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$MAB = \frac{-2-1}{4-2} = \frac{-14}{2} = -7$ شیب عمود منتهی $\rightarrow \left(\frac{1}{7}\right)$ نقطه وسط خط $\Rightarrow x = \frac{2+4}{2} = 3$ $y = \frac{1-2}{2} = -\frac{1}{2} \rightarrow (3, -\frac{1}{2})$ معادله $AB \Rightarrow y - 1 = \frac{1}{7}(x - 3) \Rightarrow y = \frac{1}{7}x - \frac{3}{7} + 1 \Rightarrow y = \frac{1}{7}x + \frac{4}{7}$ $\boxed{7y = x + 4}$	۱
معادله $BC \Rightarrow y = -\frac{4}{5}x + \frac{5}{5}$ طول $BC = \sqrt{(-4-1)^2 + (5-2)^2} = \boxed{5}$ معادله $AC \Rightarrow y = \frac{5}{4}x - \frac{5}{4}$ طول $AC = \sqrt{(\frac{5}{4}-2)^2 + (-\frac{5}{4}-1)^2} = \sqrt{\frac{25}{16} + \frac{81}{16}} = \sqrt{\frac{106}{16}} = \frac{\sqrt{106}}{4}$ معادله $AB \Rightarrow y = \frac{1}{7}x + \frac{4}{7}$ طول $AB = \sqrt{(\frac{1}{7}-2)^2 + (\frac{4}{7}-1)^2} = \sqrt{\frac{1}{49} + \frac{1}{49}} = \sqrt{\frac{2}{49}} = \frac{\sqrt{2}}{7}$ معادله $BC, AC \Rightarrow \begin{cases} -\frac{4}{5}x + \frac{5}{5} = \frac{5}{4}x - \frac{5}{4} \\ \frac{5}{4}x - \frac{5}{4} = \frac{1}{7}x + \frac{4}{7} \end{cases} \Rightarrow \begin{cases} x = \frac{5}{9} \\ y = -\frac{1}{9} \end{cases}$ نقطه $H = (\frac{5}{9}, -\frac{1}{9})$ $\Rightarrow \begin{cases} x = \frac{5}{9} \\ y = -\frac{1}{9} \end{cases}$ $\Rightarrow \sqrt{\frac{100}{81} + \frac{1}{81}} = \sqrt{\frac{101}{81}} = \frac{\sqrt{101}}{9}$ اضلاع $BC, AC \Rightarrow 5 - 2 = \boxed{3}$	۲
$4y - x - 7 = 0 \rightarrow 4y - 2x - 14 = 0$ $4y - 5x - 5 = 0 \rightarrow 4y - 2x - 2 = 0$ $\frac{14-2}{4-4} = \frac{12}{0}$ $\Rightarrow$ خط موازی $\frac{14-2}{4-4} = \frac{12}{0} = \frac{4\sqrt{5}}{10} = \frac{2\sqrt{5}}{5}$ مساحت $= \pi r^2 \Rightarrow \pi \frac{4d}{2d} = \frac{9}{5} \pi r^2 \Rightarrow \pi = \frac{27}{5} r^2$	۳
نقطه $M = (\frac{2+4}{2}, \frac{1+2}{2}) = (3, \frac{3}{2})$ معادله $AB \Rightarrow \text{شیب} = -1 \Rightarrow y = -x + 4$ معادله $AC \Rightarrow \text{شیب} = 1 \Rightarrow y = x - 2$ معادله $BC \Rightarrow \text{شیب} = \frac{1}{2} \Rightarrow y = \frac{1}{2}x + \frac{3}{2}$ معادله $AB, AC \Rightarrow \begin{cases} x - 2 = -x + 4 \\ x - 2 = \frac{1}{2}x + \frac{3}{2} \end{cases} \Rightarrow \begin{cases} x = 3 \\ y = \frac{3}{2} \end{cases}$ نقطه $H = (\frac{3}{2}, \frac{3}{2})$ $\Rightarrow \begin{cases} x = \frac{3}{2} \\ y = \frac{3}{2} \end{cases}$	۴
$(m+1)x - (2m-4)y + 1 = 0 \xrightarrow{\text{شیب}} \left(\frac{m+1}{2m-4}\right)$ $(3m-2)x + (5-m)y - 7 = 0 \xrightarrow{\text{شیب}} \frac{-(3m-2)}{5-m}$ برای اینکه خطها موازی باشند شیبها برابر باشند $\Rightarrow \left(\frac{m+1}{2m-4}\right) = \frac{-(3m-2)}{5-m} \Rightarrow \frac{m+1}{2m-4} = \frac{-(3m-2)}{5-m} \Rightarrow \frac{m+1}{2m-4} = \frac{-(3m-2)}{5-m}$ $\Rightarrow (m+1)(5-m) = -(3m-2)(2m-4) \Rightarrow 5m + 5 - m^2 - 5m = -6m^2 + 14m - 8 \Rightarrow 5m + 5 - m^2 - 5m = -6m^2 + 14m - 8$ $\Rightarrow 5m + 5 - m^2 - 5m = -6m^2 + 14m - 8 \Rightarrow 5m + 5 - m^2 - 5m = -6m^2 + 14m - 8$ $\Rightarrow 5m + 5 - m^2 - 5m = -6m^2 + 14m - 8 \Rightarrow 5m + 5 - m^2 - 5m = -6m^2 + 14m - 8$	۵

$$y = -\frac{x+1}{2} \Rightarrow AB \quad M_{b \rightarrow a} \Rightarrow \left(\frac{x_0}{2}, -\frac{1}{2} \right) \xrightarrow{AH} y = \frac{2\sqrt{2}}{10}x - \frac{1\sqrt{2}}{5}$$

$$y = 2x - 1 \Rightarrow AC \quad \text{Slopes } MC \xrightarrow{AH} \frac{1}{10} \quad AH \xrightarrow{AH} \boxed{-10} \quad \begin{cases} k_M + k_y = 4 \\ y - k_M = -1 \rightarrow A(1,1) \end{cases}$$

$$y = -x + 1 \Rightarrow BC \quad \text{Slopes } MC \xrightarrow{AH} \frac{1}{10} \quad AH \xrightarrow{AH} \boxed{-10} \quad AH = \sqrt{F}$$

$A\left(\frac{d}{2}, \frac{1}{2}\right)$
 $B(d, -1)$
 $C\left(\frac{d}{2}, -\frac{1}{2}\right)$
 $\frac{AM}{AH} \Rightarrow \frac{\frac{2\sqrt{2}}{10}x - \frac{1\sqrt{2}}{5}}{-10x + 19}$
 $AM = \frac{\sqrt{10}}{2}$
 $B(d, -1) \quad C\left(\frac{d}{2}, \frac{1}{2}\right) \quad M\left(\frac{1}{2}, \frac{1}{2}\right)$

$$y = -\frac{1}{2}x + c \Rightarrow y + \frac{1}{2}x - c = 0 \quad (0,0) \text{ slope } \frac{1-c}{1+\frac{1}{2}} = \sqrt{2}$$

$$| -c | = \sqrt{2} \times \sqrt{\frac{1}{2}} \Rightarrow | -c | = d \rightarrow c = \pm d$$

$$c \Rightarrow d \Rightarrow y = -\frac{1}{2}x + d \quad \text{Slopes } A \text{ to } B \Rightarrow y = (0, d), x = (1, 0)$$

$$c \Rightarrow -d \Rightarrow y = -\frac{1}{2}x - d \quad \text{Slopes } A \text{ to } B \Rightarrow y = (0, -d), x = (1, 0)$$

$$A \text{ to } B < \frac{\sqrt{(-1-0)^2 + (d-0)^2}}{\sqrt{(1-0)^2 + (0-d)^2}} \Rightarrow \sqrt{1+d^2} \Rightarrow \sqrt{d^2+d^2} \Rightarrow d\sqrt{2}$$

$$SD = \left| \frac{m^r - m + k}{r(m-1)} \right| \left| r k_y \frac{1}{r} - \frac{a}{r} \right|$$

$$\hookrightarrow m = r, \quad m^r + k_{m-1} = 0$$

$$r_{x-1} = -r \quad \frac{c}{a} = -1$$

$$x' = x - r \Rightarrow x = x' + r \quad \frac{\alpha + 0}{r} = r \rightarrow \alpha = r$$

$$y' = y + r \Rightarrow y = y' - r \quad \frac{\beta - r}{r} = -r \rightarrow \beta = -1$$

$$y' - r = r(x' + r) - r \Rightarrow y' = rx' + r^2 + r$$

$$\boxed{y' = rx' + r^2}$$

$$y = x + d \Rightarrow x - y + d = 0 \quad (a=1) \quad (b=-1) \quad (c=d)$$

$$\text{Slope } \Rightarrow d = \frac{ax_0 + by_0 + c}{a^2 + b^2} \Rightarrow x = x_0 - rad, y = y_0 - rbd$$

$$d = \frac{1 \times 1 + (-1)(r) + d}{2} \Rightarrow \frac{1 - r + d}{2} \Rightarrow \frac{r}{2} = \boxed{r}$$

$$\left. \begin{aligned} x &= 1 - r \times 1 \times r = 1 - r = -r \\ y &= r - r \times (-1) \times r = r + r = 2r \end{aligned} \right\} (-r, 2r) \rightarrow r(b-a) = 1r + r = \boxed{1d}$$