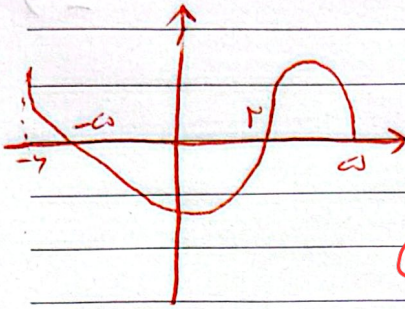


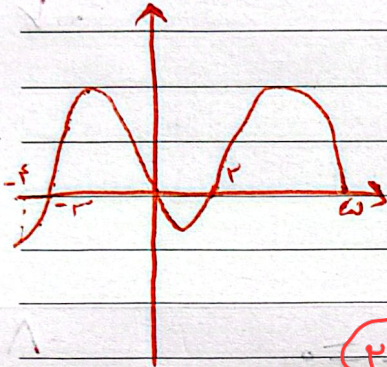
پرفیکشن



$$x f(x) \geq 0 \rightarrow \begin{cases} x > 0, f(x) \geq 0 \\ \text{یا} \\ x \leq 0, f(x) \leq 0 \end{cases} \Rightarrow D_f = [-4, 0] \cup [2, 4]$$

(2) ✓

-2



$$\frac{-x}{f(x)} \Rightarrow f(x) \neq 0 \Rightarrow x \neq -4, -2, 0, 2, 4$$

$$\frac{-x}{f(x)} \geq 0 \Rightarrow \begin{cases} x \leq 0, f(x) \geq 0 \\ \text{یا} \\ x > 0, f(x) \leq 0 \end{cases} \Rightarrow D_f = [-4, -2] \cup (0, 2]$$

(2) ✓

مثلاً 3 عدد صحیح 1، -1، -2

$$f(x) - r f(r) = x^r - r x + f \quad f(-r) = ?$$

$$x = r$$

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

(2) ✓

$$\left. \begin{aligned} f(1) &= 4, f(4) = 4 - \sqrt{9} = 2 \\ f(4) &= 2, f(2) = 4 \end{aligned} \right\} \Rightarrow f(f(4)) + f(f(1)) = 9$$

(2) ✓

$$f(x) = a x^r - b x + r \quad f(x-1) = a(x-1)^r - b(x-1) + r$$

↓

$$f(x-1) = a x^r - r a x + a - b x + b + r$$

$$f(x-1) - f(x) = a x^r - r a x + a - b x + b + r - a x^r + b x - r = -r a x + a + b$$

$$= 4x + r \Rightarrow \begin{cases} -r a = 4 \Rightarrow a = -r \\ a + b = r \Rightarrow b = 4 \end{cases} \Rightarrow a - b = -1$$

(2) ✓

IDEA

Subject:

$$f(x) = x^r - rx + 1 \quad f(1) = 1$$

$$\frac{rf(r) + f(-1)}{f'(r)} = \frac{r + 1}{1} = \checkmark$$

$$f(-1) = 1$$

$$f(r) = -1$$

(P) ✓

$$f(x) = 1 \quad \checkmark$$

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

$$f(-r) = r, \quad f(r) = \checkmark$$

(P) ✓

$$\frac{f(f(r)) - f(f(r))}{f(1) - r} = \frac{f(1) - f(r)}{f(1) - r} = \frac{1 - 1}{1} = 0$$

-A

$$f(r) = 1, \quad f(r) = r$$

(P) ✓

$$f(x) = \frac{x^r + rx + 1}{(x+r)^r + 1} \quad f(\sqrt{r} - r) = \frac{r + 1}{r + 1} = 1$$

(P) ✓

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

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

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

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

(P) ✓

IDEA