

باز هم بر

۱۴، ۷۵

کتابی ۱۷

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$$y = -\frac{1}{r}x + b \rightarrow \begin{cases} m = -\frac{1}{r} + b \\ k = 1 + b \end{cases} \rightarrow m - k = -\frac{1}{r} - 1 = \Delta y \quad \Delta n = 4 - (-2) = 6$$

$$AB = \sqrt{\Delta y^2 + \Delta n^2} = \sqrt{(-\frac{1}{r})^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5 \quad S = \frac{AB^2}{r} = \frac{25}{r} = \frac{45}{r} = 22/5$$

مساحت مربع رو داری حساب میکنی:

$$\Delta y_{AB} = \Delta y_{D-C} \Rightarrow 4 - 1 = y + 4 - y \Rightarrow 4 = 4$$

$$\Delta n_{AB} = \Delta n_{D-C} \Rightarrow -1 - 4 = -1 - n - n \Rightarrow -5 = -2n - 1 \Rightarrow n = \frac{2}{r}$$

$$\Rightarrow m_{AB} \cdot m_{BC} = -1 \Rightarrow \frac{2}{-5} \times \frac{y-1}{n-4} = -1 \Rightarrow \frac{y-1}{n-4} = \frac{5}{2} \Rightarrow 2n - 12 = 5y - 2 \Rightarrow y = \frac{2n}{5} - 2$$

$$\Rightarrow y = \frac{2 \times \frac{2}{r}}{5} - 2 = -1 \quad AB = \sqrt{(4-1)^2 + (2+1)^2} = 5 \quad BC = \sqrt{(n-4)^2 + (y-1)^2} = \sqrt{(-\frac{2}{r})^2 + (-1)^2} = \sqrt{\frac{4}{r^2} + 1} = \frac{5}{r}$$

$$\Rightarrow \text{مساحت} = (5 + \frac{5}{r}) \times 2 = 15$$

$$\tan 45^\circ = \sqrt{2} \quad y = \frac{-2m}{m^2+1} \times \frac{r}{m^2+1} \Rightarrow \frac{-2m}{m^2+1} = \sqrt{2} \Rightarrow \sqrt{2}m^2 - \sqrt{2} = -2m \Rightarrow \sqrt{2}m^2 + 2m - \sqrt{2} = 0$$

$$\Delta > 0 \rightarrow \text{اختلاف} = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{4 - 4(-\sqrt{2})\sqrt{2}}}{\sqrt{2}} = \frac{\sqrt{4+4}}{\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$$

$$m_{BC} = \frac{11-4}{4-2} = \frac{7}{2} = r \quad m_{BC} \cdot m_{Ah} = -1 \Rightarrow m_{Ah} = -\frac{1}{r} \xrightarrow{A(1,9)} 9 = -\frac{1}{r} + b \Rightarrow b = \frac{19}{r}$$

$$\begin{cases} y = 2n - 4 \\ y = -\frac{1}{r}n + \frac{19}{r} \end{cases} \Rightarrow 2n - 4 = -\frac{1}{r}n + \frac{19}{r} \Rightarrow 2n - 4 = -n + 19 \Rightarrow 3n = 23 \Rightarrow n = \frac{23}{3} \Rightarrow y = \frac{5}{3}$$

$$\Rightarrow Ah = \sqrt{(9 - \frac{5}{3})^2 + (\frac{2}{3} - 1)^2} = \sqrt{(\frac{26}{3})^2 + (-\frac{1}{3})^2} = \sqrt{\frac{676}{9} + \frac{1}{9}} = \sqrt{\frac{677}{9}} = \frac{\sqrt{677}}{3} = \frac{1}{\sqrt{5}} = 2\sqrt{5}$$

(فاصله A و BC)

$$\begin{cases} y = -2n + 4 \\ y = \frac{2n+14}{r} \end{cases} \Rightarrow -2n + 4 = \frac{2n+14}{r} \Rightarrow -2nr + 4r = 2n + 14 \Rightarrow -2nr - 2n = 14 - 4r \Rightarrow -2n(r+1) = 14 - 4r \Rightarrow n = \frac{4r-14}{2(r+1)} = \frac{2r-7}{r+1}$$

$$\begin{cases} y = -2n + 4 \\ y = \frac{2n+14}{r} \end{cases} \Rightarrow -2n + 4 = \frac{2n+14}{r} \Rightarrow -2nr + 4r = 2n + 14 \Rightarrow -2nr - 2n = 14 - 4r \Rightarrow -2n(r+1) = 14 - 4r \Rightarrow n = \frac{4r-14}{2(r+1)} = \frac{2r-7}{r+1}$$

$$m_{BH} \times m_{AC} = -1 \Rightarrow m_{BH} = -\frac{r}{2} \xrightarrow{A(1,9)} 9 = -\frac{r}{2} + b \Rightarrow b = \frac{19+r}{2} \Rightarrow y = -\frac{r}{2}x + \frac{19+r}{2}$$

$$\Rightarrow -12n + 4 = 9n + 21 \Rightarrow 9 = 21n \Rightarrow n = \frac{9}{21} = \frac{3}{7} \Rightarrow H(\frac{3}{7}, \frac{11}{7}) \Rightarrow BH = \sqrt{\Delta y^2 + \Delta n^2} = \sqrt{(\frac{4}{7})^2 + (\frac{11}{7})^2} = \sqrt{\frac{16}{49} + \frac{121}{49}} = \sqrt{\frac{137}{49}} = \frac{\sqrt{137}}{7}$$

$$S = \frac{\frac{c}{2} + 7}{2} = \frac{9}{2} = n^2 + \frac{(\frac{c}{2} - n)n}{2} + \frac{(4-n)n}{2} \Rightarrow 2n^2 + (\frac{c}{2} - n)n + (4-n)n = \frac{9}{2}$$

$$\Rightarrow 2n^2 - n^2 + \frac{c}{2}n - n^2 + 4n = (4 + \frac{c}{2})n = \frac{9}{2} \Rightarrow n = \frac{9}{2} \times \frac{2}{c+8} = \frac{9}{c+8}$$

$$\text{قطر} = \sqrt{n^2 + n^2} = \sqrt{2n^2} = \sqrt{2}n = \frac{2\sqrt{2}}{c+8} \checkmark$$

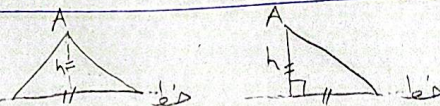
$$y = ax + 1 \Rightarrow \frac{(1,2)}{2-a-1} \Rightarrow a = 1$$

$$\Rightarrow -a = -\frac{1}{a} \Rightarrow a^2 = 1 \Rightarrow a = \pm 1 \Rightarrow \frac{|a+1-(-1)|}{\sqrt{1^2+a^2}} = \frac{|a-1|}{\sqrt{2}} = \frac{2-a}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$y = \frac{n}{a} - a + 1 \Rightarrow \frac{(1,2)}{2-\frac{1}{a}-a+1} \Rightarrow 2 - \frac{1}{a} - a + 1 = 0 \Rightarrow a^2 + a - 2 = 0 \Rightarrow a = \frac{-1 \pm \sqrt{1+8}}{2} = \frac{-1 \pm 3}{2}$$

$$(\frac{1}{\sqrt{2}})^2 + k^2 = 5 \Rightarrow \frac{1}{2} + k^2 = 5 \Rightarrow k = \sqrt{\frac{9}{2}} = \frac{3}{\sqrt{2}} \Rightarrow S = \frac{1}{\sqrt{2}} \times \frac{3}{\sqrt{2}} = \frac{3}{2} \checkmark$$

$$\text{طول ضلع} = \frac{|1 - 2(0) - 1|}{\sqrt{9+1}} = \frac{2}{\sqrt{10}} = h$$



$$\Rightarrow S_{\max} = \frac{1}{2} \times h^2 = \frac{1}{2} \times \frac{4}{10} = \frac{2}{5}$$

نقطه $(\frac{1}{2}, \frac{1}{2})$ مرکز (تغییر) نمی دهد و فقط با a و b تغییر می کند
محور مختصات x و y را در نظر بگیرید.

$$m = \frac{b-a}{-\frac{1}{c} + \frac{1}{c}} = \frac{b-a}{\frac{1}{4}} = 4b - 4a = \sqrt{2} \Rightarrow b-a = \frac{\sqrt{2}}{4}$$

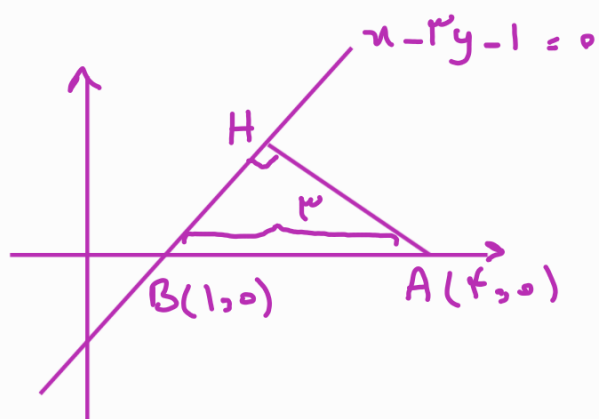
$$\text{فاصله (مقدار)} = \text{ضلع} = n \cdot \sqrt{(\frac{\sqrt{2}}{4})^2 + (-\frac{1}{c} + \frac{1}{c})^2} = \sqrt{\frac{1}{16} + (\frac{1}{4})^2} = \sqrt{\frac{1}{16} + \frac{1}{16}} = \sqrt{\frac{2}{16}} = \frac{\sqrt{2}}{4} = \frac{1}{2}$$

$$\Rightarrow \text{قطر} = \sqrt{n^2 + n^2} = \sqrt{2n^2} = \sqrt{2}n = \frac{\sqrt{2}}{2} \checkmark$$

$$m = \frac{b-a}{-\frac{1}{c} + \frac{1}{c}} = \frac{c}{c} \Rightarrow m = 1 \Rightarrow \frac{b-a}{\frac{1}{4}} = 1 \Rightarrow b-a = \frac{1}{4}$$

$$L: y = -\frac{c}{2}x + b \Rightarrow -\frac{c}{2}x + b = \frac{c}{2}x + b \Rightarrow b = \frac{c}{2}x + b \Rightarrow b = \frac{c}{2}x + b$$

$$L: y = \frac{c}{2}x + b \Rightarrow \frac{c}{2}x + b = \frac{c}{2}x + b \Rightarrow b = \frac{c}{2}x + b$$



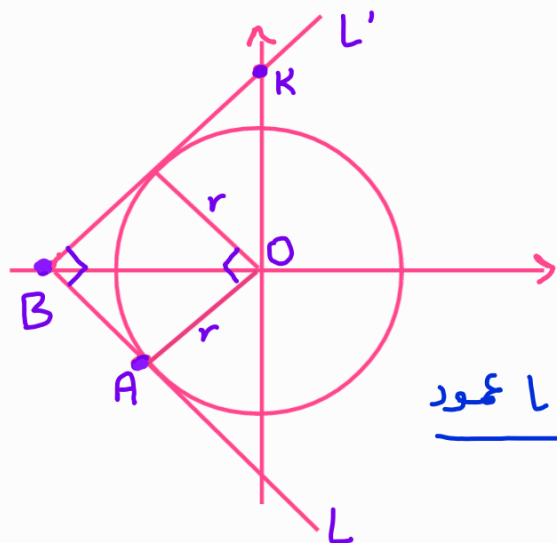
۱۸ ابتدا شغل سوال را رسم کرده و طالع ضلع

AH را می یابیم

$$|AH| = \frac{|4 - 0 - 1|}{\sqrt{9 + 1}} = \frac{3}{\sqrt{10}}$$

$$\frac{9}{10} (AH)^2 + (BH)^2 = (AB)^2 \rightarrow BH = \frac{9}{\sqrt{10}}$$

$$S_{\Delta} = \frac{9}{\sqrt{10}} \times \frac{3}{\sqrt{10}} \times \frac{1}{2} = \frac{27}{20} = 1,35$$



$$m_{OA} = \frac{4}{3} \xrightarrow{\text{عمود بر } L} m_L = -\frac{3}{4}$$

$$L: y + 4 = -\frac{3}{4}(x + 3) \rightarrow y = -\frac{3}{4}x - \frac{25}{4}$$

$$\xrightarrow{\text{L و L' عمود}} m_{L'} = \frac{4}{3} \rightarrow L': y - \frac{4}{3}x - K = 0$$

$$OL' = OA = \sqrt{9 + 16} = 5 \quad \text{شعاع}$$

$$OL' = \frac{|1 - K|}{\sqrt{1 + \frac{16}{9}}} = 5 \rightarrow K = \frac{25}{3} \rightarrow L': y = \frac{4}{3}x + \frac{25}{3}$$

$$\text{مختصات B محل تقاطع L و L'} \Rightarrow (-7, -1) \xrightarrow{\text{حاصل ضرب}} \boxed{7}$$