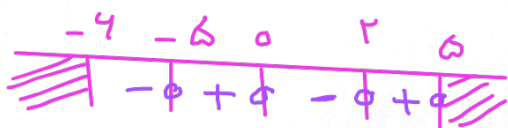


19, 28

~~.....~~ $[2, 5] \cup [-5, 10]$ $\sqrt{x} f(x)$

$x f(x) \geq 0$



یا هر درستی یا هر درستی
یا یکی یا دو تا صفر ← ناحیه اِواری

✓

$y = \sqrt{\frac{-x}{f(x)}}$

$\frac{-x}{f(x)} \geq 0 \rightarrow \frac{x}{f(x)} \leq 0$



$f(x) \neq 0 \rightarrow 0, -4, -3, 2, 5 \rightarrow$ حذف

$D_f = (-3, 2) \cup \{0\}$
 $P_f = \{-2, -1, 1\} \rightarrow$ عدد

حالت اول: $f(x) < 0, x > 0$

حالت دوم: $f(x) > 0, x < 0$

(1)

تقصی

$f(x) - 2f(2) = x^2 - 3x + 4$

$f(-2) = ?$

$f(2) - 2f(2) = 4 - 6 + 4 = 2$ $f(-2) + 2 = 4 + 4 = 8$

$-f(2) = 2 \rightarrow f(2) = -2$
 $f(x) = x^2 - 3x + 4$
 $f(-2) = 4 + 6 + 4 = 14$

1, 1, 6

✓

$f(x) = \begin{cases} x - \sqrt{x+4} & x > 3 \\ 2x+3 & x \leq 3 \end{cases}$

$f(f(8)) + f(f(1)) = ?$

$1 \leq 3 \Rightarrow 2x+3 = 2+3 = 5 \Rightarrow f(1) = 5$

$f(8) \Rightarrow x - \sqrt{x+4} = 8 - \sqrt{12} = 2 \Rightarrow f(8) = 2 \rightarrow f(f(1)) = 2$

$f(2) = 2x+3 = 4+3 = 7 \rightarrow 7+2 = 9$

(2) ✓

4

$f(x) = ax^2 - bx + 1$

$f(x-1) - f(x) = 2x+1$

$a-b = ?$

$a(x-1)^2 - b(x-1) + 1 - (ax^2 - bx + 1) = 2x+1$

$\Rightarrow ax^2 - 2ax + a - bx + b - ax^2 + bx - 1 = 2x+1$

$-2ax + a - bx + b - 1 = 2x+1$

$x(-2a-b) + a+b = 2x+2$

$x(-2a-b) + a+b = 2x+2$

$x(-2a-b) + a+b = 2x+2$

1, 1, 6

5

$-2ax + a+b = 2x+2$

$\begin{cases} -2a = 2 \rightarrow a = -1 \\ a+b = 2 \rightarrow b = 3 \end{cases}$

$a-b = -4$

$$f(x) = x^r - 3x + 1$$

$$f(1) = 1 - 3 + 1 = -1$$

$$f(-1) = 1 + 3 + 1 = 5$$

$$f(r) = 1 - 3 + 1 = -1$$

$$\frac{f(1) - f(-1)}{f'(r)} = ? \quad \frac{1 + 5}{1} = 6$$

(2) ✓

$$f(x) = \begin{cases} 3x + 1 & x \geq 2 \\ x^2 & x < 2 \end{cases}$$

$$f(2) = 3 \cdot 2 + 1 = 7$$

$$f(-2) = (-2)^2 = 4$$

$$f(r) = 3 \cdot 2 + 1 = 7$$

$$\frac{f(2) - f(-2)}{f'(r)} = \frac{7 - 4}{2} = \frac{3}{2}$$

(2) ✓

$$f = \{(1, 4), (2, 1), (3, 1), (4, 1)\}$$

$$\frac{f(f(1)) - f(f(2))}{f(1) - 2} = \frac{f(4) - f(1)}{4 - 2} = \frac{1 - 4}{2} = -\frac{3}{2}$$

(2) ✓

$$f(x) = \frac{x^r + 1}{x^r + 1} \Rightarrow \frac{1 + 1}{1 + 1} = 1$$

$$f(f(\sqrt{3} - 1)) = ? \Rightarrow f\left(\frac{1}{\sqrt{3}}\right) = \frac{\frac{1}{\sqrt{3}} + 1}{\frac{1}{\sqrt{3}} + 1} = 1$$

با این صفت بنویس

$$f(x) = x^r + \frac{1}{x^r}$$

$$(f(x))^r - f(x)$$

$$f(\sqrt{x}) = (\sqrt{x})^r + \frac{1}{(\sqrt{x})^r} = x^{\frac{r}{2}} + \frac{1}{x^{\frac{r}{2}}}$$

$$(x + \frac{1}{x})^r = x^r + 1 + \frac{1}{x^r}$$

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

(2) ✓

9. از اتحاد مربع دو جمله‌ای استفاده می‌کنیم:

$$f(n) = \frac{n^2 + 4n + 4}{n^2 + 4n + 4} = \frac{n^2 + 4n + 4 + 1}{n^2 + 4n + 4 + 1} = \frac{(n+2)^2 + 1}{(n+2)^2 + 1}$$

$$f(\sqrt{3}-2) = \frac{(\sqrt{3}-2+2)^2 + 1}{(\sqrt{3}-2+2)^2 + 1} = \frac{3 + 1}{3 + 1} = 2$$

$$f(f(\sqrt{3}-2)) = f(2) = \frac{(2+2)^2 + 1}{(2+2)^2 + 1} = \frac{17}{17}$$