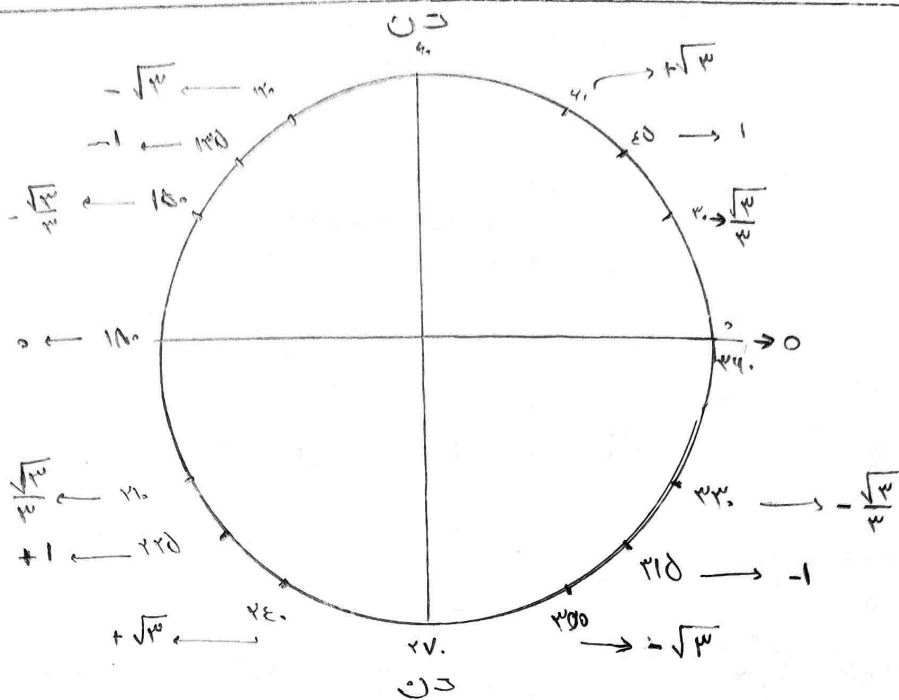


سؤال (۱)



سؤال (۲)

$$1) \frac{1}{r} + (-1) + 2(-1) \Rightarrow \frac{-2}{r}$$

$$2) -\frac{\sqrt{3}}{r} - 3 + \frac{2\sqrt{3}}{r} \Rightarrow -3 + \frac{\sqrt{3}}{r}$$

$$1) \frac{\sqrt{3}}{r} + \frac{\sqrt{3}}{r} - 3(-\frac{\sqrt{3}}{r}) \Rightarrow \frac{5\sqrt{3}}{r}$$

$$2) \cos 0^\circ + \sin(\frac{\pi}{6}) \rightarrow 1 + 1 \Rightarrow 2$$

سؤال (۳)

$$a^2 + 2a = 12a + 2 \rightarrow a^2 + a - 2 = 0 \rightarrow (a-1)(a+2) = 0$$

1 → 1
-2 → x → طبق شرط

$$f(n) = \begin{cases} n^2 + 2n & n \geq 1 \\ 2n + 3 & n \leq 1 \end{cases} \quad f(1) = 0$$

$$n+1 \geq 2 \rightarrow n \geq 1$$

$$n+1 \leq 2 \rightarrow n \leq 1$$

$$\text{مشتق است} \rightarrow 11 - b \rightarrow a - 4$$

$$\Rightarrow 11 - b = a - 4 \Rightarrow \underline{a + b = 15}$$

سؤال (۴)

$$y = \frac{1}{x^2(x-4)} = -\frac{1}{4x} - \frac{1}{4x^2} + \frac{1}{x-4} \quad Df = \mathbb{R} - \{2, 0\}$$

الف)

$$y = \frac{1}{2x^3 + 4x^2 + 2x + 4} \Rightarrow 2x^3 + 4x^2 + 2x + 4 \neq 0 \Rightarrow x^3 + 2x^2 + x + 2 \neq 0$$

ب)

$$(x^3 + 2x^2 + x + 2) \Rightarrow (x+2)(x^2+1) \neq 0 \rightarrow x \neq -2$$

$$Df = \mathbb{R} - \{-2\}$$

(6) 3

$$\text{مثال 1) } \sqrt{x^2-1} + \sqrt{x-2} \rightarrow Df = [2, \infty+)$$

$$\frac{-1}{+0-0+} \cap \frac{1}{x-2} \rightarrow x \geq 2$$

$$\rightarrow) \frac{\sqrt{4-4x}}{\sqrt{4x-4}} \Rightarrow \begin{cases} 4-4x \geq 0 \rightarrow x \leq 1 \\ 4x-4 \geq 0 \rightarrow x \geq 1 \end{cases} \cap \Rightarrow \frac{1}{4} < x \leq 1 = Df$$

(7) 3

$$\begin{cases} 4x-a \geq 0 \rightarrow x \geq \frac{a}{4} \\ b-3x \geq 0 \rightarrow \frac{b}{3} \geq x \end{cases} \cap \Rightarrow \left\{ \frac{a}{4} \leq x \leq \frac{b}{3} \right\} \rightarrow \frac{b}{a} = \frac{1}{4}$$

(8) 3

$$\text{مثال 1) } \sqrt{\frac{(x-3)(x+2)}{(x^2-4)(x^2-9)}} \rightarrow \sqrt{\frac{(x-3)(x+2)}{(x-2)(x+2)(x-3)(x+3)}} \geq 0$$

$$\frac{-3}{+0-0+} - \frac{-2}{+0-0+} - \frac{2}{+0-0+} + \frac{3}{+0-0+} \rightarrow Df = (-\infty, -3) \cup (2, 3) \cup (3, \infty+)$$

$$\rightarrow) \sqrt{\frac{(x-1)(x-3)(x+2)}{(x+1)(x+2)(x-2)}} \rightarrow \frac{-3}{+0-0+} - \frac{-2}{+0-0+} + \frac{-1}{+0-0+} - \frac{1}{+0-0+} + \frac{2}{+0-0+} - \frac{2}{+0-0+}$$

$$Df = (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup [3, \infty+)$$

(9) 3

$$y = \sqrt{x[x]-2} \quad [x]-2 \geq 0 \rightarrow [2, \infty+) = Df$$

(الف)

$$y = \sqrt{x[x]-5} \quad [x] \geq \frac{5}{x} \rightarrow [2, \infty+) = Df$$

(ب)

(10) 3

$$\text{مثال 1) } \Rightarrow \frac{-1}{+0-0+} - \frac{2}{+0-0+} \rightarrow \frac{1}{x+1} \rightarrow (-\infty, -1] \cup (2, \infty+) \cap (-\infty, 4] \Rightarrow Df = (-\infty, -1]$$

$$\rightarrow) \Rightarrow \begin{cases} x \geq 4 \\ x < 4 \end{cases} \cap \rightarrow \emptyset \quad Df = \emptyset$$