad \frac{3}{2} \leq 2x + \frac{1}{x} < 2 \rightarrow [2x + \frac{1}{x}] = 1 \rightarrow f(x) = 1 + 1 = 2$$

$$\frac{3}{2} \leq x < 2 \rightarrow [2x] = 1, \quad 2 \leq 2x + \frac{1}{x} < \frac{9}{2} \rightarrow [2x + \frac{1}{x}] = 2 \rightarrow f(x) = 1 + 2 = 3$$



به 0, 1, 2

۷- با توجه به دامنه، زیر رادیکال یک خط با شیب مثبت بوده یعنی $a=0$ است و نقطه $(2,0)$ هم در معادله خط صدق میکند...

$$\begin{cases} (2,0) \rightarrow 2b+c=0 \\ (3,1) \rightarrow 3b+c=1 \end{cases} \rightarrow b=1, c=-2$$

$$g(x) = \sqrt{x^2+4} \rightarrow \text{ext} \Big|_x^0 \Rightarrow R_g = \sqrt{[4, +\infty)} = [2, +\infty)$$

$$f(x) = \frac{x(x-2)(x+2)}{x+2} = x^2 - 2x$$

$$x^2 - 2x \neq 8 \rightarrow \begin{cases} x \neq -2 \\ x \neq 4 \end{cases}$$

$y=8$ در برد تابع نیست یعنی:

$$D_f = \mathbb{R} - \{-2, 4\} \quad \text{پس دامنه برابر است با:}$$

$$f(x) = x^2 - 2x \rightarrow \text{ext} \Big|_{-1}^1 \Rightarrow R_f = [-1, +\infty) - \{8\} \quad \text{حالا بیایم سراغ برد!}$$

$$f\left(\frac{a+b}{2c}\right) = f\left(\frac{2}{-2}\right) = f(-1) \rightarrow f(-1) = 3$$