

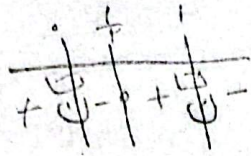
تکلیف و تابع

(میان فرض)

آرایه‌ای از درجه ۳

$$\text{الف) } \frac{x-1}{x} - \frac{x}{x-1} \geq 0 \rightarrow \frac{(x-1)^2 - x^2}{x(x-1)} = \frac{x^2 - 2x + 1 - x^2}{x^2 - x} = \frac{-2x + 1}{x^2 - x} \geq 0 \quad (1)$$

$$\frac{-2x+1}{x(x-1)} \geq 0$$



$$D_f = (-\infty, \frac{1}{2}) \cup [1, \infty)$$

ب) $x+1 \neq 0 \Rightarrow x \neq -1$ $x \neq 0$ $x-1 \neq 0 \Rightarrow x \neq 1$ $x+2 \neq 0 \Rightarrow x \neq -2$ $\frac{x}{x-1} + \frac{1}{x+2} \neq 0$

$$x \neq \frac{-2}{3}$$

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

$$D_f = \mathbb{R} - \{-1, \frac{-2}{3}, -\frac{3}{4}, 0, 1, -2\}$$

$$\text{الف) } \left[\left(\frac{1}{x} \right)^x - 9 \right] (32 - x^x) \geq 0$$

$x^x = x^{-x} \Rightarrow x = -2$
 $x^0 = x^x \Rightarrow x = \frac{0}{x}$

x	$\frac{1}{x^x} - 9$	$32 - x^x$	$f(x)$
$-\infty$	+	-	-
$-\frac{2}{3}$	+	+	+
0	-	-	+
1	-	-	-
2	-	-	-

$$D_f = (-\infty, -\frac{2}{3}) \cup [\frac{2}{3}, \infty)$$

$$\text{ب) } (\sqrt{y-1} = \sqrt[3]{x-1})^2$$

$$x-1 \geq 0 \rightarrow x \geq 1$$

$$D_f = [1, \infty)$$

$$\sqrt[3]{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$$

$$x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0$$

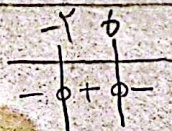
$$x < -1 \text{ or } x > 2$$

$$x^2 - 1 \geq 0 \rightarrow x \geq 1 \text{ or } x \leq -1$$

$$D_f = (-\infty, -1) \cup (2, \infty)$$



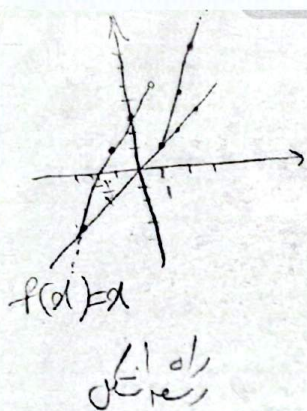
$$\sqrt{-x^2 + ax + 3}$$



$$a+b = \frac{1}{p} + \frac{p}{q} = 1$$

$$\left(\frac{1}{a} \right)^p = -\frac{p}{q} = -\frac{1}{b} \rightarrow b = \frac{p}{q}$$

$$\left(\frac{b}{a} \right)^q = +a = \frac{p}{q} + (-x) = \frac{1}{p}$$



$$\begin{array}{c|cc} x & 1 & 2 \\ \hline y & 1 & 4 \end{array}$$

$$\begin{array}{c|ccc} x & \frac{1}{2} & 1 & 2 \\ \hline y & 0 & 1 & 4 \end{array}$$

$$2x + y = 4$$

$$x = 2$$

$$f(x) = x \Rightarrow \begin{cases} 1 - x \geq x \\ x \geq 1 \end{cases} \quad \text{①}$$

$$f(x) \geq x \Rightarrow \begin{cases} x \geq 1 \\ x \geq 1 \end{cases} \quad \text{②}$$

$$D_f = [-2, +\infty) \Rightarrow \begin{cases} x + y \geq x \\ (x+y) \geq -2 \end{cases} \quad \text{③}$$

$$f(x) = 2\left(\frac{\sqrt{3}+1}{2}\right)^2 - 2\left(\frac{\sqrt{3}+1}{2}\right) = \frac{2(\sqrt{3}+1)^2}{4} - \frac{2(\sqrt{3}+1)}{2}$$

$$\frac{\sin x}{\frac{\sqrt{3}}{2}} + \cos x = \frac{\sqrt{3}+1}{2}$$

(x) مع

$$2\left(\frac{\sqrt{3}+1}{2}\right) \cdot \frac{\sqrt{3}+1}{2} - \frac{2(\sqrt{3}+1)}{2} = \frac{1}{2}$$

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

$$f\left(\frac{a+1}{a-1}\right) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} \rightarrow \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a+1}{a-1}} = \frac{2a}{2} = a \quad \text{①}$$

$$D_f = \{a \mid a \in \mathbb{Z}, a \neq 1\}$$

$$g(a) = \sqrt{a^2-1}$$

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

$$\rightarrow (-\sqrt{a^2-1}) = \frac{-a^2 + 1}{-a^2 - 1} \rightarrow \frac{1 - a^2}{1 + a^2} = a^2 + \frac{1 - a^2}{1 + a^2}$$

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

$$f(-3) = (x-3)(x-2) = (-4-3)(-4-2) = -9(-6) = 54$$

$$x + y = -3$$

$$x = -4$$

$$f(-3) + f(3) = 18$$

$$f(3) = (x-3)(x-2) = (1-3)(1-2) = -2(-1) = 2$$

$$x + y = 3$$

$$x = 1$$

$$x \cos x + y \cos x = 0 \rightarrow \frac{x \cos x + y \cos x}{x} = 0$$

$$\cos x + y \cos x - 1 = 0$$

$$(x \cos x + y \cos x) \rightarrow \cos x = \frac{1}{x} \rightarrow x = \frac{1}{\cos x} \rightarrow \tan x = 1$$