

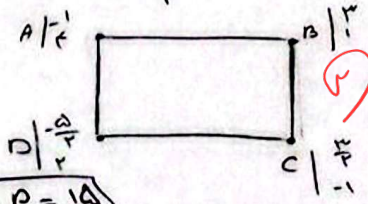
$$m_{AB} = -\frac{1}{r} = \frac{m-k}{k-(-r)} = \frac{m-k}{4} \rightarrow m-k = -r$$

$$AB = \sqrt{(m-k)^2 + (r-(-r))^2} = \sqrt{(-r)^2 + 4r^2} = \sqrt{5}r$$

$$S = (AB)^2 = (\sqrt{5}r)^2 = \boxed{5r^2}$$

$$m_A + m_C = m_B + m_D \rightarrow -1 + m = r + (-1-m) \Rightarrow 2m = r \rightarrow m = \frac{r}{2}$$

$$m_{AB} \times m_{AD} = -1 \rightarrow -\frac{r}{2} \times \frac{1-y}{\frac{r}{2}} = -1 \rightarrow y = -1$$



$$\left. \begin{aligned} AB = CD &= \sqrt{(r-(-1))^2 + (r-(-1))^2} = \frac{5}{r} \\ BD = AC &= \sqrt{(\frac{r}{2})^2 + (r)^2} = \frac{5}{r} \end{aligned} \right\} P = 2 \times (\frac{5}{r} + \frac{5}{r}) \rightarrow \boxed{P = 10}$$

$$rm + (m^2-1)y = r \rightarrow y = \frac{rm}{-m^2+1} + \frac{r}{m^2-1}$$

$$Q = \tan(\alpha) = \sqrt{r} \rightarrow \frac{rm}{1-m^2} = \sqrt{r} \rightarrow \sqrt{r}m^2 + rm - \sqrt{r} = 0 \rightarrow (m + \frac{r}{\sqrt{r}})(m - \frac{1}{\sqrt{r}}) = 0$$

$$\left. \begin{aligned} m_1 &= \frac{r}{\sqrt{r}} = -\sqrt{r} \\ m_2 &= \frac{1}{\sqrt{r}} = \frac{\sqrt{r}}{r} \end{aligned} \right\} |m_1 - m_2| = \left| -\frac{r}{\sqrt{r}} - \frac{1}{\sqrt{r}} \right| = \boxed{\frac{r}{\sqrt{r}} + \frac{1}{\sqrt{r}}}$$

$$A(1, 9) \quad B(r, r) \quad C(v, 11)$$

$$m_{AC} = \frac{11-r}{v-r} = \frac{1}{r} = r \rightarrow y = rm - r \rightarrow y - rm + r = 0$$

$$AH = \frac{|19 - r + r|}{\sqrt{1+r}} = \frac{10}{\sqrt{5}} = \boxed{2\sqrt{5}}$$

$$AB: y + rm = v \rightarrow y = -rm + v$$

$$BC: ry - vm = -19 \rightarrow y = \frac{v}{r}m - \frac{19}{r}$$

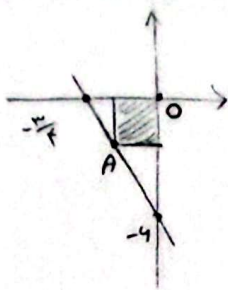
$$AC: ry - rm = 1v \rightarrow y = \frac{r}{r}m + \frac{1v}{r}$$

$$BH = \frac{|1 - r + r + 19|}{\sqrt{1+r}} = \frac{20}{\sqrt{2}} = \boxed{10\sqrt{2}}$$

$$B: -rm + v = \frac{v}{r}m - \frac{19}{r} \rightarrow \frac{11}{r}m = \frac{r}{r} \rightarrow m = r$$

$$y = 1$$

$$B(r, 1)$$



$$(0, -4), \left(-\frac{4}{\sqrt{2}}, 0\right)$$

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

$$A(m, m) \rightarrow y = x \rightarrow m = -\sqrt{2}m - 4 \rightarrow 9m = -4 \rightarrow m = -\frac{4}{9}$$

$$\Rightarrow A\left(-\frac{4}{9}, -\frac{4}{9}\right)$$

$$OA = \sqrt{\left(\frac{4}{9}\right)^2 + \left(\frac{4}{9}\right)^2} = \left|\frac{4}{9}\sqrt{2}\right| = \frac{4\sqrt{2}}{9}$$

$$y - am = 1 \rightarrow y = am + 1$$

$$ay - m = a - 1 \rightarrow y = \frac{m}{a} + 1 - \frac{1}{a}$$

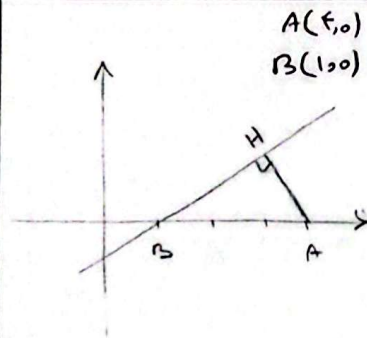
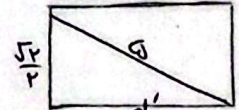
$$a=1 \rightarrow y = m + 1 \rightarrow y = m \rightarrow d = \frac{|1-0-1|}{\sqrt{1}} = \frac{1}{\sqrt{1}}$$

$$a=-1 \rightarrow y = -m + 1 \rightarrow y = -m + 2$$

نقطة (1, 2) هي نقطة تقاطع المستقيمان.

$$d' = \frac{1}{\sqrt{2}}$$

$$S = dd' = \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = \left|\frac{1}{2}\right| = \frac{1}{2}$$



$$x - 4y = 1 \rightarrow x - 4y - 1 = 0$$

$$AH = d = \frac{|4-0-1|}{\sqrt{1+16}} = \frac{3}{\sqrt{17}}$$

$$BA = 5$$

$$BH = 5 - \frac{3}{\sqrt{17}} = \frac{5\sqrt{17}-3}{\sqrt{17}}$$

$$S = \frac{1}{2} \times \frac{3}{\sqrt{17}} \times \frac{5\sqrt{17}-3}{\sqrt{17}} = \frac{15-9}{2} = \frac{3}{2}$$

$$m = \frac{b-a}{\frac{1}{a} - \left(-\frac{1}{a}\right)} = \sqrt{2} \rightarrow b-a = \frac{\sqrt{2}}{2}$$

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

$$d = \sqrt{2} \times \frac{1}{\sqrt{2}} = 1$$

$$r_{\text{محور}} = r_{\text{محور}} = \sqrt{r^2 + r^2} = \sqrt{2}r$$

$$mL = \frac{-1}{\frac{0+r}{0+r}} = -\frac{r}{r} \rightarrow L: y = -\frac{r}{r}x - \frac{r}{r} \rightarrow mL = -1$$

$$L': y = \frac{r}{r}x + \frac{r}{r}$$

$$\Rightarrow \begin{cases} 12y + 9x = -10 \\ 12y - 14x = 100 \end{cases} \rightarrow \begin{cases} 9x = -110 \\ y = -1 \end{cases} \rightarrow \boxed{xy = 110}$$