

۲. آزمون عالی نوشتار

نام و نام خانوادگی: / شماره: / کلاس: / دهم دبیر B

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

$D = (-\infty, 0) \cup [1, +\infty)$

۱) $\Rightarrow x \neq -2, -1, 0, 1$, $\frac{3}{x-1} + \frac{1}{x+2} \neq 0 \Rightarrow \frac{3x+4x-1}{(x+2)(x-1)} \neq 0$ $x \neq -\frac{5}{7}, -2$

$D = \mathbb{R} - \{-2, -\frac{5}{7}, 0, 1\}$

۲) $(\frac{1}{x})^x - 9 = 0$ $x = -2$ $3^x = 4^x \Rightarrow x = \frac{5}{2}$

$D = \mathbb{R} - \{-2, \frac{5}{2}\}$

۳) $\sqrt{y+1} = 3 - \sqrt[4]{x-1} \rightarrow 3 - \sqrt[4]{x-1} \geq 0 \Rightarrow x \leq 17$

$\sqrt[4]{x-1} \rightarrow x \geq 1$ $D_f = [1, 17]$

۴) $\frac{x^2 - x - 2}{x} \rightarrow x^2 - x - 2 \geq 0 \rightarrow (x+1)(x-2) \geq 0$ $\frac{-1}{+1} \frac{2}{+1} \rightarrow x > 2$ یا $x < -1$

$\sqrt{x^2 - 1} + 1 \rightarrow 0$ $\sqrt{x^2 - 1} \geq 0 \Rightarrow x^2 - 1 \geq 0 \rightarrow (x+1)(x-1) \geq 0 \rightarrow x > 1$ یا $x < -1$

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

۵) $-2, b \xrightarrow{\text{مشتق}} 0$ $3 - 2(a) - (-1)^2 \leq 0 \rightarrow a \leq -\frac{1}{2}$

$f(x) = \sqrt{3 - \frac{x}{2} - x^2} \rightarrow -x^2 - \frac{x}{2} + 3 = 0 \rightarrow x = (\frac{1}{2} \pm \sqrt{\frac{49}{4}}) \times \frac{1}{-2}$

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

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

۶) $f(x) - x = \frac{3x-2-2}{2x+3-x} \geq 1$ $\frac{3x-2}{x+3} \geq 1$ $\frac{3x-2}{x+3} \geq 1 \rightarrow x \geq 1$

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$D_f = [-3, \infty)$

$$x = 2\pi/r + \cos \varphi = \frac{\sqrt{r}}{r} + 1 = \frac{\sqrt{r} + r}{r}$$

$$f(x) = r(x-r) = \left(\frac{\sqrt{r}+r}{r} \times r \right) \left(\frac{\sqrt{r}-r}{r} \right) = -\frac{1}{r} \quad \text{D}$$

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$$f \circ f(a) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1+a-1}{a-1} \cdot \frac{a-1}{a+1-a-1} \cdot a \neq 1 \quad a \in \mathbb{R} - \{1\} \quad \text{D}$$

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$$g(a) = t \quad f(t) = -2 \Rightarrow t - 2t = -2 \Rightarrow t = 2$$

$$g(a) = 2 \Rightarrow \sqrt{a^2 - 1} = 2 \Rightarrow a^2 = 5 \Rightarrow a = \pm \sqrt{5} \quad \text{D}$$

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$$x = 1 \Rightarrow f(x) = 1$$

$$x = -1 \Rightarrow f(-1) = 1$$

$$f(x) \times f(-x) = 1 \quad \text{D}$$

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$$r \cos x + \sin x - \frac{1}{r} = 0 \rightarrow \cos x = \frac{-1 \pm \sqrt{1 - \left(\frac{r}{\lambda} \right)^2}}{r}$$

$$\cos x = \frac{r}{\lambda} \Rightarrow x = \pi/r$$

$$f\left(\frac{r}{\lambda}\right) = 2g \pi/r \Rightarrow r \quad \text{D}$$

$$-1 \leq \cos x \leq 1$$

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