

$$y = 2 - \sqrt{-x + 1} \quad \text{الف) ۱-}$$

$$y = \sqrt{-(x-1)} \Rightarrow y = \sqrt{-x+1} - 2 \Rightarrow y = 2 - \sqrt{-x+1}$$

ب) ۶

$$\lim_{x \rightarrow -\infty} \frac{32x^7 - 2x^8}{5x^8} = 6$$

ج) ۶

$$y' = f'(x)g'(f(x)) \xrightarrow{x=-1} y'(-1) = f'(-1)g'(f(-1)) = 3 \times 2 = 6$$

د) ۲

$$7 - 5 - 2 = 0$$

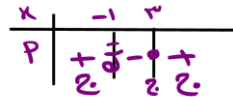
الف) ۲-

$$D_f = [3, +\infty) \quad D_g = \mathbb{R} - \{-1\}$$

$$D_{f \circ g} = \{x \in D_g \mid g(x) \in D_f\}$$

$$D_{f \circ g} = \left\{x \neq -1 \mid \frac{2x}{1+x} \geq 3\right\} = (-\infty, -1) \cup [3, +\infty)$$

$$\frac{2x - 3 - x}{1+x} \geq 0 \quad \frac{x-3}{1+x} \geq 0$$



ب) ۶

$$(f \circ g)^{-1}(1) = g^{-1}(f^{-1}(1)) = g^{-1}(4) = -2$$

$$\sqrt{x-3} = 1 \Rightarrow x-3 = 1 \Rightarrow x = 4$$

$$\frac{2x}{1+x} = 4 \Rightarrow 2x = 4 + 4x \Rightarrow 2x = -4 \Rightarrow x = -2$$

۳-

$$f(x^2) - f(4 - x^2) \geq 0 \Rightarrow f(x^2) \geq f(4 - x^2) \Rightarrow f \text{ اکیداً نزولی است} \Rightarrow x^2 \leq 4 - x^2$$

$$2x^2 \leq 4 \Rightarrow x^2 \leq 2 \Rightarrow -\sqrt{2} \leq x \leq \sqrt{2}$$

-۴

$$|a| = \frac{\max - \min}{2} = \frac{2 - 0}{2} = 1 \Rightarrow a = \pm 1$$

$$c = \frac{\max + \min}{2} = \frac{2 + 0}{2} = 1 \Rightarrow c = 1$$

$$T = 2 \Rightarrow \frac{2\pi}{|b|} = 2 \Rightarrow |b| = \pi \Rightarrow b = \pm \pi$$

$$y = a \cos bx + c \Rightarrow y = -\cos(\pi x) + 1$$

-۵

$$2(1 - \cos^2 x) + 5 \cos x + 1 = 0 \Rightarrow -2 \cos^2 x + 5 \cos x + 3 = 0$$

$$\cos^2 x + 5 \cos x - 6 = 0 \Rightarrow \begin{cases} \cos x = \frac{1}{-2} \Rightarrow \cos x = \cos\left(\pi - \frac{\pi}{3}\right) \Rightarrow x = 2k\pi \pm \frac{2\pi}{3} \\ \cos x = \frac{-6}{-2} = 3 \text{ غ ق ق} \end{cases}$$

-۶

$$= \frac{[(-1)^+]}{.-} = \frac{-1}{.-} = +\infty$$

۷-۳ $x = 3$ ریشه مضاعف مخرج است

$$-\frac{b}{a} = s \rightarrow -\frac{a}{2} = 6 \Rightarrow a = -12$$

$$\frac{c}{a} = p \rightarrow \frac{b}{2} = 9 \Rightarrow b = 18$$

-۸

$$\lim_{x \rightarrow (-2)^-} \sqrt{5 - 2x} = 3 \quad \lim_{x \rightarrow (-2)^+} f(x) = -2 - 2b + c \quad -2 - 2b + c = 3 \Rightarrow -2b + c = 5$$

$$f'_-(-2) = f'_+(-2) \Rightarrow \frac{-2}{2\sqrt{5-2x}} = -x + b \xrightarrow{x=-2} -\frac{1}{3} = 2 + b \Rightarrow b = -2 - \frac{1}{3} \quad b = -\frac{7}{3}$$

$$\frac{14}{3} + c = 5 \Rightarrow c = 5 - \frac{14}{3} \Rightarrow c = -\frac{1}{3}$$

-۹

$$y' = 3 \left(\frac{\Delta x^2 - 1}{\sqrt{2x+1}} \right)^2 \frac{10 \times \sqrt{2x+1} - \frac{2}{2\sqrt{2x+1}} \times (\Delta x^2 - 1)}{2x+1}$$

-۱۰

$$V' = 60 \left(1 - \frac{t}{50} \right) \times \frac{-1}{50} \quad \frac{V(50) - V(0)}{50 - 0} = \frac{-30}{50}$$

$$V(50) = 0 \quad V(0) = 30$$

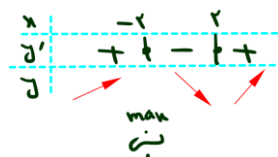
$$60 - \left(1 - \frac{t}{50} \right) \times \frac{-1}{50} = \frac{1}{2} \times \frac{-30}{50} \Rightarrow 1 - \frac{t}{50} = \frac{1}{4} \Rightarrow \frac{t}{50} = \frac{3}{4}$$

-۱۱

$$f'(x) = 6x^2 - 24 = 0 \Rightarrow x^2 = 4 \Rightarrow x = \pm 2$$

$$x = -2 \text{ طول max نسبی} \Rightarrow y = 17 \quad (-2, 17) \Rightarrow$$

$$-16 + 48 + k \Rightarrow k = 17 - 32 \quad k = -15$$



-۱۲

$$C(x) = 320 \cdot V^2 t + 80000 \cdot t \xrightarrow{t = \frac{x}{V} = \frac{1}{V}}$$

$$C(V) = 320 \cdot V^2 \left(\frac{1}{V} \right) + \frac{80000}{V} \Rightarrow c(V) = 320 \cdot V + \frac{80000}{V} \Rightarrow c'(V) = 320 - \frac{80000}{V^2}$$

$$C'(V) = 0 \Rightarrow 320 = \frac{80000}{V^2} \Rightarrow V^2 = 2500 \Rightarrow V = 50$$

-۱۳

$$c = \frac{1}{r} \quad b = 4\sqrt{2}$$

$$c = \sqrt{1 - \left(\frac{b}{a} \right)^2} \Rightarrow \frac{1}{r} = \sqrt{1 - \left(\frac{4\sqrt{2}}{a} \right)^2} \Rightarrow \text{به توان ۲} \Rightarrow$$

$$\frac{1}{9} = 1 - \left(\frac{4\sqrt{2}}{a} \right)^2 \Rightarrow \left(\frac{4\sqrt{2}}{a} \right)^2 = \frac{8}{9} \xrightarrow{\text{جذر ۸}} \frac{4\sqrt{2}}{a} = \frac{2\sqrt{2}}{3} \Rightarrow a = 6$$

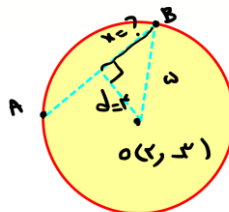
$$c^2 = a^2 - b^2 = 36 - 32 \Rightarrow c = 2$$

$$S_{\Delta ABF} = \frac{1}{2} FA \times OB = \frac{1}{2} (a - c)b = \frac{1}{2} (6 - 2)4\sqrt{2} \Rightarrow S_{\Delta} = 8\sqrt{2}$$

-۱۴

$$d = \frac{|6 + 12 + 2|}{5} = 4 \quad x = 3 \Rightarrow |AB| = 6$$

$$O(2, -3) \quad r = \sqrt{\alpha^2 + \beta^2 - c} = \sqrt{13 + 12} = 5$$

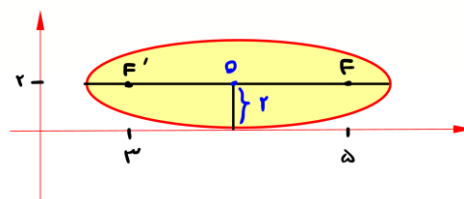


-۱۵

$$b = 2 \quad c = 1$$

$$a = \sqrt{5} = r = \text{شعاع دایره}$$

$$O = (4, 2) \Rightarrow (x - 4)^2 + (y - 2)^2 = 5$$



-۱۶

$$\xrightarrow{\frac{1}{2}} \text{پشت}$$

$$\xrightarrow{\frac{1}{2}} \text{رو} \rightarrow \text{چهار سکه دیگر} \left(\text{رو رو پشت رو} \right) \frac{4}{16}$$

$$P(A) = \frac{1}{2} + \frac{1}{2} \times 14 = \frac{1}{2} + \frac{1}{8} = \frac{5}{8}$$