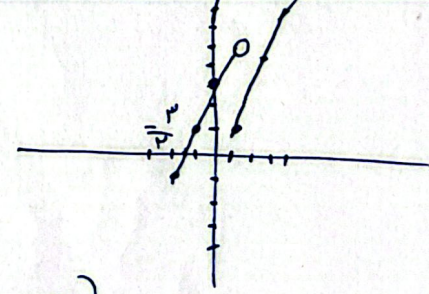


الف) $f(x) = \sqrt{\frac{(x-1)^2 - x^2}{x(x-1)}}$ $\frac{-2x+1}{x(x-1)} \geq 0$ $\frac{1}{x} - \frac{1}{x-1} \geq 0$ $\frac{1}{x} - \frac{1}{x-1} \geq 0$ $\frac{1}{x} - \frac{1}{x-1} \geq 0$	ب) $D_f = (-\infty, 0) \cup (\frac{1}{2}, 1)$ $\frac{x-2x-1}{x(x-1)} \geq 0$ $\frac{-x-1}{x(x-1)} \geq 0$ $\frac{-x-1}{x(x-1)} \geq 0$ $\frac{-x-1}{x(x-1)} \geq 0$	۱
ب) $(x^2 - 9)(x^2 - 1) \geq 0$ $(x^2 - 9)(x^2 - 1) \geq 0$ $(x^2 - 9)(x^2 - 1) \geq 0$ $(x^2 - 9)(x^2 - 1) \geq 0$	ب) $y_1 = \sqrt{x-1}$ $x-1 \geq 0$ $\sqrt{x-1} \geq 0$ $\sqrt{x-1} \leq 1$ $x-1 \leq 1$ $x \leq 2$ $D_f = (-\infty, -2] \cup [\frac{1}{2}, +\infty)$ $D_f = \{x \mid x \leq 2\}$	۲
$x^2 - 1 \geq 0$ $x^2 \geq 1 \rightarrow x \geq 1$ $x \leq -1$ $\sqrt{x^2 - 1} + 1 > 0$	$x^2 - x - 2 > 0$ $(x-2)(x+1) > 0$ $\frac{-1}{x} - \frac{2}{x+1} > 0$ $\frac{-1}{x} - \frac{2}{x+1} > 0$ $D_f = (-\infty, -1) \cup (2, +\infty)$	۳
$x^2 - 2 \rightarrow \frac{1}{x} - \frac{2}{x} = 0$ $\frac{1}{x} - \frac{2}{x} = 0$ $\frac{1}{x} - \frac{2}{x} = 0$ $\frac{1}{x} - \frac{2}{x} = 0$	$f(x) = \sqrt{1 - \frac{1}{x} - x^2}$ $\frac{x+b}{x^2} \rightarrow 1 - \frac{1}{x} - x^2 \geq 0$ $1 - \frac{1}{x} - x^2 \geq 0$ $1 - \frac{1}{x} - x^2 \geq 0$ $1 - \frac{1}{x} - x^2 \geq 0$	۴
$2x^2 - 3 \geq 0$ $x^2 \geq \frac{3}{2}$ $x \geq \sqrt{\frac{3}{2}}$ $x \leq -\sqrt{\frac{3}{2}}$ $f(x) - x \geq 0$ $D_f = [-\frac{3}{2}, +\infty)$		۵

$f\left(\frac{\sqrt{x}}{x} + 1\right) = \sqrt{x(x-1)} = \sqrt{x\left(\frac{\sqrt{x}+1}{x}\right)} \left(\frac{\sqrt{x}-1}{x}\right)$ $= \frac{x-1}{x} = \frac{-1}{x}$	6
$f\left(\frac{a+1}{a-1}\right) = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{1}{a-1}} = a$ $D_f = \mathbb{R} - \{1\}$	7
$f(g(a)) = x \rightarrow g(a) = y$ $x^2 - 5x + 6 = 0 \quad \sqrt{a^2 - 1} = y$ $x^2 - 5x + 6 = 0 \quad a^2 - 1 = 5$ $(x-1)(x-6) = 0 \quad a^2 = 6 \rightarrow a = \pm\sqrt{6}$ $x = y$	8
$f(x) \xrightarrow{x=1} 1 - 2 + 5 = 4$ $f(-1) \xrightarrow{x=-1} 1 + 1 + 1 = 3$ $f(x) \neq f(y) \vee x \neq y \text{ is false}$	9
$\cos^2 x = x \rightarrow \cos^2 x + \delta x = \frac{1}{x}$ $\cos^2 x + \delta x - \frac{1}{x} = 0$ $\cos^2 x + \delta x - 1 = 0$ $(x+1)(x-1) = 0$ $x = \frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm \sqrt{-3}}{2}$ $\sin z = \frac{\sqrt{x}}{x}$	10