

$$\sin \frac{\pi}{r} = \frac{\sqrt{r}}{r} = \frac{1}{\sqrt{r}}$$

$$\cos \frac{\pi}{r} = 1 = \frac{r}{r}$$

$$\rightarrow F(x) \rightarrow r \left(1 + \frac{\sqrt{r}}{r}\right)^r - r \left(1 + \frac{\sqrt{r}}{r}\right) \rightarrow r \left(1 + \sqrt{r} + \frac{r}{r} - \left(1 + \sqrt{r}\right)\right)$$

$$\rightarrow r + \sqrt{r} + \frac{r}{r} - r - \sqrt{r} = \frac{r}{r} = 1$$

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✓

$$F(f(x)) = \frac{f(x)+1}{f(x)-1} = \frac{\frac{x+1}{x-1} + 1}{\frac{x+1}{x-1} - 1} = \frac{\frac{x+1+x-1}{x-1}}{\frac{x+1-x+1}{x-1}} = \frac{2x}{2} = x \rightarrow \text{جواب صحیح است}$$

$$g: a \neq 1 \rightarrow a \neq 1 \quad g: \frac{a+1}{a-1} \neq 1 \rightarrow R - \{1\}$$

7
✓

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

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

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$$(x+r) = f \rightarrow x = f-r \rightarrow 1-x+y = 2 \rightarrow f-f+r = 2 \rightarrow r = 2$$

$$(x+r) = -r \rightarrow x = -r-r \rightarrow r+y+r = \sqrt{r} \rightarrow 2r+y = \sqrt{r}$$

$$\sqrt{r} = 1 \rightarrow r = 1$$

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✓

$$\cos = t \rightarrow f^r t^r + \Delta t = \frac{r}{\Delta} \rightarrow x \Delta \rightarrow r t^r + r \Delta t - r = 0 \rightarrow t = \frac{-r \Delta \pm \sqrt{r^2 \Delta^2 + 4r^2}}{r}$$

$$= \frac{-r \Delta \pm \sqrt{r^2 \Delta^2 + 4r^2}}{r} \rightarrow -1 \leq \cos x \leq 1 \rightarrow \frac{-r \Delta - \sqrt{r^2 \Delta^2 + 4r^2}}{r} = \cos$$

$$\rightarrow f\left(\frac{x}{r}\right) = \tan^r x \rightarrow \frac{1-\cos^r}{\cos^r} = \frac{1}{\cos^r} - 1 = \frac{1}{(\sqrt{1-\cos^2})^r} - 1 \leq 1, r \geq 1$$

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

الف) $\frac{1-x}{x(x-1)} \geq 0$ $\rightarrow$ $\frac{0}{+} \quad \frac{+}{-} \quad \frac{1}{+}$ $\rightarrow D = (-\infty, 0) \cup (1, +\infty)$

ب) $R = \{x \mid x < 0 \text{ یا } x > 1\}$ $\rightarrow$ $\frac{0}{+} \quad \frac{+}{-} \quad \frac{1}{+}$ $\rightarrow$ $\frac{0}{+} \quad \frac{+}{-} \quad \frac{1}{+}$ $\rightarrow$ $\frac{0}{+} \quad \frac{+}{-} \quad \frac{1}{+}$

الف) $(3^{-x} - 3^2)(2^5 - 2^{2x}) \geq 0 \rightarrow (3^{-x} - 3^2)(2^5 - 2^{2x}) \geq 0 \rightarrow 3^{-x} = 3^2 \rightarrow x = -2$ $\rightarrow 2^5 = 2^{2x} \rightarrow x = 2.5$

ب) $D = x \leq 2.5$ $\rightarrow D = (-\infty, 2.5] \cup [2.5, +\infty)$

ب) $3 - \sqrt{x+1} \geq 0 \rightarrow \sqrt{x+1} \leq 3 \rightarrow x+1 \leq 9 \rightarrow x \leq 8 \rightarrow D = [-1, 8]$

$(x^2 - x - 2) = (x-2)(x+1) \rightarrow x > 2 \text{ یا } x < -1$ $\frac{+}{+} \quad \frac{-}{-} \quad \frac{+}{+}$

$x^2 - 1 \geq 0 \rightarrow x > 1 \text{ یا } x < -1$ $\frac{-}{+} \quad \frac{+}{-} \quad \frac{+}{+}$ $\rightarrow$ $(-\infty, -1) \cup (1, +\infty)$

جواب: $3 + ax - x^2 \geq 0$ $\rightarrow$ $3 + b - 2 = \frac{-(-a)}{-1}$ $\rightarrow a = b - 2$ $\rightarrow a + b = 1$

$3 + b - 2 = \frac{3}{-1} \rightarrow b = 1.5$ $\rightarrow a = -0.5$

$x > 1 \rightarrow 3x - 2 = f(x) \rightarrow 3x^2 - x \geq 0 \rightarrow 2x > 2 \rightarrow x > 1$

$x < 1 \rightarrow f(x) = 2x + 3 \rightarrow 2x + 3 - x \geq 0 \rightarrow x > -3$ $\rightarrow$ $[-3, 1)$