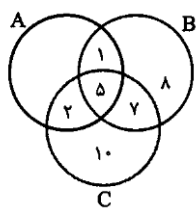


۱ - گزینه ۱



۲ - گزینه ۴

$$\frac{2^x}{1-x} \in \mathbb{Z} \Rightarrow \frac{2^x}{x} \in \mathbb{Z} \Rightarrow x = \pm 1, \pm 2, \pm 4, \pm 5, \pm 8, \pm 10, \pm 20, \pm 40 \Rightarrow n(A) = 16$$

$$\binom{16}{15} = \frac{16!}{(16-15)! \times 15!} = \frac{16 \times 15!}{1! \times 15!} = 16$$

۳ - گزینه ۲

$$n(S) = \frac{999-100}{1} + 1 = 900$$

$$n(A) = \frac{995-100}{5} + 1 = 180$$

$$n(A \cap B) = \frac{960-120}{6} + 1 = 150$$

$$n(A - B) = n(A) - n(A \cap B) = 180 - 150 = 30$$

$$p(A - B) = \frac{30}{900} = \frac{1}{30}$$

۴ - گزینه ۲

$$\frac{1/125 - 2 \div \left(-\frac{2}{3} + \frac{4}{9}\right)}{\frac{4+5}{24}} = \frac{125}{1000} - 2 \div \left(\frac{-6+4}{9}\right) = \frac{1}{8} - 2 \div \left(-\frac{2}{9}\right) = \frac{1}{8} - 2 \times \left(-\frac{9}{2}\right) = \frac{1}{8} + 9 = \frac{73}{8} = \frac{73}{8}$$

۵ - گزینه ۲

$$1) \sqrt{\sqrt{256}} = 4$$

$$2) \sqrt{0.36} \in \mathbb{Q}'$$

$$3) \sqrt{1 + \sqrt{25 - 3 \times 2^3}} = \sqrt{1+1} = 2$$

$$4) \sqrt{18 + \sqrt{49}} = \sqrt{18+7} = \sqrt{25} = 5$$

۶ - گزینه ۴

$$b < -1 < a < 0$$

$$M = |1 - |b|| - |a - b| - |2 - 2a| + |a + b| = -(1 + b) - (a - b) - (2 - 2a) - (a + b) = -1 - b - a + b - 2 + 2a - a - b = -b - 3$$

۷ - گزینه ۲

$$\frac{(-y)^{-r} x^r}{(-x^{-r} y)^{-r} x^{-r}} = \frac{x^r \times (-x^{-r} y)^r \times x^r}{(-y)^r} = \frac{x^5 \times (-x^{-6} y^3)}{y^r} = \frac{-(x^5 \times x^{-6}) \times y^3}{y^r} = -x^{-1} \times y = -\frac{y}{x}$$

۸ - گزینه ۳

$$2^{b+3} = 2^b \times 2^3 \xrightarrow{2^b=5} 2^b \times 2^3 = 5 \times 2^3 = 5 \times 8 = 40$$

۹ - گزینه ۱

$$\frac{\sqrt[3]{3} \times \sqrt[3]{3}}{\sqrt[3]{3^5}} = \frac{\sqrt[3]{3^3} \times \sqrt[3]{3^2}}{\sqrt[3]{3^5}} = \frac{\sqrt[3]{3^3 \times 3^2}}{\sqrt[3]{3^5}} = \frac{\sqrt[3]{3^5}}{\sqrt[3]{3^5}} = 1$$

۱۰ - گزینه ۳

$$\left(\frac{a}{b} + \frac{b}{a}\right) \left(\frac{ab}{a^r - b^r}\right) = \left(\frac{a^r + b^r}{ab}\right) \left(\frac{ab}{(a^r - b^r)(a^r + b^r)}\right) = \frac{1}{a^r - b^r}$$

۱۱ - گزینه ۳

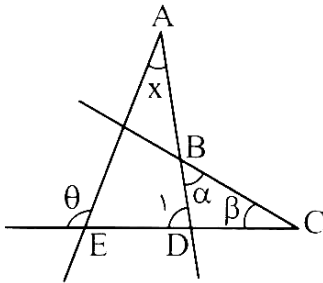
$$x^r + x^r + x^r + x = x(x^r + x^r + x + 1) = x(x^r(x+1) + (x+1)) = x(x+1)(x^r + 1)$$

۱۲ - گزینه ۴

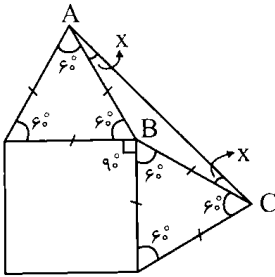
$$12 \left(\frac{2x+3}{2} - \frac{3}{4} > \frac{4x+1}{3} \right) \Rightarrow 6(2x+3) - 3(3) > 4(4x+1) \Rightarrow 12x+18-9 > 16x+4 \Rightarrow -4x > -5 \Rightarrow x < \frac{5}{4}$$

$$y = ax + b \rightarrow y = ax + 5 \xrightarrow{A = \begin{bmatrix} -3 \\ 1 \end{bmatrix}} \cdot = -3a + 5 \rightarrow -3a = -5 \rightarrow a = \frac{5}{3} \rightarrow$$

$$y = \frac{5}{3}x + 5$$

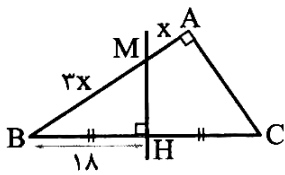


$$\theta = x + D_1 \xrightarrow{D_1 = \alpha + \beta} \theta = x + \alpha + \beta \rightarrow x = \theta - \alpha - \beta$$



$$90^\circ + 6^\circ + \hat{B} + 6^\circ = 360^\circ \rightarrow \hat{B} = 150^\circ$$

$$x + \hat{B} + x = 180^\circ \rightarrow 2x + 150^\circ = 180^\circ \rightarrow 2x = 30^\circ \rightarrow x = 15^\circ$$

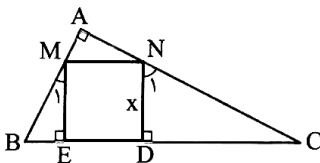


$$\left. \begin{array}{l} \hat{B} \text{ مشترک} \\ \hat{A} = \hat{H} = 90^\circ \end{array} \right\} \Rightarrow \triangle BMH \sim \triangle ABC$$

$$\frac{3x}{36} = \frac{18}{4x} \Rightarrow 12x^2 = 18 \times 36$$

$$x^2 = \frac{18 \times 36}{12} \Rightarrow x^2 = 18 \times 3 \Rightarrow x = 3\sqrt{6}$$

$$AB = 4x = 12\sqrt{6}$$



$$\left. \begin{array}{l} \hat{C} + \hat{N}_1 = 90^\circ \\ \hat{B} + \hat{C} = 90^\circ \end{array} \right\} \Rightarrow \hat{B} = \hat{N}_1$$

$$\left. \begin{array}{l} \hat{N}_1 = \hat{B} \\ \hat{C} \text{ مشترک} \end{array} \right\} \Rightarrow \triangle BAC \sim \triangle NDC$$

$$\frac{AB}{ND} = \frac{AC}{DC} = \frac{BC}{NC} \Rightarrow \frac{10}{x} = \frac{18}{9} \Rightarrow x = 5$$

۱۸ - گزینه ۲

$$AB = BC = CD = AD = 16$$

$$\triangle AFD \sim \triangle BEF \Rightarrow \frac{BF}{FD} = \frac{EF}{AF} = \frac{BE}{AD} \Rightarrow \frac{x}{11} = \frac{8}{16} \Rightarrow x = 5/5$$

۱۹ - گزینه ۱

$$\frac{4}{3}\pi(6)^3 - \frac{4}{3}\pi(3)^3 = \frac{4}{3}\pi(216) - \frac{4}{3}\pi(27) = 288\pi - 36\pi = 252\pi$$

$$\frac{252\pi}{36\pi} = 7$$

۲۰ - گزینه ۱

$$S = 3V \Rightarrow 4\pi r^2 = 3 \times \frac{4}{3}\pi r^3 \Rightarrow r = 1$$