

نوین کنکور

کنکور

امتحان نهایی

**نوین کنکور
شرط لازم و کافی
برای موفقیت**

novinkonkor.com

$$① a, ra, r^2a \rightarrow \frac{a}{r}, \frac{ar}{r}, \frac{ar^2}{r} \rightarrow \frac{ar}{r} = \frac{ar^2}{r} + \frac{a}{r}$$

$$\rightarrow r^2 + 1 = 2r \rightarrow \boxed{r=1}$$

مهندس کامیاب مرادی

$$② \begin{matrix} (c, y) \\ (-2, y) \end{matrix} \rightarrow \begin{matrix} x_1^2 \\ x_2^2 \end{matrix} \Rightarrow \begin{matrix} x_1 \\ x_2 \end{matrix} = \frac{c + (-2)}{2} = -1 \rightarrow \frac{-b}{2a} = -1 \rightarrow \boxed{b = 2a}$$

$$x_1^2 + y = 1 \rightarrow \frac{-\Delta}{2a} = 1 \rightarrow \boxed{-b^2 - 4ac = 4a}$$

$$a^2 + b^2 = 2 \rightarrow 5 - 2p = 2 \rightarrow \frac{b^2}{a^2} - 2\frac{c}{a} = 2 \rightarrow \frac{4a^2}{a^2} - 2\frac{c}{a} = 2$$

$$\frac{4c}{a} = -1 \rightarrow \boxed{4c = -a}$$

$$\Rightarrow -(2a)^2 - 4a(-a) = 4a \rightarrow -4a^2 - 4a^2 = 4a \rightarrow$$

$$-4a^2 = 4a \rightarrow -4a^2 - 4a = 0 \rightarrow \begin{matrix} a \neq 0 \\ a = -\frac{1}{4} \end{matrix} \rightarrow \boxed{c = \frac{1}{8}}$$

$$③ au'' - au' - b = 0 \rightarrow u'' - u' - \frac{b}{a} = 0 \Rightarrow \begin{matrix} s=1 \\ p = -\frac{b}{a} \end{matrix}$$

$$\xi \cdot B + \gamma \cdot A - \gamma \cdot B = N \rightarrow \gamma B + A - B = \frac{N}{\gamma}$$

$$\Rightarrow A + B + \frac{B}{\gamma} - B = \frac{N}{\gamma} \Rightarrow s' - 2p - p = \frac{N}{\gamma} \rightarrow 1 - 3p = \frac{N}{\gamma}$$

$$r, k, m, c, \dots \rightarrow \frac{b}{a} = -p$$

$$\Rightarrow \boxed{p = \frac{1}{\gamma}} \Rightarrow |A - B| = \frac{\sqrt{\Delta}}{|a|} = \boxed{\frac{\gamma}{\sqrt{\Delta}}}$$

(4)

$$\frac{1}{x^2} + \frac{1}{(1-x)^2} = \frac{14}{9} \Rightarrow \frac{(1-x)^2 + x^2}{x^2(1-x)^2} = \frac{14}{9}$$

مهندس کامیاب مرادی

$$\frac{2x^2 - 2x + 1}{x^2 - 2x^3 + x^4} = \frac{14}{9} \Rightarrow \frac{2x^2 - 2x + 1}{(x^2 - x)^2} = \frac{14}{9}$$

$$\left\{ \begin{aligned} x^2 - x = t &\Rightarrow \frac{2t+1}{t^2} = \frac{14}{9} \Rightarrow 14t^2 - 18t - 9 = 0 \end{aligned} \right\}$$

$$\left\{ \begin{aligned} \Rightarrow \sqrt{\Delta} = \sqrt{81} &\Rightarrow t_1 = \frac{18 + \sqrt{81}}{28} = \frac{9}{4} \\ t_2 = \frac{18 - \sqrt{81}}{28} = -\frac{1}{4} \end{aligned} \right\} \begin{array}{l} \text{لازم به حساب} \\ \text{نبرد} \end{array}$$

$$x^2 - x = \frac{9}{4} \rightarrow S = 1$$

$$x^2 - x = -\frac{1}{4} \rightarrow S = 1 \rightarrow S_T = 2$$

(5)

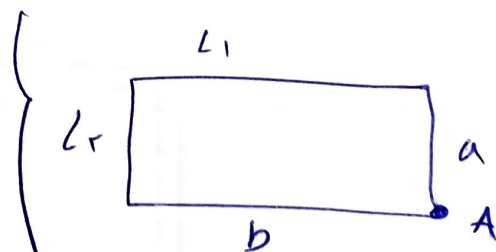
$$x - 4y = 5 \xrightarrow{(4, 5)} \text{صدق نمی کند}$$

$$4x + y = 2 \xrightarrow{(4, 5)} \text{صدق نمی کند}$$

$$L_1: y = \frac{1}{4}x - \frac{5}{4}$$

$$\rightarrow L_1 \nparallel L_2$$

$$L_2: y = -4x + 2$$



بیشترین فاصله، وسط قطر از اضلاع می شود نصف ~~قطر~~ طول «b»

$$A \text{ به } L_1: a = \frac{|4(4,5) - 1 - 5|}{\sqrt{1 + 16}} = \frac{1,5}{\sqrt{17}}$$

$$B \text{ به } L_2: b = \frac{|4(4,5) + 2 - 2|}{\sqrt{16 + 1}} = \frac{17}{\sqrt{17}} \Rightarrow \left(\frac{\sqrt{17}}{2} \right)$$

$$(1) f(n) = \sqrt{n-2\sqrt{m-1}}$$

$$y = 12 - n \xrightarrow{y=10} n=2 \Rightarrow (2, 10) \Rightarrow f(10) = 2 \Rightarrow m=1$$

$$f(m+1) = f(n) = \sqrt{2-2\sqrt{2-1}} = 1$$

$$(9) A_r = A_1 \left(1 - \frac{1}{q}\right)^{\frac{t}{r}} \Rightarrow \frac{1}{q} = \left(\frac{A}{A_1}\right)^{\frac{t}{r}} \Rightarrow q = \left(\frac{A}{A_1}\right)^{\frac{r}{t}}$$

$$\rightarrow \log q \Rightarrow \log q = t (\log q - \log A_1)$$

$$\Rightarrow \log q + \log A_1 = t (\log q - \log A_1) \quad \text{مهندس کامیاب مرادی}$$

$$\Rightarrow \frac{1}{\log r} + \frac{1}{\log c} = t \left(\frac{r}{\log q} - \frac{c}{\log r} \right)$$

$$(10) \quad \begin{array}{c} \text{Diagram: A rectangle with width } r, \text{ height } r, \text{ and diagonal } \sqrt{r}. \text{ A line segment of length } s \text{ is drawn from the top-left corner to the bottom-right corner.} \end{array} \quad s = 1 - 2 - \varepsilon = 2 - \frac{1}{r} \sqrt{1} \times \sqrt{r} \times \sin \alpha$$

$$\Rightarrow \sin \alpha = \frac{1}{\sqrt{1}} \rightarrow \text{Diagram: A right triangle with hypotenuse } 1, \text{ opposite side } \sqrt{1}, \text{ and angle } \alpha. \rightarrow \boxed{\alpha = 90^\circ}$$

$$(11) s = \varepsilon_1 \cdot \frac{1}{r} = \frac{1}{r} \times 4 \times \sqrt{r} \sin \alpha \rightarrow \sin \alpha = \frac{\sqrt{r}}{4} \rightarrow \alpha = 12.9^\circ, 4.1^\circ$$

$$\frac{12.9}{4} = (2)$$

$$(12) f(x) = a + \frac{b}{r} \sin (x - \frac{\pi}{r}) = a + \frac{b}{r} \cos x$$

$$c=1, a=1, \frac{b}{r} = -2 \Rightarrow \text{با توجه به نمودار}$$

$$f(n) = 1 - 2 \cos n = 0 \rightarrow \cos n = \frac{1}{2} \rightarrow n = \frac{\pi}{3}, \frac{5\pi}{3}$$

$$(13) \left[\cos \left(n + \frac{\pi}{r} \right) = \frac{\sqrt{r}}{r} \cos n - \frac{\sqrt{r}}{r} \sin n \right] \Rightarrow \cos n - \sin n = \frac{\sqrt{r}}{r}$$

$$\cos n - \sin n = t \rightarrow t^r = 1 - \sin^2 n \Rightarrow m t - c \sqrt{r} (1 - t^r) = \sqrt{r}$$

$$\rightarrow r \sqrt{r} t^r + m t - c \sqrt{r} \xrightarrow{t=\sqrt{\frac{r}{c}}} r \sqrt{r} + m \sqrt{\frac{r}{c}} - c \sqrt{r} = 0 \rightarrow \boxed{m=4}$$

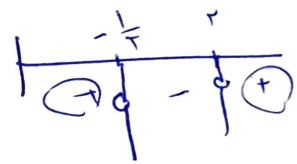
مهندس کامیاب مرادی

۱۴

دامنه تابع $(-\infty, 0)$

$$\rightarrow \text{ایده نزول} \quad -m^2 + 2m - 2 < m^2 - 5m - 5 < 0$$

$$\rightarrow \quad \underbrace{-m^2 + 2m - 2 < m^2 - 5m - 5}_{(2m+1)(m-2) > 0} < 0 \Rightarrow$$



$$m^2 - m - 5 < 0 \rightarrow \frac{1-\sqrt{21}}{2} < m < \frac{1+\sqrt{21}}{2}$$

$$\text{دامنه} = (-\infty, 0) \cap \left(\frac{1-\sqrt{21}}{2}, \frac{1+\sqrt{21}}{2} \right) \cup \left(\frac{1-\sqrt{21}}{2}, -\frac{1}{2} \right)$$

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$$f(u) = \frac{au+b}{cu+d} \rightarrow f^{-1}(u) = \frac{-du+b}{cu-a}$$

$$g(u) = \frac{cu+d}{au+b} \rightarrow g^{-1}(u) = \frac{-bu+d}{au-c}$$

مهندس کامیاب مرادی

$$\lim_{u \rightarrow -\infty} \frac{f(u)}{g^{-1}(u)} = \lim_{u \rightarrow +\infty} \frac{g^{-1}(u)}{g(u)} \Rightarrow \frac{\frac{a}{c}}{\frac{-b}{a}} = \frac{-b}{\frac{c}{a}} \rightarrow a^2 = b^2 \Rightarrow a = \pm b$$

$$\lim_{u \rightarrow c^+} f^{-1}(u) = -\frac{b}{a} = \pm 1$$

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$$f(u) = \begin{cases} |u - \lfloor -u \rfloor| & \text{if } \lfloor u \rfloor \\ u - \lfloor u \rfloor + k & \text{if } \lfloor u \rfloor \end{cases}$$

فرض $n=1$
 $n=2 \rightarrow \begin{cases} u = \pm 1 \\ u = \pm 2 \end{cases}$

$$u = -1: \lim_{u \rightarrow -1^+} f(u) = f(-1) = k, \quad \lim_{u \rightarrow -1^-} f(u) = |-1 - \lfloor -(-1) \rfloor| = 2$$

$$\boxed{k=2}$$

$$\begin{aligned} u = 2: \quad \lim_{u \rightarrow 2^+} f(u) &= \lim_{u \rightarrow 2^+} |2 - \lfloor -(2^+) \rfloor| = 0 \\ \lim_{u \rightarrow 2^-} f(u) &= \lim_{u \rightarrow 2^-} (u - \lfloor u \rfloor + k) = 1 + k \\ f(2) &= \varepsilon \end{aligned}$$

پیوسته نیست

فقط برای مقادیر n

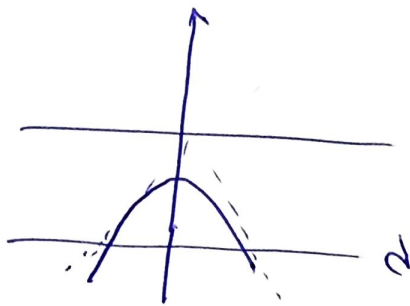
IV

$$f(u) = u g(u) + 1 \rightarrow g(u) = \frac{f(u)-1}{u} \Rightarrow \lim_{u \rightarrow 0} g(u) = \lim_{u \rightarrow 0} \frac{f(u)-1}{u} = \text{HOP}$$

$$\lim_{u \rightarrow 0} g(u) = f'(0) \left\{ \begin{aligned} f'(u) &= r \left(\frac{x' u u - 1}{\sinh u + 1} \right) \left(\frac{\cosh u (x' u u + 1 - \sinh u + 1)}{(\sinh u + 1)^2} \right) \end{aligned} \right.$$

$$\boxed{f'(0) = -\varepsilon}$$

(۱۸)



خط $y = 1 - x^2$ را در ۲ نقطه قطع می‌کند

مهندس کامیاب مرادی

برای نمود بودن ۲ مماس باید شیب‌ها + و - باشند چون شیب $y = 0$ مقارن هستند

$$f'(x) = \pm 1 \rightarrow -2x = 1 \rightarrow x = -\frac{1}{2}$$

$$-2x = -1 \rightarrow x = \frac{1}{2} \rightarrow y = -\frac{5}{4} \rightarrow \left(\frac{1}{2}, -\frac{5}{4}\right)$$

$$x = 1, 20$$

این‌ها در عرض خط $y = 0$

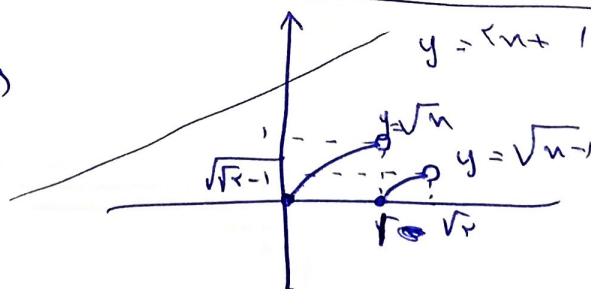
(۱۹)

$$y = ax^2 + bx^2 \xrightarrow{\text{نقطه مطلق}} \left(-\frac{b}{2a}, \frac{4}{a^2} \frac{b^2}{a^2}\right) \rightarrow \text{ریم دوم}$$

$$\begin{aligned} -\frac{b}{a} &\neq 0 \rightarrow a, b > 0 \rightarrow k > 0 \rightarrow k > -1 \\ \frac{b^2}{a^2} &> 0 \rightarrow k < 0 \rightarrow k > -1 \end{aligned}$$

در این بازه هیچ مقدار k هیچ قطعی ندارد

$$(۲۰) y = \sqrt{x - [x^2]} \Rightarrow$$



کمترین فاصله بیرون نمودار $y = \sqrt{x}$ به ازای $1 < x < 2$

$$\Rightarrow A(a, \sqrt{a}) \rightarrow d(a) = \frac{|2a - \sqrt{a} + 1|}{\sqrt{5}} \rightarrow d'(a) = 0 \rightarrow 2 - \frac{1}{2\sqrt{a}} = 0$$

$$\Rightarrow a = \frac{1}{16} \rightarrow d_{\min} = \frac{|\frac{1}{8} - \frac{1}{8} + 1|}{\sqrt{5}} = \frac{1}{\sqrt{5}}$$

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