

نام و نام خانوادگی پاسخنامه تشریحی تکلیف شماره ... کلاس ...

الف) تابع است $y^3 - 2x^2 = 2x - 1 \Rightarrow y^3 = 2x^2 + 2x - 1 \Rightarrow \begin{cases} y_1^3 = 2x^2 + 2x - 1 \\ y_2^3 = 2x^2 + 2x - 1 \end{cases} \Rightarrow y_1 = y_2$

ب) $x \cos y = y \cos x$ If $x = \pi \Rightarrow \pi \cos y = y \cos \pi \Rightarrow \pi \cos y = 0 \Rightarrow \cos y = 0 \Rightarrow y = 2k\pi + \frac{\pi}{2}$

ج) $\frac{x+y}{2} = \sqrt{x+y} \quad x, y > 0 \Rightarrow x+y + 2\sqrt{xy} = 0 \Rightarrow (\sqrt{x} + \sqrt{y})^2 = 0 \Rightarrow \sqrt{x} = -\sqrt{y}$

د) $xy^2 + 2x - y^3 - 2y = 0 \xrightarrow{x=0} y^3 - 2y = 0 \Rightarrow y(y^2 - 2) = 0 \Rightarrow \begin{cases} y = \sqrt{2} \\ y = -\sqrt{2} \\ y = 0 \end{cases}$

$f(x) = \begin{cases} 2x^2 - b, & |x-1| \geq 2 \\ a + 2x, & -3 \leq x \leq -1 \end{cases} \quad f(x) = \begin{cases} 2x^2 - b, & x \geq 3 \\ a + 2x, & -3 \leq x \leq -1 \end{cases} \xrightarrow{x=-3} 2x^2 + b = a + 2x$
 $= 18 - b - a - 6 \Rightarrow a + b = 12$

$-(x-b)(x-a) \geq 0 \Rightarrow (x-b)(x-a) \leq 0 \Rightarrow x^2 - x(a+b) + ab \leq 0$

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

$a+b = -b \Rightarrow 2b = -a \Rightarrow a = -2b$
 $-ab = a \Rightarrow b = -1$
 $a + b = -1 - 1 = -2$

$y = \frac{2}{\sqrt{ax^2 + bx + c}} \quad \text{If } x = 1 \Rightarrow (a + 2b + c = 0 \Rightarrow c = -a - 2b$

$b^2 - (ac = 0 \Rightarrow b^2 - (-a - 2b)(-a - 2b) = 0 \Rightarrow b^2 + 4a^2 + 12ab = 0 \Rightarrow (b + 4a)^2 = 0$
 $\Rightarrow a = \frac{-b}{4} \xrightarrow{c = -a - 2b} c = -(-\frac{b}{4}) - 2b = -b \Rightarrow 2a + c - 3|b| = \frac{3b}{4} - b - 3b =$
 $\frac{-3b - 4b - 12b}{4} = \frac{-19b}{4}$

$f(x) = \sqrt{x} + \sqrt{y} = 1 \Rightarrow (\sqrt{y})^2 = (1 - \sqrt{x})^2$
 $\Rightarrow y = x + 1 - 1\sqrt{x} \Rightarrow f = x \geq 0$

$f(x) = \sqrt{\frac{1}{|x| - [x]}} \quad |x| - [x] \neq 0 \Rightarrow |x| \neq [x]$
 $D_f = \mathbb{R} - \mathbb{Z}$

(الف) $f(x) = \log \frac{1}{4 + \sqrt{x} - x } \quad \sqrt{x} \geq 0 \quad \checkmark$ $\sqrt{ x } = t \Rightarrow 4 + t - t^2 \neq 0 \Rightarrow (t-3)(t+2) \neq 0$ $t = \sqrt{ x } \neq 3 \Rightarrow x \neq 9 \Rightarrow x \neq \pm 9$ $t = \sqrt{ x } \neq -2 \quad \checkmark$ $D_f = \mathbb{R} - \{\pm 9\}$	(ب) $f(x) = \sqrt{\log_3 x - 1}$ $x > 0, x \neq 1, 3x - 1 > 0 \Rightarrow x > \frac{1}{3}$ $\log_3 x - 1 \geq 0 \Rightarrow \log_3 x \geq 1 \Rightarrow x \geq 3$ $\Rightarrow \frac{1}{3} < x \leq \frac{4}{3} \quad \text{یا} \quad x \geq 3$ $\textcircled{1} \cup \textcircled{2} = (\frac{1}{3}, \frac{4}{3}] \cup (3, +\infty)$	4
تابع $y = \sqrt{\frac{3x+2}{x-2}}$ معکوس $x = f(y)$ کی صورت میں y کی قیمت کا پتہ لگنا ہے۔ $b = +2$ $y = \sqrt{\frac{3x+2}{x-2}} + a \Rightarrow y = \sqrt{\frac{x(3+a) + 2a+2}{x-2}}$ $a = -3$		
$f(x) = \begin{cases} 2x-1, & [x] > 4 \\ 3x+3, & [x] \leq 4 \end{cases} \Rightarrow f(x) = \begin{cases} 2x-1, & x \geq 5 \\ 3x+3, & x < 5 \end{cases}$ $y = \sqrt{f(x) - x + 1} \Rightarrow f(x) - x + 1 \geq 0 \Rightarrow \text{If } f(x) = 2x-1 \Rightarrow x \geq 5$ $\text{If } f(x) = 3x+3 \Rightarrow 3x+3 \geq 0 \Rightarrow x \geq -\frac{3}{3} \Rightarrow x \geq -1$ $D_f = \left[-\frac{3}{3}, 5 \right) \cup [5, +\infty)$		
$y = \frac{2x^3 + 3x^2 + 11x + 3}{(x^2 + (x+1))^2} = \frac{3(x+1)^3}{(x^2 + (x+1))^2} = \frac{3(x+1)^3}{(x+1)^4} = \frac{3}{x+1}$ $D_f \rightarrow x^2 + (x+1) \neq 0 \Rightarrow (x+1)^2 \neq 0 \Rightarrow x+1 \neq 0 \Rightarrow x \neq -1 \Rightarrow D_f = \mathbb{R} - \{-1\}$		
$y = \sqrt{1 - \log_3(x-a)} \Rightarrow 1 - \log_3(x-a) \geq 0 \Rightarrow \log_3(x-a) \leq 1 \Rightarrow x-a \leq 3 \Rightarrow x \leq \frac{10+a}{3}$ $x-a > 0 \Rightarrow x > \frac{a}{3}$ $\frac{a}{3} = b, \frac{10+a}{3} = c \Rightarrow c-b = \frac{10+a}{3} - \frac{a}{3} = \frac{10}{3} = \boxed{a}$		