

به نام داناى مطلق رياضيات تجربى كنكور سرتايم ۱۴۰۲
دکتر عارف خفزی
۰۹۱۰۷۸۴۹۶۱۲

(۱۱۱) تمرین ۳

$$2^{\frac{1}{12}} \times (5 \times 3^4)^{\frac{1}{4}} \times 2 \times 2^{\frac{1}{12}} = 12$$

$$\frac{12}{\sqrt{4}} = \frac{12 \times \sqrt{4}}{4} = 2\sqrt{4}$$

(۱۱۲) تمرین ۲
ایراد دارم چون اگر اشتباهی بود باز مناهم است و بی فایده است
و صبر کنید لطفاً!

$$\frac{5}{m+2} \leq \frac{4}{m+1} \Rightarrow \frac{m-3}{(m+1)(m+2)} \leq 0$$

$$m \in \{1, 2, 3\}$$

	-2	-1	3
$m-3$	-	-	-
$(m+1)(m+2)$	+	-	+
P	-	+	+

(۱۱۳) تمرین ۴
 $ab = a + c \Rightarrow \frac{b}{a} = 1 + \frac{c}{a} \xrightarrow{\frac{b}{a} = x} 2x = 1 + \frac{1}{x}$

$$q = \frac{1}{b} = \frac{1}{\frac{1}{a}} = \frac{1}{1 + \frac{1}{x}} \Rightarrow \frac{c}{a} = \frac{1}{b} = \frac{1}{x}$$

$$\Rightarrow (2x-1) = \frac{1}{x} \Rightarrow x(2x-1) = 1 \Rightarrow 2x^2 - x - 1 = 0$$

$$\Rightarrow x = 1, x = -\frac{1}{2} \Rightarrow q = \frac{1}{1} \cdot \frac{1}{b} = \frac{1}{1} \cdot \frac{1}{x} \Rightarrow 2q = \frac{1}{x} = -2$$

$$a - rm > 0 \Rightarrow m < \frac{a}{r} \Rightarrow m = r \rightarrow \text{گزینه ۳ (۱۱۴)}$$

$$(-1, r) = (-1, 0)$$

$$m + n = r + 0 = r$$

$$m = 1 \rightarrow m - r = -1, (-1, -1) \times$$

$$S = \frac{ah}{r} = \frac{a(r a + r)}{r} \xrightarrow[h+2 = ra+y]{a+\varepsilon} S' = \frac{(a+\varepsilon)(ra+y)}{r} \quad \text{گزینه ۱ (۱۱۵)}$$

$$\frac{S'}{S} = \frac{a}{r} \Rightarrow r(a+\varepsilon)(ra+y) = a(r a + r)$$

$$\Rightarrow a = r \checkmark, a = -\frac{1}{r} \times \quad S = \frac{a(r a + r)}{r} = r \times r + r = 1$$

$$g(rx) = C, f(r+x) = r+x \quad \text{گزینه ۲ (۱۱۶)}$$

$$C + r(r+x) = r + rx \Rightarrow y + C + rx = r + rx \Rightarrow y + C = r$$

$$\Rightarrow C = -r \Rightarrow \frac{f(-1)}{g(-\varepsilon)} = \frac{-1}{-r} = \frac{1}{r}$$

$$(g \circ f)(x) = r - \sqrt{a-x}$$

(118) گزینہ ۳

$$r - \sqrt{a-x} = \sqrt{a-x} \quad \left| \begin{array}{l} \Rightarrow r - \sqrt{a} = \sqrt{a} \\ x=0 \end{array} \right. \Rightarrow$$

$$a = \frac{9}{2} = 4.5$$

$$\sqrt{\frac{1}{\alpha}} + \sqrt{\frac{1}{\beta}} = 0 \Rightarrow \frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = 0$$

(119) گزینہ ۱

$$\frac{\sqrt{\alpha} + \sqrt{\beta}}{\sqrt{\alpha\beta}} = 0 \Rightarrow \frac{\alpha + \beta}{\sqrt{\alpha\beta}} = 0 \Rightarrow \frac{m+12}{\sqrt{\alpha\beta}} = 0$$

$$\alpha\beta = \frac{1}{17}$$

$$\frac{m+12}{17} + \frac{15}{17} = \frac{52}{17}$$

$$m = -1 \Rightarrow \frac{c'}{a'} = \frac{5}{-1} = -5$$

$$f^{-1}(x) = h(x) = \pm \sqrt{\frac{x^2 - a}{b}}$$

(119) گزینہ ۴

$$f\left(-\frac{5}{a}\right) = -\frac{5}{a} \quad (1) \quad 20a + 9b = 17$$

$$\Rightarrow -vb = v$$

$$f^{-1}\left(-\frac{5}{a}\right) = -\frac{5}{a} \quad (2) \quad 20a + 17b = 9$$

$$b = -1$$

$$\Rightarrow a = +1 \Rightarrow \frac{a}{b} = \frac{+1}{-1} = -1$$

(۱۲۰) گزینه ۳ $\{(-2, 2m), (2, 2m+2), (2, m-2)\}$ مرتب شده

با فرض اینکه x از اول به اول و اول به اول باشد $(1, -1)$

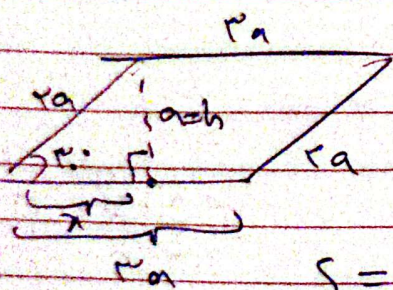
$$2-m \geq 2m+2 \geq m-2 \geq -1 \Rightarrow m \leq \frac{1}{3}, m \geq -2$$

$$\Rightarrow -2 \leq m \leq \frac{1}{3} \Rightarrow m \in \{-2, -1, -\frac{1}{2}, -\frac{1}{3}, 0, \frac{1}{3}\}$$

(۱۲۱) گزینه ۱

$$\begin{cases} a+b=2 \\ \varepsilon b-a=2 \end{cases} \Rightarrow b=\frac{1}{\varepsilon} \Rightarrow a=2-\frac{1}{\varepsilon}$$

$$\Rightarrow b-a=\frac{1}{\varepsilon} - (2-\frac{1}{\varepsilon}) = \frac{1}{\varepsilon} + \frac{1}{\varepsilon} - 2 = -\frac{\varepsilon}{2}$$



(۱۲۲) گزینه ۳ $h = r_a \sin \alpha = a$ ✓

$$(r_a)^2 = a^2 + x^2 \Rightarrow x^2 = r_a^2 - a^2 \Rightarrow x = \sqrt{r_a^2 - a^2}$$

$$S = a \cdot r_a = 2\varepsilon \Rightarrow a^2 = 1 \Rightarrow a = \sqrt{2}$$

$$P = 1 \cdot a = 1 \cdot \sqrt{2} = \sqrt{2} \checkmark$$

(۱۲۳) گزینه ۳

$$\tan(\pi - \alpha) = -\tan \alpha \Rightarrow \tan\left(\sqrt{\frac{\pi}{\lambda}}\right) = -\tan \frac{\pi}{\lambda}$$

$$A = -1 + \tan\left(\sqrt{\frac{\pi}{\lambda}}\right) = -1 - \tan \frac{\pi}{\lambda} \Rightarrow x = \tan \frac{\pi}{\lambda}$$

$$1 = \tan \frac{\pi}{\varepsilon} = \frac{x + \tan \frac{\pi}{\lambda}}{1 - \tan \frac{\pi}{\lambda} x} \Rightarrow x^2 + x - 1 = 0 \Rightarrow x = \frac{-1 \pm \sqrt{5}}{2}$$

$$\Rightarrow A = -1 - \left(\frac{-1 + \sqrt{5}}{2}\right) = -\frac{\sqrt{5}}{2}$$

LINE NOTE

$$\sin 2x = \cos 2x = \sin(\pi/2 - 2x)$$

سؤله ۱۲۴

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

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

$x \in [0, \pi]$

$$\Rightarrow x \in \left\{ \frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4} \right\}$$

$$\log_{15} 10 = \frac{\log 10}{\log 15} = \frac{1 + \log 5}{1 + \log 3} = \frac{1 + \frac{1}{2}}{1 + \frac{1}{3}} = \frac{12}{19}$$

سؤله ۱۲۵

$$\bar{x} = \frac{217}{5} = 43.4$$

سؤله ۱۲۶

$$\sigma = \sqrt{\frac{7 \cdot 12^2 + 7 \cdot 17^2 + 7 \cdot 4^2 + 7 \cdot 17^2 + 7 \cdot 17^2}{5}} = \frac{217}{\sqrt{5}}$$

$$C.V = \frac{\sigma}{\bar{x}} = \frac{217/\sqrt{5}}{43.4} = \frac{1}{\sqrt{5}}$$

$$f(x) = \lim_{x \rightarrow 1^-} \varepsilon - \frac{10}{x} = -1 \quad \text{سؤله ۱۲۷}$$

$$f(1) = -1 \Rightarrow -1 = \frac{2+a+b}{-1} \Rightarrow a+b = -1$$

$$\lim_{x \rightarrow -r^{\pm}} f(x) = l < \infty$$

(128) نیزه ۲

$$\lim_{x \rightarrow -r^{\pm}} r \left[\frac{r-x}{r} \right] + a \left[\frac{x+r}{r} \right] = l$$

$$\lim_{x \rightarrow -r^+} f(x) = r - a$$

$$\Rightarrow r - a = r \Rightarrow a = r$$

$$\lim_{x \rightarrow -r^+} f(x) = r + 0 = r$$

$$\Rightarrow \left[\frac{a}{r} \right] = \left[\frac{r}{r} \right] = 0$$

$$\lim_{x \rightarrow -1^+} \frac{1+k}{0^-} = -\infty \Rightarrow k > -1$$

(129) نیزه ۳

$$\lim_{x \rightarrow -1^-} \frac{1+rk}{0^+} = -\infty \Rightarrow 1+rk < 0 \Rightarrow rk < -1 \Rightarrow k < -\frac{1}{r}$$

$$-1 < k < -\frac{1}{r} \Rightarrow (k\pi, \cos k\pi) \quad \text{در ربع سوم}$$

$$\text{H.o.P: } \frac{ra+m}{-1} = \frac{ra+m}{-1} = r \Rightarrow \frac{ra+(r-a)}{-1} = -r \Rightarrow \frac{ra+ra-r}{-1} = -r \Rightarrow \frac{ra}{-1} = -r \Rightarrow ra = r \Rightarrow a = r$$

$$\text{Core } (x-a)(x-ra) = x^2 - \underbrace{ra}_m x + \underbrace{ra^2}_n$$

$$m = -ra = -4, n = ra^2 = 16 \Rightarrow n-m = 16 - (-4) = 20$$

$$y = 2 - ax \Rightarrow f(x) = 2 - 2a \quad \text{نقطه ۱۳۱} \quad \text{نقطه ۳}$$

$$f'(x) = -a \Rightarrow f(x) + f'(x) = -1$$

$$\Rightarrow 2 - 2a - a = -1 \Rightarrow a = \frac{3}{3} = 1 \Rightarrow f'(x) = -\frac{3}{3} = -1$$

$$d: y = ax \Rightarrow 2\sqrt{x}(2x^2 + 2) = ax \quad \text{نقطه ۱۳۲} \quad \text{نقطه ۱}$$

$$\Rightarrow \frac{2\sqrt{x}}{\sqrt{x}}(2x^2 + 2) = \frac{ax}{\sqrt{x}} \Rightarrow 2(2x^2 + 2) = a\sqrt{x}$$

$$\Rightarrow 4x^2 + 4 = a\sqrt{x} \Rightarrow 16x = \frac{a}{2\sqrt{x}} \Rightarrow a = 32x\sqrt{x}$$

$$2\sqrt{x}(2x^2 + 2) = 32x\sqrt{x} \Rightarrow x = \frac{1}{2} \Rightarrow a = 16\sqrt{2}$$

$$\text{نقطه ۱۳۳} \quad \text{نقطه ۱} \quad \text{نقطه ۲} \quad \text{نقطه ۳} \quad \text{نقطه ۴} \quad \text{نقطه ۵} \quad \text{نقطه ۶} \quad \text{نقطه ۷} \quad \text{نقطه ۸} \quad \text{نقطه ۹} \quad \text{نقطه ۱۰}$$

$$d = (x^2 + x^2 + 1) - (x^2 - 2x + 2) = x^2 + 2x - 1$$

$$\Rightarrow 2x - 1 = 0 \Rightarrow x = \frac{1}{2} \Rightarrow d = 3$$

$$\text{نقطه ۱۳۴} \quad \text{نقطه ۳} \quad \text{نقطه ۴} \quad \text{نقطه ۵} \quad \text{نقطه ۶} \quad \text{نقطه ۷} \quad \text{نقطه ۸} \quad \text{نقطه ۹} \quad \text{نقطه ۱۰}$$

$$180 - 69 = 111$$

$$181, 180, 179, 178, 177, 176, 175, 174, 173, 172, 171, 170, 169, 168, 167, 166, 165, 164, 163, 162, 161, 160, 159, 158, 157, 156, 155, 154, 153, 152, 151, 150, 149, 148, 147, 146, 145, 144, 143, 142, 141, 140, 139, 138, 137, 136, 135, 134, 133, 132, 131, 130, 129, 128, 127, 126, 125, 124, 123, 122, 121, 120, 119, 118, 117, 116, 115, 114, 113, 112, 111, 110, 109, 108, 107, 106, 105, 104, 103, 102, 101, 100, 99, 98, 97, 96, 95, 94, 93, 92, 91, 90, 89, 88, 87, 86, 85, 84, 83, 82, 81, 80, 79, 78, 77, 76, 75, 74, 73, 72, 71, 70, 69, 68, 67, 66, 65, 64, 63, 62, 61, 60, 59, 58, 57, 56, 55, 54, 53, 52, 51, 50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1$$

$$\text{نقطه ۱۳۵} \quad \text{نقطه ۳} \quad \text{نقطه ۴} \quad \text{نقطه ۵} \quad \text{نقطه ۶} \quad \text{نقطه ۷} \quad \text{نقطه ۸} \quad \text{نقطه ۹} \quad \text{نقطه ۱۰}$$

LINE NOTE

نقطة M من C و D قرار می دهیم! (۱۳۸) گزینه ۳

$$DM = x$$

$$MC = \varepsilon - x$$

$$= BM$$

مسافتها برابر است: $(\varepsilon - x)^2 = r^2 + x^2 \Rightarrow x = \frac{r}{2}$

$$\Rightarrow BM = \varepsilon - x = \frac{\varepsilon}{2}$$

$\triangle BMC$ مسافه مساوی است $\Rightarrow BC = \sqrt{r^2 + \left(\frac{\varepsilon}{2}\right)^2} = r\sqrt{5}$

مسافتها برابر است: $FC = \sqrt{5} \Rightarrow ME = \sqrt{\left(\frac{\varepsilon}{2}\right)^2 - (\sqrt{5}r)^2} = \sqrt{\frac{\varepsilon^2}{4} - 5r^2} \Rightarrow ME = \frac{\sqrt{5}}{2}$

$$AM \times ME = MC^2 \Rightarrow AM = \frac{5\sqrt{5}}{r} \Rightarrow S_{ABE} = \frac{1}{2} \sqrt{5} \left(\frac{5\sqrt{5}}{r} - \frac{\sqrt{5}}{2} \right)$$

$$= 5$$

$BD \times \sqrt{90} = 9 \Rightarrow BD = \frac{3\sqrt{10}}{\sqrt{10}}$ (۱۳۹) گزینه ۱

$$BD^2 = BE \times BC \Rightarrow \left(\frac{3\sqrt{10}}{\sqrt{10}} \right)^2 = BE \times 9 \Rightarrow BE = 1$$

$m = r = \frac{a-b}{-\frac{1}{r} + \frac{1}{r}} \Rightarrow a-b = -\frac{\sqrt{r}}{r}$ (۱۴۰) گزینه ۱

$d = a\sqrt{r} \Rightarrow d = \sqrt{r} \times \frac{1}{r} = \frac{\sqrt{r}}{r}$

$$|AB| = \sqrt{\left(\frac{1}{r}\right)^2 + (a-b)^2} = \sqrt{\frac{1}{r^2} + \frac{r}{r^2}} = \frac{1}{r}$$