

حلنا مجموعته لـ دهم ب - تكيف لـ

سوال 1 -

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

تحقق مشترك

Df = $(-\infty, 0) \cup \left[\frac{1}{2}, 1\right) \cup (1, +\infty)$

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

$$\frac{x}{x-1} + \frac{1}{x+2} \rightarrow x \neq 1, x \neq -2$$

Df = $\mathbb{R} - \left\{ -\frac{1}{2}, -2, 1, 0, 1, 0, 0 \right\}$

$x+2+x-1 \neq 0$
 $x \neq -\frac{1}{2} \rightarrow x \neq -\frac{1}{2}$

سوال 2 -

الف) $f(x) = \sqrt{\left(\left(\frac{1}{3}\right)^x - 9\right)(32 - 4^x)} \geq \frac{1}{3} - 9 \geq 0 \rightarrow \frac{1}{3} \geq 9 \rightarrow x \leq -2$

$32 - 4^x \geq 0 \rightarrow 32 \geq 4^x \rightarrow \log_4 32 \geq x \rightarrow 2.5$

Df = $(-\infty, -2] \cup [2.5, +\infty)$

ب) $\sqrt{x-1} + \sqrt{y+1} \geq 2$

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

$\sqrt{y+1} \geq 2 - \sqrt{x-1} \rightarrow 2 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 2 \rightarrow x-1 \leq 4 \rightarrow x \leq 5$

Df = $[1, 5]$

سوال 3 -

الف) $\sqrt{x^2-1} \rightarrow x^2 \geq 1 \rightarrow x \geq 1 \vee x \leq -1$

Df = $(-\infty, -1) \cup (1, +\infty)$

$\sqrt{x^2-1} + 1 \neq 0 \rightarrow \sqrt{x^2-1} \neq -1 \rightarrow$ متحقق

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

$\frac{-1}{2} \quad \frac{2}{1}$

$\frac{1}{2} \quad -1$

Df = $(-\infty, -1) \cup (2, +\infty)$

سوال 4 -

الف) $1-2 \rightarrow 3 + -2a + f = 0 \rightarrow 3 + \frac{1}{2}a - a^2$

$-2a = -1 \rightarrow a = \frac{1}{2}$

$-2b = \frac{3}{-1} \rightarrow b = -\frac{3}{2}$

$a+b = -\frac{1}{2} + \frac{3}{2} = 1$

$b = \frac{3}{2}$

سوال ۵ -

$$f'(x) - x \geq 0$$

$$x \geq 1 \text{ s.t. } 2x - x - x \geq 0 \Rightarrow x = 1 \rightarrow x \geq 1$$

$$x < 1 \text{ s.t. } 2x + 1 - x \geq 0 \rightarrow x \geq -1 \rightarrow D = [-1, +\infty)$$

سوال ۶ -

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

$$\sin \frac{\pi}{r} + \cos \frac{\pi}{r} = \left(t = \sqrt{\frac{r}{r}} + 1 \right)$$

$$f(t) = 2f\left(1 + \frac{\sqrt{r}}{r}\right)\left(\frac{\sqrt{r}}{r} - 1\right) = 2r\left(-\frac{1}{r}\right) = \boxed{f(t) = -\frac{1}{r}}$$

سوال ۷ -

$$f(a) = \frac{a+1}{a-1} \rightarrow f\left(\frac{a+1}{a-1}\right) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1+a-1}{a+1-a-1} = \frac{2a}{a-2} = a \rightarrow a \in \mathbb{R} - \{1\}$$

از آنجا که $f(a) = a$ و $f(a) = \frac{a+1}{a-1}$ پس $a = \frac{a+1}{a-1}$ و $a \neq 1$

سوال ۸ -

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

$$f(\sqrt{a^2 - 1}) = t^2 - 4t = 0 \rightarrow t^2 - 4t + 4 = 0$$

$$\begin{aligned} \frac{-b}{2a} &= 2 \rightarrow \sqrt{a^2 - 1} = 2 \\ a^2 - 1 &= 4 \\ a^2 &= 5 \\ a &= \pm \sqrt{5} \end{aligned}$$

سوال ۹ -

$$\begin{aligned} x + 2 &= 1 \rightarrow x = -1 \rightarrow f(1) = 1 - 1 + 1 = 1 \\ x + 2 &= -1 \rightarrow x = -3 \rightarrow f(-1) = 1 + 1 + 1 = 3 \end{aligned} \rightarrow \boxed{V \text{ of } f \text{ is } [1, 3]}$$

سوال ۱۰ -

$$\begin{aligned} f\left(\frac{v}{r}\right) &\rightarrow \left(\cos^2 + \sin^2\right)^{\frac{v}{r}} \\ \cos^2 + 1 - \cos^2 - v &\geq 0 \rightarrow \cos^2 \geq \frac{1}{r} \\ \tan^2 u &= \frac{1}{\cos^2 u} - 1 \rightarrow \sec^2 u - 1 \geq \frac{1}{r} \end{aligned}$$

$$\boxed{f(r, u) = 2}$$