

اصول هارنس

14 سوال

$B(2, 1) \quad A(4, -4)$

$y - 1 = \frac{1}{3}(x - 2)$

1.

نقطه $g \rightarrow g\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = (2, 1)$

$y = \frac{1}{3}x + \frac{2}{3}$

$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-4)}{2 - 4} = \frac{5}{-2} = -\frac{5}{2}$ $m' = \frac{1}{5/2} = \frac{2}{5}$

$A(3, 1) \quad B(-4, 2) \quad C(-1, 2) \quad \frac{BC}{AH} = ?$

2.

$BC \text{ طول} = \sqrt{(-1+4)^2 + (2-2)^2} = \sqrt{9} = 3$

$BC \perp AH = AH \rightarrow BC \text{ خط} \rightarrow y = -\frac{2}{3}x + \frac{4}{3} \rightarrow A: BC = \frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}}$

$\hookrightarrow AH = 2 \quad BC - AH = 3 - 2 = 1$

$fy = ax + r, \quad ry - x = r \quad S_0 = ?$

3.

$\hookrightarrow y = \frac{a}{r}x + \frac{1}{r} \quad \hookrightarrow y = \frac{1}{r}x + \frac{r}{r}$

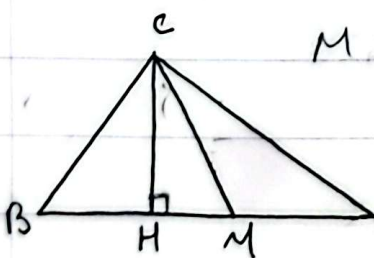
$\frac{a}{r} = \frac{1}{r} \rightarrow a = 1 \quad d = \frac{|C_2 - C_1|}{\sqrt{a^2 + b^2}} = \frac{|\frac{1}{r} - \frac{1}{r}|}{\sqrt{1 + \frac{1}{r^2}}} = \frac{0}{\frac{1}{r}\sqrt{r^2 + 1}} = 0$

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

$A(2, 3) \quad B(4, 1) \quad C(-1, -3)$

4.

$M \rightarrow \text{نقطه} \quad H \rightarrow \text{ارتفاع} \quad MH = ?$



$M \rightarrow \begin{cases} \frac{y_1 + y_2}{2} = 2 \\ \frac{x_1 + x_2}{2} = 2.5 \end{cases}$

$CM = \sqrt{(2+1)^2 + (3+3)^2} = \sqrt{36} = 6$

$AB \rightarrow m = \frac{3-1}{2-4} = -\frac{1}{2} \rightarrow y = -\frac{1}{2}x + 2$

$AB: C \text{ خط} = \frac{|y - x - 2|}{\sqrt{2}} = \frac{|-1 - 2 - 2|}{\sqrt{2}} = \frac{5}{\sqrt{2}}$

$\hookrightarrow MH^2 + CH^2 = CM^2 \rightarrow MH^2 + \frac{25}{2} = 36$

$\hookrightarrow MH^2 = \frac{47}{2} \rightarrow MH = \frac{\sqrt{94}}{2}$

$$(3m-2)x + (2-m)y - 7 = 0 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{معمولاً } m=5 \quad .5$$

$$(m+1)x - (2m-4)y + 1 = 0 \rightarrow y = \frac{-(m+1)}{-(2m-4)} x = \frac{1}{-(2m-4)}$$

$$(2-m)y = -(3m-2)x + 7 \rightarrow y = \frac{-(3m-2)}{(2-m)} x + \frac{7}{(2-m)}$$

$$m_1 \times m_2 = -1 \rightarrow (3m-2)(m+1) = (2-m)(2m-4) \rightarrow 2m^2 - 13m + 18 = 0$$

برای معادله درجه دوم: $\Delta < 0 \rightarrow$ هیچ جوابی ندارد!

$$AB: x+2y=3, AC: y=2x-1, BC: x+y=4 \quad .6$$

$$AM \rightarrow \text{مساحت} \quad AH \rightarrow \text{ارتفاع} \rightarrow \frac{AM}{AH} = \frac{1}{2} \quad A = 2x-1 = \frac{3}{2} - \frac{1}{2}x \rightarrow \frac{3}{2}x = \frac{5}{2} \rightarrow x=1, y=1$$

$$B = \frac{3}{2} - \frac{1}{2}x = \frac{3}{2} - \frac{1}{2} = 1 \rightarrow x=2, y=-1 \quad C = 4-x = 2 \rightarrow x=2, y=2 \rightarrow \frac{3}{2}x = \frac{9}{2} \rightarrow y = \frac{3}{2}$$

$$M \left| \begin{array}{l} \frac{1}{2} \\ \frac{3}{2} \end{array} \right. \rightarrow AM = \sqrt{\frac{4}{9} + \frac{1}{9}} = \frac{\sqrt{5}}{3} \rightarrow m_{BC} = 1 \rightarrow y = x-4 \rightarrow H = x-4 = -x+2 \rightarrow x=3, y=-1$$

$$m_{AH} = -1 \rightarrow y = -x+2 \quad AH = \sqrt{4+4} = 2\sqrt{2} \rightarrow \frac{AM}{AH} = \frac{\frac{\sqrt{5}}{3}}{2\sqrt{2}} = \frac{\sqrt{5}}{6\sqrt{2}}$$

$$m = -\frac{1}{2} \quad Od = \sqrt{20} \quad AB = 8 \quad .7$$

$$\rightarrow y = -\frac{1}{2}x + c \xrightarrow{\text{از } O} x+2y-c=0 \rightarrow x=0 \rightarrow y=c \rightarrow (0, c)$$

$$\rightarrow x=0 \rightarrow x=2c \rightarrow (2c, 0)$$

$$AB = \sqrt{20}$$

$$d = \frac{|0+0-c|}{\sqrt{5}} = \sqrt{20} \rightarrow |c| = \sqrt{20} = 2\sqrt{5} \rightarrow c = \pm 2\sqrt{5} \rightarrow AB = \sqrt{(1-0)^2 + (2\sqrt{5}-0)^2}$$

$$\rightarrow (-3) \text{ ضرب } 3, -2+\sqrt{5}, -2-\sqrt{5}$$

مقادیر m

$$my - 2x = 2m, y + mx = x+2 \rightarrow S_{\Delta} = \frac{d}{2} = S = \frac{1}{2} \left| m + \frac{2}{m-1} \right| \quad .8$$

$$y = \frac{2}{m}x + 2 \rightarrow y = (1-m)x + 2 \rightarrow y=0 \quad \left. \begin{array}{l} A(0,2) \\ B(-\frac{2}{m}, 0) \\ C(-\frac{2}{m-1}, 0) \end{array} \right\}$$

$$\text{نقاط برخورد خطوط} \rightarrow 0 = \frac{2}{m}x + 2 \rightarrow x = -\frac{2}{m} \quad 0 = (1-m)x + 2 \rightarrow x = -\frac{2}{1-m} \rightarrow \frac{2}{m}x + 2 = (1-m)x + 2 \rightarrow x = 0 \rightarrow \frac{2}{m} - 1 + m = 0$$

$$y = 2x - 3 \quad \text{نسبت } M(2, -2) \quad .9$$

$$2 = \frac{2+x_{B'}}{2} \rightarrow x_{B'} = 2$$

$$-3 = \frac{0+y_{B'}}{2} \rightarrow y_{B'} = -6$$

$$\left. \begin{array}{l} \\ \end{array} \right\} d' = y = 2x - 1$$

$$A(1, r) \quad y = n + d \rightarrow A'(a, b) \quad r b - a = r \quad .10$$

$$m = -1 \rightarrow y - r = -(n - 1) \rightarrow y = -n + r$$

$$M = -n + r = n + d \rightarrow rn = -r \rightarrow n = -1 \rightarrow y = \varepsilon \rightarrow M \quad \left| \begin{array}{l} \frac{1+a}{r} = -1 \rightarrow a = -r \\ \frac{r+b}{r} = \varepsilon \rightarrow b = 4 \end{array} \right.$$

$$r b - a = 1r + r(-1) = 0$$
