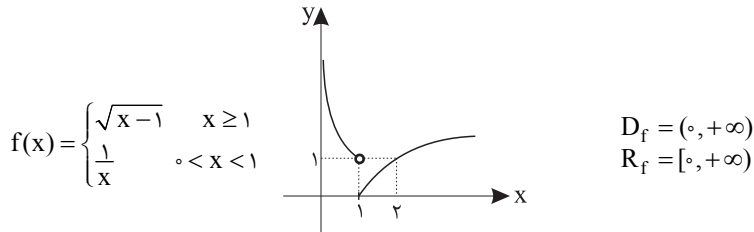




پاسخ سؤال ۱:



پاسخ سؤال ۲:

$$f = \{(0, 2), (-2, 4), (2, 3), (3, -5)\}, D_f = \{0, -2, 2, 3\}$$

$$g(x) = \frac{x+1}{x^2-2x}, D_g = \mathbb{R} - \{0, 2\}$$

$$D_f \cap D_g = \{-2, 3\}, g(-2) = \frac{-1}{4}, g(3) = \frac{4}{3}$$

$$f \circ g \circ 2 = \{(-2, -\frac{1}{4} \times 4 + 2), (3, -5 \times \frac{4}{3} + 2)\} = \{(-2, \frac{5}{3}), (3, -\frac{11}{3})\}$$

پاسخ سؤال ۳:

$$f(x) = \frac{1}{3}x - 1 \Rightarrow \frac{1}{3}x - 1 = y \Rightarrow x = 3y + 3$$

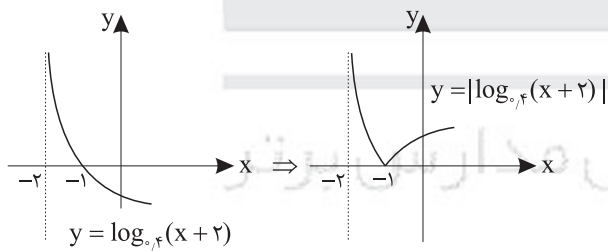
$$\Rightarrow f^{-1}(x) = 3x + 3, D_{f^{-1}} = \mathbb{R}, g(x) = \frac{x}{x-4}, D_g = \mathbb{R} - \{4\}$$

$$D_{g \circ f^{-1}} = \{x \in D_{f^{-1}} \mid f^{-1}(x) \in D_g\} = \{x \in \mathbb{R} \mid f^{-1}(x) \neq 4\}$$

$$3x + 3 \neq 4 \Rightarrow x \neq \frac{1}{3} \Rightarrow D_{g \circ f^{-1}} = \mathbb{R} - \{\frac{1}{3}\} \Rightarrow (g \circ f^{-1})(x) = g(f^{-1}(x)) = g(3x + 3) = \frac{3x+3}{3x+3-4} = \frac{3x+3}{3x-1}$$

پاسخ سؤال ۴:

(الف)



(ب)

$$(r^{\frac{1}{3}})^{-x} = (r^{-3})^{2-x} \Rightarrow r^{-\frac{1}{3}x} = r^{-6+3x} \Rightarrow -6+3x = -\frac{1}{3}x \Rightarrow 3x + \frac{1}{3}x = 6 \Rightarrow \frac{10}{3}x = 6 \Rightarrow x = \frac{18}{10} = \frac{9}{5}$$

پاسخ سؤال ۵:

$$\log_{\frac{1}{3}} 2^6 \times \log_{\frac{1}{3}} 3^4 + 5^{\log_5 2^3} = 6 \times 2(\log_3 2) \times 4 \times \frac{1}{3} \log_3 3 + 5^{\log_5 2^3} = 12 \times \frac{1}{3} \log_3 2 \times \log_3 3 + 5^{\log_5 2^3} = 3 \times 2 + 3 = 3 \times 5$$

پاسخ سؤال ۶:

$$\log_3 \frac{(x+3)(x-3)}{x} = \log_3 2^3 \Rightarrow \frac{x^2-9}{x} = 8 \Rightarrow x^2-9 = 8x \Rightarrow x^2-8x-9 = 0 \Rightarrow (x-9)(x+1) = 0 \Rightarrow \begin{cases} x = 9 & \text{جواب} \\ x = -1 & \text{غ ق ق} \end{cases}$$



پاسخ سؤال ۷:

$$\text{الف)} \quad \frac{12^\circ}{18^\circ} = \frac{R}{\pi} \Rightarrow R = \frac{12\pi}{18} = \frac{2\pi}{3}$$

$$\text{ب)} \quad \text{طول کمان} = 12 \times \frac{2\pi}{3} = 8\pi \text{ cm}$$

پاسخ سؤال ۸:

$$-\sin\left(\frac{54\pi + \pi}{6}\right)\cos\left(\pi + \frac{\pi}{2} - \frac{\pi}{3}\right) + \tan\left(\frac{40\pi + \pi}{4}\right) = -\sin\left(9\pi + \frac{\pi}{6}\right)\left(-\cos\left(\frac{\pi}{2} - \frac{\pi}{3}\right)\right) + \tan\left(10\pi + \frac{\pi}{4}\right)$$

$$= \sin\left(\pi + \frac{\pi}{6}\right)\cos\left(\frac{\pi}{2} - \frac{\pi}{3}\right) + \tan\frac{\pi}{4} = -\sin\frac{\pi}{6}\sin\frac{\pi}{3} + \tan\frac{\pi}{4} = -\frac{1}{2} \times \frac{\sqrt{3}}{2} + 1 = -\frac{\sqrt{3}}{4} + 1$$

پاسخ سؤال ۹:

