

۱- گزینه چهارم

$$2(1 + 2a) = 5 - a + a \Rightarrow 2 + 4a = 5 \Rightarrow a = \frac{3}{4}$$

$$\frac{3}{4}, \frac{5}{2}, \frac{17}{4} \quad a_9 = a_1 + 8d = \frac{3}{4} + 8 \times \frac{7}{4} = \frac{59}{4} = 14\frac{3}{4}$$

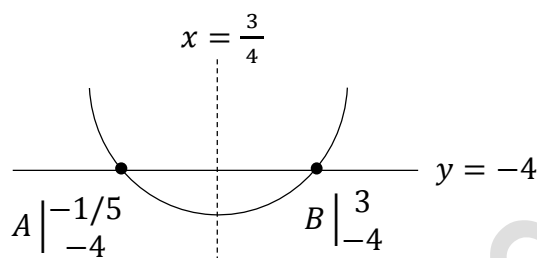
$$d = \frac{7}{4}$$

۲- گزینه سوم

$$\left( \begin{matrix} \text{درست} \\ p \end{matrix} \Rightarrow r \right) \Rightarrow \left( r \Rightarrow \begin{matrix} \text{نادرست} \\ q \end{matrix} \right) \sim r$$

کل درست  $r \rightarrow$  نادرست  $r \rightarrow$  نادرست

۳- گزینه اول



۴- گزینه چهارم

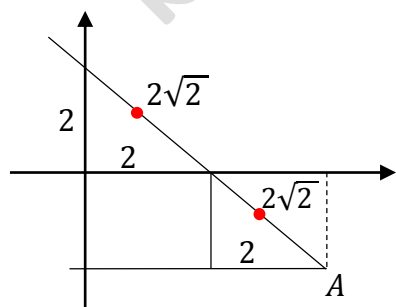
$$|x' - x''| = \sqrt{s^2 - 4p} = \sqrt{4k^2 - 20} = 2\sqrt{k^2 - 5} = \frac{4}{3}k$$

$$k^2 - 5 = \frac{4}{9}k^2 \Rightarrow \frac{5k^2}{9} = 5 \Rightarrow k = \pm 3 \Rightarrow \left[ \frac{k^2}{2} \right] = 4$$

۵- گزینه اول

$$B \begin{vmatrix} 0 \\ 2 \end{vmatrix} \quad m = \operatorname{tg} \frac{3\pi}{4} = -1$$

$$y - 2 = -1(x - 0) \rightarrow y = 2 - x$$



$$A \begin{vmatrix} 4 \\ -2 \end{vmatrix}$$

$$OA = \sqrt{16 + 4} = 2\sqrt{5}$$



۶- گزینه دوم

$$f(\sqrt{5}) = 5 - 2 = 3$$

$$f(a \times 3) = 2 \xrightarrow{a = -\frac{1}{3}} f(3a) = f(-1) = 1 + 1 = 2$$

۷- گزینه دوم

$$\sqrt{x} = a - \sqrt{x-a}$$

$$\left( \frac{\sqrt{x} + \sqrt{x-a}}{a} \right) (\sqrt{x} - \sqrt{x-a}) = a$$

$$\sqrt{x} + \sqrt{x-a} = a$$

$$\Rightarrow 2\sqrt{x} = a + 1 \quad \sqrt{x} = \frac{a+1}{2}$$

$$\sqrt{x} - \sqrt{x-a} = 1$$

$$a = 1, 3, 5, 7, 9$$

۸- گزینه دوم

$$10 - x = -10 \Rightarrow x = 20 \Rightarrow \begin{vmatrix} 20 \\ 1 \end{vmatrix} \in f^{-1} \Rightarrow \begin{vmatrix} 1 \\ 20 \end{vmatrix} \in f$$

$$20 = 1 + 6 + a + 1 \Rightarrow a = 12$$

۹- گزینه چهارم

$$(x-2)(x^2+2x+4) = 8 \Rightarrow x^3 - 8 = 8 \Rightarrow x^3 = 16 \Rightarrow x = 2\sqrt[3]{2}$$

$$\log_{\sqrt[3]{2}} x = \log_{2^{\frac{1}{3}}} 2^{\frac{4}{3}} = \frac{\frac{4}{3}}{\frac{1}{3}} = 4$$



۱۰- گزینه اول

$$y = c + \log_5(ax + b)$$

$$f(0) = 2 \Rightarrow 2 = c + \log_5 b$$

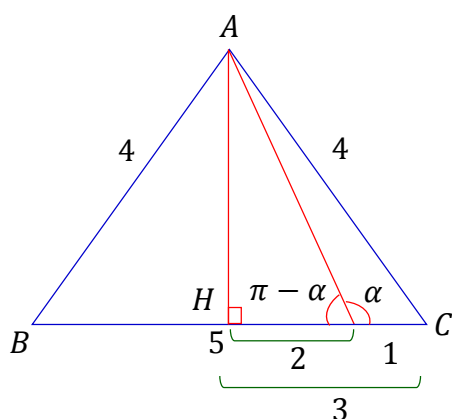
$$f(2/4) = 0 \Rightarrow 0 = c + \log_5 \left( \frac{12a}{5} + b \right)$$

$$\log_5 \frac{\frac{12a}{5} + b}{b} = -2 \Rightarrow \frac{12a + 5b}{5b} = \frac{+1}{25}$$

$$60a + 25b = +b \Rightarrow 60a = -24b$$

$$\frac{a}{b} = \frac{-24}{60} = \frac{-2}{5}$$

۱۱- گزینه سوم



$$AH^2 = 16 - 9 = 7 \Rightarrow AH = \sqrt{7}$$

$$\operatorname{tg}(\pi - \alpha) = \frac{\sqrt{7}}{2} \Rightarrow -\operatorname{tg} \alpha = \frac{\sqrt{7}}{2} \Rightarrow \operatorname{tg} \alpha = -\frac{7}{2}$$

۱۲- گزینه دوم

$$3\cos 4x + \sqrt{2} \times \sqrt{2} \sin \left( x - \frac{\pi}{4} \right)$$

$$3\cos \frac{\pi}{3} + 2 \sin \left( \frac{\pi}{12} - \frac{\pi}{4} \right) = 3 \times \frac{1}{2} + 2 \times \sin \frac{-\pi}{6} = \frac{3}{2} - 1 = \frac{1}{2}$$

۱۳- گزینه سوم

$$\alpha = \frac{\pi}{2} \Rightarrow \frac{1+0}{1} - \frac{0+4}{1+1} = -1$$



۱۴- گزینه چهارم

$$1 - 2\sin^2 x + \sin^2 x = 0 \Rightarrow \sin^2 x = 1 \Rightarrow \sin x = \pm 1 \Rightarrow \frac{\pi}{2} - \frac{\pi}{2} - \frac{5\pi}{2} - \frac{3\pi}{2} = -4\pi$$

۱۵- گزینه اول

$$\lim_{x \rightarrow 2^+} \frac{x-2}{x^2 - [x^2]} = \lim_{x \rightarrow 2^+} \frac{x-2}{x^2 - 4} = \lim_{x \rightarrow 2^+} \frac{1}{2x} = \frac{1}{4}$$

$$\lim_{x \rightarrow 2^-} \frac{x-2}{x^2 - 3} = 0$$

۱۶- گزینه دوم

$$(f - g)(x) = \frac{4}{x^2 + 2x - 3} - \frac{1}{x-1} = \frac{4}{(x-1)(x+3)} - \frac{1}{x-1} = \frac{4-x-3}{(x-1)(x+3)} =$$

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

$$\begin{cases} x = -3 \\ y = 0 \end{cases}$$

۱۷- گزینه سوم

$$\lim_{x \rightarrow 0^+} f(x) = 1 - 3a^2 = b \sin \frac{\pi}{a}$$

$$\lim_{x \rightarrow 0^-} f(x) = a - 1$$

$$3a^2 + a - 2 = 0 \Rightarrow \begin{cases} a = -1 \rightarrow b \sin(-\pi) = -2 \text{ X} \\ a = +\frac{2}{3} \rightarrow b \sin \frac{3\pi}{2} = -\frac{1}{3} \Rightarrow b = \frac{1}{3} \end{cases}$$

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

۱۸- گزینه اول

$$\frac{f}{g} = x + 8 - x = 8$$

$$\frac{f'g - g'f}{g^2} = 0$$



۱۹- گزینه دوم

$$\text{اولاً: } m - 1 \leq 1 \Rightarrow m \leq 2 \xRightarrow{m \neq 2} m < 2 \quad (1)$$

$$ad - bc < 0 \Rightarrow (m - 1)m - 2 < 0 \Rightarrow$$

$$m^2 - m - 2 < 0 \Rightarrow -1 < m < 2 \quad (2)$$

$$(1) \cap (2): -1 < m < 2 \Rightarrow m = 0, 1$$

۲۰- گزینه چهارم

$$\left. \begin{array}{l} \text{اولاً: } ba + c = \frac{1}{a} \Rightarrow ba^2 + ac = 1 \\ \text{ثانیاً: } b = \frac{-1}{a^2} \Rightarrow ba^2 = -1 \end{array} \right\} \Rightarrow ac = 2$$

۲۱- گزینه سوم

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

$$f(-1) = -4 \Rightarrow -1 + a - b - 1 = -4$$

$$b = 5$$

$$\frac{a}{b} = \frac{3}{5} = 0/6$$

