

۱.۱) گزیننده ①

$$f(m) = \sqrt{m - e^m} \Rightarrow f'(m) = \frac{1}{2\sqrt{m - e^m}} (1 - e^m)$$

$$f(m) = \sqrt{m \ln(m - e^m)} \quad \left\{ \begin{array}{l} m \ln(m - e^m) > 0 \\ m - e^m > 0 \end{array} \right. \Rightarrow m < e^m \quad \text{②}$$

$$\frac{1}{2} + \frac{1}{2} = 1 \Rightarrow m < 2 \quad \text{①}$$

$D_f = \text{①} \cap \text{②} = [0, 2]$

۱.۲) گزیننده ④

$$\left\{ \begin{array}{l} -\frac{1}{9/5} > 0 \Rightarrow a - 2 > 0 \Rightarrow a > 2 \quad \text{①} \\ \frac{1}{9/6} > 0 \Rightarrow 14 - a > 0 \Rightarrow a < 14 \quad \text{②} \\ \Delta' > 0 \Rightarrow (a - 2)^2 - 14 + a > 0 \Rightarrow a^2 - 3a - 10 > 0 \end{array} \right.$$

$$\frac{a}{9/5} \quad \frac{a}{9/6}$$

$$\text{①} \cap \text{②} \cap \text{③} : a < a < 14$$

۱.۳) گزیننده ③

از هر دو طرف کنیم

$$(2, 4) \in f(m) = a + \log_p (b^{m-2} - \varepsilon) \rightarrow 4 = a + \log_p (b^{m-2} - \varepsilon)$$

$$(1, 14) \in f(m) = a + \log_p (b^{m-1} - \varepsilon) \rightarrow 10 = a + \log_p (b^{m-1} - \varepsilon)$$

$$\Rightarrow \varepsilon = \log_p (b^{m-1} - \varepsilon) - \log_p (b^{m-2} - \varepsilon) \Rightarrow \varepsilon = \log_p \frac{b^{m-1} - \varepsilon}{b^{m-2} - \varepsilon} \Rightarrow$$

$$14 = \frac{b^{m-1} - \varepsilon}{b^{m-2} - \varepsilon} \rightarrow (b=3) \rightarrow 7 = a + \log_p 2 \Rightarrow a=5$$

۱.۴) گزیننده ①

مقدار  $T = \varepsilon \pi$

$$m = \frac{1}{2} \Rightarrow f(m) = \frac{1}{2} + 2 \cos \frac{\pi}{2}$$

مقدار  $T = \frac{\pi}{m}$

$$\Rightarrow f\left(\frac{14\pi}{\pi}\right) = \frac{1}{2} + 2 \cos \frac{14\pi}{2} = -\frac{1}{2}$$

۱.۵ - گزینه ۲

$$\left(\frac{\sqrt{r}}{r}\right)^{2M} = r^M + \frac{1}{r} \rightarrow \left(r^{-M} + r^M + \frac{1}{r}\right) r^M$$

$$r^{2M} + \left(\frac{1}{r}\right) r^M - 1 = 0 \quad \xrightarrow{r^M = A} \quad rA^2 + \frac{1}{r}A - r = 0$$

$$A = \frac{-\frac{1}{r} \pm \sqrt{\frac{1}{r^2} + 4r}}{2} \quad \left\{ \begin{array}{l} A = -r \quad \text{قفا} \\ A = \frac{1}{r} \quad \checkmark \end{array} \right.$$

$$r^M = \frac{1}{r} \rightarrow \left. \begin{array}{l} M = -1 \\ y = r^{-M} + \frac{1}{r} = r^1 \end{array} \right\} \rightarrow A = \left| \frac{-1}{r} \right|, B = \left| \frac{1}{r} \right| \Rightarrow |AB| = 2$$

۱.۴ - گزینه ۴

$$\sqrt{a} + \sqrt{b} = 2 \rightarrow \sqrt{s + 2\sqrt{p}} = 2$$

$$s + 2\sqrt{p} = 4 \quad \left\{ \begin{array}{l} s = \frac{m+1}{r} \\ p = \frac{1}{14} \end{array} \right. \rightarrow \frac{m+1}{r} + 2\left(\frac{1}{r}\right) = 4 \rightarrow m = 7$$

۱.۷ - گزینه ۲

$$D_f: \text{[scribble]} \quad 1 - x^2 \neq 0 \rightarrow x \neq \pm 1 \quad (1)$$

$$D_{oP} = \sqrt{P - P^2} = \sqrt{P(1 - P^2)} = \sqrt{\left(\frac{1+x^2}{1-x^2}\right) \left(\frac{-2x^2}{1-x^2}\right)} = \text{[scribble]}$$

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

$$D_f = (1) \cap (2) \rightarrow \{0\}$$

1.8 - گزینه 1

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

1.9 - گزینه 3

$$\frac{\cos 1a - \sin 1a}{\sin 1a \cos 1a} = \frac{\sqrt{2} \sin(\pi/4 - 1a)}{\frac{1}{2} \sin 2a} = 2\sqrt{2}$$

11. - گزینه 4

$$\sin m \sin 2m = \cos 2m \rightarrow -\frac{1}{2} [\cos 3m - \cos m] = \cos 2m$$

$$\cos 3m - \cos m = -2 \cos 2m \rightarrow \cos 3m = -\cos 2m$$

$$\cos 3m = \cos(\pi - 2m) \rightarrow 3m = 2k\pi \pm (\pi - 2m)$$

$$m = \frac{k\pi}{2} + \frac{\pi}{4} \quad (1) \quad \checkmark$$

$$m = (2k-1)\frac{\pi}{4} \quad (2)$$

$$(2) \subset (1) \rightarrow (1) \cup (2) = (1) \Rightarrow m = \frac{k\pi}{2} + \frac{\pi}{4}$$

111 - گزینه 1

$$\frac{\sqrt{1 - \frac{9}{25}x^2} - \left(1 - \frac{4}{5}x\right)}{x^2} = -2$$

۱۱۲ - گزینه (د)

$$y' = \frac{\frac{1}{4}}{1 + \frac{\pi^2}{\epsilon}} \cos\left(\frac{\pi}{\epsilon} + t\sqrt{\frac{\pi^2}{\epsilon}}\right) \quad \underline{u = \frac{\pi}{\sqrt{\epsilon}}}$$

$$y' = \frac{\frac{1}{4}}{1 + \frac{\pi^2}{\epsilon}} \cos\left(\frac{\pi}{\epsilon} + t\sqrt{\frac{\pi^2}{\epsilon}}\right) = \frac{1}{\pi} \left(-\frac{1}{4}\right) = -\frac{1}{4\pi}$$

۱۱۳ - گزینه (ع)

$$a_n = \begin{cases} \lfloor \frac{1}{n} \rfloor & \text{در } n \rightarrow L_1 = \lfloor \frac{1}{+\infty} \rfloor = 0 \\ \lfloor \frac{-1}{n} \rfloor & \text{در } n \rightarrow L_2 = \lfloor \frac{-1}{+\infty} \rfloor = -1 \end{cases}$$

$L_1 \neq L_2 \Rightarrow$  دروغ

۱۱۴ - گزینه (ا)

$$f = \begin{cases} -1 & 2 \\ a & 2 \end{cases} \xrightarrow{\text{شرط پیوسته}} \textcircled{a = -1}$$

۱۱۵ - گزینه (ب)

$$y = \sqrt{\frac{\epsilon n^3 - 2n^2}{n-1}} = \sqrt{\epsilon n^2 + n + \dots} \sim \sqrt{\epsilon} \left(n + \frac{1}{\sqrt{\epsilon}}\right)$$

$$y_{\text{تقریبی}} = \sqrt{\epsilon} n + \frac{1}{\sqrt{\epsilon}} \rightarrow \text{میانگین} = \frac{1}{\sqrt{\epsilon}}$$

۱۱۶ - گزینه (ب)

$$\begin{cases} f(0) = 1 > 0 \quad \cdot \quad \times \\ f\left(\frac{1}{\sqrt{\epsilon}}\right) = \frac{1}{\sqrt{\epsilon}} > 0 \quad \cdot \quad \times \end{cases} \quad \begin{cases} f\left(\frac{1}{\sqrt{\epsilon}}\right) = \frac{1}{\sqrt{\epsilon}} - \frac{1}{\sqrt{\epsilon}} + 1 < 0 \quad \cdot \quad \times \\ f\left(\frac{1}{\sqrt{\epsilon}}\right) = \frac{1}{\sqrt{\epsilon}} - \frac{1}{\sqrt{\epsilon}} + 1 < 0 \quad \cdot \quad \times \end{cases}$$

$$\begin{cases} f\left(\frac{1}{\sqrt{\epsilon}}\right) \Rightarrow 0 \\ f\left(\frac{1}{\sqrt{\epsilon}}\right) = \frac{1}{\sqrt{\epsilon}} - \frac{1}{\sqrt{\epsilon}} + 1 < 0 \quad \checkmark \end{cases}$$

117 - گزینه (ع)

طول گویه  $\rightarrow n=1$

$$m_1 = f'_+(1) = \frac{1}{x} = 1 \rightarrow m_1 \theta = \left| \frac{m_1 - m_2}{1 + m_1 m_2} \right| = \infty$$

$$m_2 = f'_-(1) = -\frac{1}{x} = -1$$

118 - گزینه (ب)

$$\lim_{x \rightarrow \varepsilon} \frac{f(x) + v}{n - \varepsilon} = -\frac{v}{\gamma} \Rightarrow \begin{cases} f(\varepsilon) = -v \\ f'(\varepsilon) = -\frac{v}{\gamma} \end{cases}$$

$$\left( \frac{f(x)}{x} \right)' = \frac{\gamma x f'(x) - f(x)}{x^2} \stackrel{n=2}{=} \frac{\varepsilon f'(\varepsilon) - f(\varepsilon)}{\varepsilon} = \frac{1}{\varepsilon}$$

119 - گزینه (ع)

$$n + \ln m = n \rightarrow n=1$$

$$A' \Big|_1 \rightarrow \text{[blacked out]} \quad m' = (f^{-1})'_{(1)} = \frac{1}{f'(1)} = \frac{1}{1 + \frac{1}{n}} = \frac{1}{2}$$

$$y - 1 = \frac{1}{2}(n-1) \rightarrow 2y - n = 1$$

120 - گزینه (ع)

$$x^x + y^y - cxy - c = 0$$

$$m = f'(1, 2) = -\frac{x y^y - c y}{x y^y - c x} = -\frac{-2}{9} = \frac{1}{3} \Rightarrow m_T = -2$$

$$y - 2z - c(n-1) \rightarrow f(1) = 0$$

سؤال ۱۲۱ - گزینه (۳)

$$V = \frac{\epsilon}{\rho} \pi r^2 \rightarrow V' = \epsilon \pi r^2 r' \rightarrow r' = \frac{V'}{\epsilon \pi r^2}$$

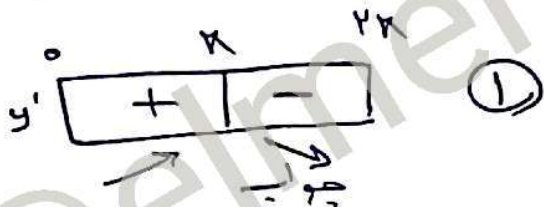
$$S = \epsilon \pi r^2 \rightarrow S' = 2 \pi r r'$$

$$\Rightarrow S' = 2 \pi r r' = \frac{2 \pi r V'}{\epsilon \pi r^2} = \frac{2 V'}{\epsilon r} = \frac{2 \times 10}{\epsilon} = 1,5$$

سؤال ۱۲۲ - گزینه (۲)

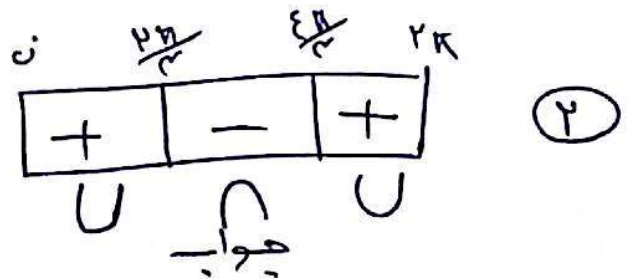
$$y = -2 \cos m \sin m + 2 \sin m \cos m$$

$\left. \begin{array}{l} \sin m = 0 \rightarrow m = 0, \pi, 2\pi \\ \cos m = 1 \rightarrow m = 2\pi \end{array} \right\}$



$$y' = -\sin 2m + 2 \sin m \rightarrow y' = -2 \cos 2m + 2 \cos m = -\epsilon \cos 2m + 2 \cos m = 0$$

$$\left\{ \begin{array}{l} \cos m = 1 \rightarrow m = 2\pi \\ \cos m = -\frac{1}{2} \rightarrow \begin{cases} m = \frac{2\pi}{3} \\ m = \frac{4\pi}{3} \end{cases} \end{array} \right.$$



① و ②  $\left( \pi < m < \frac{4\pi}{3} \right)$

سؤال ۱۲۳ - گزینه (۲)

$$y = \sqrt{2} \sin^2 m = \sqrt{2} |\sin m|$$



$$S = \int_0^{\pi} \sqrt{2} \sin m = -\sqrt{2} \cos m \Big|_0^{\pi} = 2\sqrt{2}$$

سؤال ۱۲۴ - گزینه (۳)

$$\int_0^{\epsilon} |1 - \sqrt{u}| = \int_0^1 1 - \sqrt{u} + \int_1^{\epsilon} \sqrt{u} - 1 = \left( u - \frac{2}{3} u^{3/2} \right) \Big|_0^1 + \left( \frac{2}{3} u^{3/2} - u \right) \Big|_1^{\epsilon}$$