

نام و نام خانوادگی: (السید علی خاوری) پاسخنامه تشریحی تکلیف شماره ۱۷ کلاس ۱۲ ریاضی دوم دبیرستان

$B(2, m)$ و $A(-2, K)$ $y = -\frac{1}{4}x + b$ $B(2, m)$ $m = -2 + b$
 $A(-2, K)$ $K = 1 + b$

فاصله B, A (نقطه‌ای) $= \sqrt{(y_A - y_B)^2 + (x_A - x_B)^2} \Rightarrow \sqrt{(1 + b - m)^2 + (-4 - 2)^2} = \sqrt{4^2 + 4^2} = 4\sqrt{2}$
 مساحت $= \text{ضلع} \times \text{ضلع} \Rightarrow S = \sqrt{4\omega} \times \sqrt{4\omega} = \boxed{4\omega}$

$m_{AB} = m_{CD} \Rightarrow m_{AB} = \frac{4-1}{-1-3} = -\frac{3}{4}$ $m_{CD} = \frac{y+3-y}{-1-x-x} = \frac{3}{-1-2x} = -\frac{3}{4}$

برای اینکه دو نقطه مرکز یک دایره باشند، باید در یک خط باشند
 $C(\frac{3}{4}, y)$ و $D(-\frac{3}{4}, y+3) \Rightarrow AC = BD \Rightarrow \sqrt{(y_C - y_A)^2 + (x_C - x_A)^2} = \sqrt{(y_D - y_B)^2 + (x_D - x_B)^2}$
 $= \sqrt{(\frac{3}{4})^2 + (y-4)^2} = \sqrt{(\frac{11}{4})^2 + (y+1)^2} \xrightarrow{\text{مربع کردن}} \frac{9}{16} + y^2 - 8y + 16 = \frac{121}{16} + y^2 + 2y + 1 \Rightarrow 14y = 14 - \frac{121}{16} + \frac{9}{16} \Rightarrow y = 1$
 $\Rightarrow y = 1 \Rightarrow C(\frac{3}{4}, 1)$ و $D(-\frac{3}{4}, 4) \Rightarrow m_{AD} = \frac{4}{-1} = -4 = -\frac{1}{m_{AB}} \Rightarrow$ متعامد است $ABCD \Rightarrow AD = \sqrt{1^2 + (\frac{11}{4})^2} = \frac{5}{4}\sqrt{5}$ $AB = \sqrt{3^2 + 4^2} = 5 \Rightarrow \boxed{\frac{5}{4}\sqrt{5}}$

$(m^2 - 1)y = -2mx + 3 \Rightarrow y = \frac{-2m}{m^2 - 1}x + \frac{3}{m^2 - 1}$

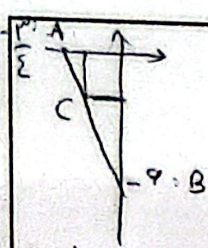
$\tan 45^\circ = \sqrt{3} = \frac{-2m}{m^2 - 1} \Rightarrow \sqrt{3}m^2 - \sqrt{3} = -2m \Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0$
 $m^2 + 2m - 3 = 0 \Rightarrow m = 1$ $\Rightarrow m_1 = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ $m_2 = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$
 $\Rightarrow m_1 - m_2 = \frac{\sqrt{3}}{3} - (-\frac{\sqrt{3}}{3}) = \frac{2\sqrt{3}}{3} = \boxed{\frac{2\sqrt{3}}{3}}$

میانگین B, C $\Rightarrow m_{BC} = \frac{1}{4}$ $2 \Rightarrow y - 3 = 2(x - 4) \Rightarrow y = 2x - 5 \Rightarrow y - 2x + 5 = 0$

فاصله A از خط BC $\Rightarrow d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}} \Rightarrow \frac{|9 - 2 + 5|}{\sqrt{1^2 + 2^2}} = \frac{12}{\sqrt{5}} = \boxed{\frac{12\sqrt{5}}{5}}$

$AB: y = 2x + 1 \Rightarrow -2x + 12 - 7x = -19 \Rightarrow x = 4, y = 1 \Rightarrow B(4, 1)$
 $BC: 2y - 7x = -19$

فاصله A از خط BC $\Rightarrow d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}} \Rightarrow \frac{|14 - 28 - 19|}{\sqrt{4 + 49}} = \frac{33}{\sqrt{53}} = \boxed{\frac{33\sqrt{53}}{53}}$



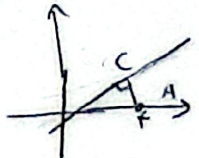
$A \mid \begin{pmatrix} -\frac{3}{2} \\ 0 \end{pmatrix}$ $m_{AB} = \frac{-4-0}{4-0} = -1 \Rightarrow y+4 = -1(x) \Rightarrow y = -x-4$
 $B \mid \begin{pmatrix} 0 \\ -4 \end{pmatrix}$ $C \mid \begin{pmatrix} x \\ -x-4 \end{pmatrix}$

دایره مماسی C از محورهای مختصات و مربع برابر است.
 $d = \frac{|-x-4|}{\sqrt{1}} = |-x-4| \Rightarrow |-x-4| = 1 \Rightarrow x = -5 \text{ or } x = -3$
 $d = \frac{|x|}{\sqrt{1}} = |x| \Rightarrow |x| = 1 \Rightarrow x = 1 \text{ or } x = -1$
 $x = -x-4 \Rightarrow 2x = -4 \Rightarrow x = -2 \Rightarrow y = -2$
 $x = -x-4 \Rightarrow 2x = -4 \Rightarrow x = -2 \Rightarrow y = -2$

$y = am + 1$ $a = \frac{1}{a} \Rightarrow a^2 - 1 = 0 \Rightarrow a = 1 \text{ or } a = -1$
 $ay = n + a \cdot 1 \Rightarrow y = \frac{1n}{a} + \frac{a-1}{a}$

① $y = m+1$ $y = n$ $y = 2n+1$ $r = 1+\sqrt{2}$
 ② $y = -m+1$ $y = -n+1$ $r = 1+\sqrt{2}$
 $y = m-1$ $y = -n-1$ $r = 1+\sqrt{2}$
 $y = -m-1$ $y = n-1$ $r = 1+\sqrt{2}$

$y = \frac{1}{r}n - \frac{1}{r}$ $m_{AC} = -3 \Rightarrow y = -3(x-4) \Rightarrow y = -3x+12$
 $y = -3x+12$ $-3x+12 = \frac{1}{r}n - \frac{1}{r} \Rightarrow \frac{3}{x} = \frac{1}{r} \Rightarrow x = \frac{3r}{1}$



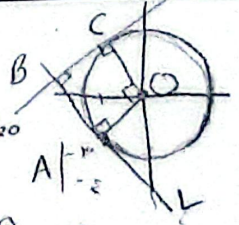
اگر $(\frac{1}{r}, \frac{1}{r})$ باشد، بخواهیم نقطه مماسی B را بیابیم.

$AC = \sqrt{3^2 + 12^2} = 13$ $BC = \sqrt{1^2 + 1^2} = \sqrt{2}$ $S = AB \times BC = \frac{13\sqrt{2}}{2}$

$y = \sqrt{3}x + b$ $b = -\frac{\sqrt{3}}{3} + b$
 $y = \sqrt{3}x + 3$ $a = -\frac{\sqrt{3}}{3} + b$

$d = \sqrt{(-\frac{1}{3} + \frac{1}{3})^2 + (-\frac{\sqrt{3}}{3} + b - b)^2} = \sqrt{\frac{1}{9} + \frac{3}{9}} = \frac{2}{3}$
 فاصله نقطه از خط = $\frac{2}{3}$

$m_{OA} = \frac{4}{3} \Rightarrow m_{BC} = \frac{3}{4} \Rightarrow BC: y = \frac{3}{4}x + b$
 $AO \parallel BC$



$m_{AB} = -\frac{3}{4} \Rightarrow y+2 = -\frac{3}{4}(x+4) \Rightarrow y = -\frac{3}{4}x - 5$
 $m = -\frac{3}{4}$ $y = -\frac{3}{4}x - 5$