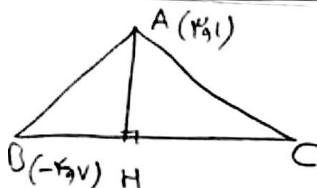
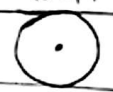
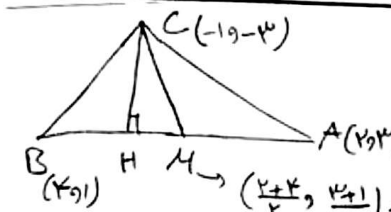


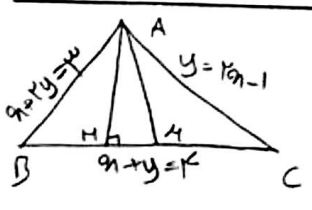
1- $m = \frac{-4-1}{k-2} = \frac{-1k}{2} = -\frac{k}{2}$ $\Rightarrow y = -\frac{k}{2}x + b \rightarrow b = \frac{k}{2} \Rightarrow y = -\frac{k}{2}x + \frac{k}{2}$
 $M = (\frac{k+2}{2}, \frac{1-4}{2}) = (\frac{k+2}{2}, -\frac{3}{2})$
 $vy = x + k$

2-  $m_{BC} = \frac{1-1}{-1+1} = \frac{-k}{2} \Rightarrow y = -\frac{k}{2}x + b \rightarrow b = \frac{k}{2} \Rightarrow y = -\frac{k}{2}x + \frac{k}{2}$
 $AH = \frac{|(-1 \times 1) + (-1 \times 1) + \frac{k}{2}|}{\sqrt{(-1)^2 + (-1)^2}} = \frac{10}{2} = 5$
 $BC = \sqrt{(-1-1)^2 + (1-3)^2} = 2\sqrt{2} \Rightarrow BC - AH = 2\sqrt{2} - 5$

3-  $ky = ax + 2 \Rightarrow \frac{a}{k} = \frac{1}{2} \rightarrow a = \frac{k}{2}$
 $\begin{cases} 2x - ky + 2 = 0 \\ -x + 2y - 1 = 0 \end{cases} \xrightarrow{x=1} \begin{cases} 2 - k + 2 = 0 \\ -1 + 2 - 1 = 0 \end{cases} \Rightarrow k = 4$
 $S_{\text{circle}} = (\frac{10}{\sqrt{5}})^2 \pi = 20\pi$
 $\frac{|2-1k|}{\sqrt{k^2+4}} = \frac{12}{2\sqrt{5}} = \frac{6}{\sqrt{5}} \Rightarrow \frac{1}{\sqrt{5}} = \frac{6}{\sqrt{5}} \Rightarrow \frac{1}{\sqrt{5}} = \frac{6}{\sqrt{5}}$

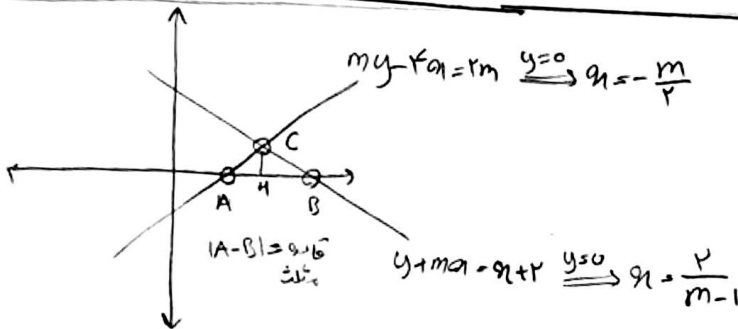
4-  $m_{AB} = \frac{1-1}{1-1} = -1 \Rightarrow m_{CH} = 1 \Rightarrow y = x + b \rightarrow b = -1 \Rightarrow y = x - 1$
 $m_{AC} = \frac{1-3}{1-(-1)} = -1 \Rightarrow m_{BH} = 1 \Rightarrow y = x + b \rightarrow b = 0 \Rightarrow y = x$
 $M = (\frac{1+1}{2}, \frac{1+1}{2}) = (1,1)$
 $AH = \sqrt{(1-1)^2 + (1-1)^2} = 0$

5- $m_1 = -\frac{3m-2}{a-m} \Rightarrow \frac{a-m}{3m-2}$ و $m_2 = -\frac{m+1}{-(2m-1)} = \frac{m+1}{2m-1} \Rightarrow \frac{m+1}{2m-1} = \frac{a-m}{3m+2}$
 $3m^2 + am + 2 = -2m^2 + km - 2 \Rightarrow am^2 - 4m + 4 = 0 \Rightarrow \Delta < 0 \Rightarrow$ m_1, m_2 حقیقی و متمایز نیستند

6-  $\begin{cases} 2x-1 = k-x \rightarrow x_C = \frac{a}{2} \text{ و } y_C = \frac{1}{2} \\ 2x-1 = \frac{1-x}{2} \rightarrow x_A = 1 \text{ و } y_A = 1 \\ \frac{1-x}{2} = k-x \rightarrow x_B = a \text{ و } y_B = -1 \end{cases}$
 $M = (\frac{\frac{a}{2}+a}{2}, \frac{\frac{1}{2}-1}{2}) = (\frac{3a}{4}, -\frac{1}{4})$
 $AH = \sqrt{(\frac{3a}{4}-1)^2 + (-\frac{1}{4}-1)^2} = \frac{a\sqrt{5}}{4}$ و $AH = \frac{|1+1-k|}{\sqrt{1+1}} = \frac{2}{\sqrt{2}} = \sqrt{2} \Rightarrow \frac{AH}{AH} = \frac{\frac{a\sqrt{5}}{4}}{\sqrt{2}} = \frac{a\sqrt{5}}{4\sqrt{2}} = \frac{a\sqrt{10}}{8}$

$m = -\frac{1}{r} \Rightarrow y = -\frac{1}{r}x + b \xrightarrow{y=0} y=b \Rightarrow B=(0, b)$
 $\xrightarrow{x=0} x=r b \Rightarrow A=(r b, 0)$
 از طرفی: $\frac{|0+0+b|}{\sqrt{(\frac{1}{r})^2+1}} = \sqrt{20} \Rightarrow |b| = \omega \rightarrow b = \omega$
 $AB = \sqrt{10^2 + \omega^2} = \sqrt{120} = \omega\sqrt{3}$
 $B = (0, \omega)$
 $A = (10, \omega)$

چون فاصله رو می‌خواه
 متغی را مثبت برون می‌فرقی
 نمی‌کنه



$C = \text{محل تقاطع دو خط مستقیم}$ و $CH = \text{ارتفاع}$ = عرض نقطه $C \Rightarrow \frac{my - 2m}{r} = \frac{y - 2}{1 - m} \Rightarrow ry - 1 = (my - 2m)(1 - m) \rightarrow$
 $ry - my + m^2y = 1 - 2m + 2mr \rightarrow y = \frac{1 - 2m + 2mr}{m^2 - m + 1} = \frac{r(m^2 - m + 1)}{m^2 - m + 1} = r$
 $\frac{rx \left(\frac{r}{m-1} + \frac{m}{r} \right)}{r} = \frac{\omega}{r} \Rightarrow m^2 - m + 1 = \omega m + \omega \rightarrow m^2 + 4m - 1 \xrightarrow{\Delta \pm} \frac{C}{\omega} = -1$
 $m^2 - 4m + 9 = 0 \rightarrow m = 3$

$B + B' = M \Rightarrow B = \frac{M + B'}{2} \Rightarrow B = \frac{(1, 2) + (-1, 2)}{2} = (0, 2)$
 $-k - y_{B'} = r(k - x_{B'}) - p \Rightarrow y_{B'} = 2x_{B'} - 9$

$m_{AA'} = -1 \rightarrow y = -x + b \rightarrow b = 3 \Rightarrow y = -x + 3$
 $A(1, 2) \rightarrow y = 2x + \omega$
 $A'(-1, 2) \rightarrow y = 2x - 3$
 $\frac{A + A'}{2} = M \Rightarrow \frac{1 + (-1)}{2} = 0, \frac{2 + 2}{2} = 2 \Rightarrow M(0, 2)$
 $2b - a = 2(4) - (-3) = 11$
 $A' = \frac{2M - A}{2} = \frac{2(0, 2) - (1, 2)}{2} = \left(-\frac{1}{2}, 1 \right)$