نام و نام خانوادگی .... پاسخنامه تشریحی تکلیف شماره .... کلاس ۱۵

۱ (۲)

$\frac{K-m}{-2-4} = \frac{K-m}{-6} = -\frac{1}{2} \to K-m=3$

$\sqrt{(2-6)^2+(K-m)^2} \to \sqrt{(-4)^2+3^2} = \sqrt{16+9} = \sqrt{25} = 5$

$S = 5^2 = (\sqrt{25})^2 = 25$ ✓

۲ (۱)

$x_A + x_C = x_B + x_D \quad -1+x = 3-1-x \to 2x = 3 \to x = \frac{3}{2}$ ✓

$m_{BD} = \frac{1-y-3}{3+1+\frac{3}{2}} = \frac{-2-y}{\frac{11}{2}} \to m' = -\frac{1}{m} = -\frac{1}{\frac{-2-y}{\frac{11}{2}}} = \frac{\frac{11}{2}}{2+y} \to 22 = -6-3y = 28 = -3y \quad y = \cancel{-\frac{28}{3}}$

$AB = \sqrt{\Delta x^2+\Delta y^2} \to \sqrt{(-1-3)^2+(4-1)^2} = \sqrt{(-4)^2+3^2} = 5$ ✓ $\quad AD = \sqrt{(-1+\frac{3}{2})^2+(4+\frac{28}{3})^2} = 10,44$

$P = 2(AB+AD) \to 2(5+10,44) = 2(15,44) = 30,88$

۳ (۰)

$\tan\theta = \left|\frac{m_1-m_2}{1+m_1m_2}\right| \to \sqrt{3} = \left|\frac{m_1-m_2}{1+m_1m_2}\right| \to |m_1-m_2| = \sqrt{3}\,|1+m_1m_2|$

$m_2 = \tan(\theta+60) \to \tan(\theta+60°) = \frac{\tan\theta_1 + \tan 60}{1-\tan\theta_1 \tan 60} = \frac{m_1+\sqrt{3}}{1-\sqrt{3}m_1} = m_2$

$|m_2-m_1| = \left|\frac{m_1+\sqrt{3}}{1-m_1\sqrt{3}} - m_1\right| \Rightarrow \left|\frac{m_1+\sqrt{3}-m_1(1-m\sqrt{3})}{1-m\sqrt{3}}\right| = \left|\frac{\sqrt{3}(1+m^2)}{1-m_1\sqrt{3}}\right|$

$\xrightarrow{m_1=0} |m_2-m_1| = \cancel{\sqrt{3}}$

۴ (۲)

$\frac{1}{2}\begin{vmatrix} 1 & 9 & 1 \\ 3 & 3 & 1 \\ 7 & 11 & 1 \end{vmatrix} = \frac{1}{2}(3+63+33-21-27-11) = 20 \quad BC = \sqrt{\Delta x^2+\Delta y^2} = \sqrt{(7-3)^2+(11-3)^2}$

$BC = \sqrt{(7-3)^2+(11-3)^2} = \sqrt{4^2+8^2} = 4\sqrt{5} \quad \frac{BC \times AH}{2} = 20 \to \frac{4\sqrt{5} \times AH}{2} = 20$

$4\sqrt{5} \times AH = 40 \to AH = \frac{10}{\sqrt{5}} \quad \frac{10}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5} = AH$ ✓

۵ (۲)

$B \begin{cases} 3y-7x=-19 \\ y+2x=7 \end{cases} \to x=3 \quad y+2(3)=7 \to y=1 \qquad B \begin{vmatrix} 3 \\ 1 \end{vmatrix}$

$C \begin{cases} 3y-7x=-19 \\ 4y-3x=17 \end{cases} \Rightarrow x=5 \quad 4y = 17+15 = 32 \to 4y=32 \quad y=8 \qquad C \begin{vmatrix} 5 \\ 8 \end{vmatrix}$

$A \begin{cases} y+2x=7 \\ 4y-3x=17 \end{cases} \quad y=5 \quad x=1 \qquad A \begin{vmatrix} 1 \\ 5 \end{vmatrix}$

$\frac{1}{2}\begin{vmatrix} 1 & 5 & 1 \\ 3 & 1 & 1 \\ 5 & 8 & 1 \end{vmatrix} = \frac{1}{2}(1+25+24-5-8-15) = 11$

$AC = \sqrt{\Delta x^2+\Delta y^2} \to \sqrt{(5-1)^2+(8-5)^2} = \sqrt{4^2+3^2} = 5$

$\frac{5 \times BH}{2} = 11 \to 5BH = 22$

۳

$BH = \frac{22}{5}$ ✓

۶ (۲)

$m_d = \frac{-4-0}{0-\frac{1}{2}} = \frac{-4}{\frac{1}{2}} = -8 \qquad y - y_0 = m(x-x_0) \to y - -4 = -8(x-0)$

$y+4 = -8x \to y = -8x-4 \qquad \begin{cases} y = -8x-4 \\ y = x \end{cases} \to x = -\frac{4}{9}$

$\sqrt{\Delta x^2+\Delta y^2} \to \sqrt{(-\frac{4}{9}-0)^2+(-\frac{4}{9}-0)^2} = \frac{4}{9}\sqrt{2}$ ✓

۷ (۲)

$ay = x + a - 1 \to y = \frac{1}{a}x + \frac{a-1}{a} \qquad a=+1 \to y - x = 1 \xrightarrow{(1,2)} 2-1=1$ ✓

$y = -x+1 \qquad a = \frac{1}{a} \to a^2=1 \to a=\pm 1 \qquad y - x = 0 \to 2-1=0$ ✗

$a=-1 \to -y+x=1 \xrightarrow{(1,2)} -2+1=1$ ✗ $\qquad a=+1 \to \begin{matrix} y-x-1=0 \\ y-x=0 \end{matrix} \qquad \frac{|c'-c|}{\sqrt{a^2+b^2}} = \frac{|-1-0|}{\sqrt{1^2+(-1)^2}}$

$-y-x=-2 \to -2-1=-2$ ✗

$\frac{1}{\sqrt2}$ = فاصله دو خط $\to 5^2-(\frac{1}{\sqrt2})^2 = x^2 \to 25-\frac12 = x^2 \to \frac{49}{2} = x^2 \to x = \frac{7}{\sqrt2} \,/\, S = \frac{7}{\sqrt2}\times\frac{1}{\sqrt2} = \frac{7}{2}$ ✓

۸ (۱/۵)

$\frac{|ax_0+by_0+c|}{\sqrt{a^2+b^2}} \to \frac{|4-3(0)-1|}{\sqrt{1^2+(-3)^2}}$ ارتفاع ✓ $= \frac{3}{\sqrt{10}} = \frac{|c'-c|}{\sqrt{a^2+b^2}} = \frac{|k-1|}{\sqrt{10}} \to |k-1| = 3 \begin{cases} k=4 \\ k=-2 \end{cases}$

$k=4 \to x-3y=-4 \to 3(3)-1/5 = 2$ ✓ $\qquad k=-2 \to x-3y=-2 \to 4/5-1/5=3$ ✗

$x-3y=1 \xrightarrow{y=0} x=1 \qquad B(1, 0)$ ✓

$x=4 \to x-3y=1 \to 4-3y=1 \to 3y=3 \to y=1$

$x-3y=1 \xrightarrow{x=0} -3y=1 \to y=-\frac{1}{3}$ غیر قابل قبول

اول بالا خودت دراوردی $\frac{3}{\sqrt{10}}$!

$C(4, 1)$ فاصله نزدیک‌تر باشد

$S = \frac12 \times$ ارتفاع $\times$ قاعده $= \frac12 (4-1)(1-0) = \cancel{\frac{3}{2}}$ ۴

۹ (۱/۵)

$\frac{a-b}{\frac{1}{2}-\frac{1}{3}} = \sqrt3 \to \frac{a-b}{\frac{-3+2}{6}} = \frac{a-b}{-\frac{1}{6}} = \sqrt3 \qquad a-b = -\frac{\sqrt3}{6} \,/\, \sqrt{\Delta x^2+\Delta y^2}$

قطر = ضلع $\sqrt{2}$ ← قطر $= \frac{\sqrt{2}}{3}$

$\sqrt{(a-b)^2+(-\frac12-\frac13)^2} = \sqrt{(a-b)^2+(-\frac16)^2} = \sqrt{(-\frac{\sqrt3}{6})^2+(-\frac16)^2} = \sqrt{\frac{4}{36}} = \frac{2}{6}$ ✓

$\frac26 \times \frac26 = \frac{4}{36} = S \qquad S = \frac{\text{قطر} \times \text{قطر}}{2} \to \frac{x^2}{2} = \frac{2}{6} \to x^2 = \frac{2}{4} \to x = \sqrt{\frac24} = \frac{\sqrt2}{2}$

۱۰ (۱)

$\sqrt{\Delta x^2+\Delta y^2} = \sqrt{(0-3)^2+(0-4)^2} = 5$ ✓ $\qquad -4(x)+3(-3) = 25 \qquad x(3)+y(4) = r^2$

$-4(x)-3y = 25 \to 4x+3y+25=0 \to m = -\frac{4}{3} \qquad m' = -\frac{1}{m} = -\frac{1}{-\frac43} = \frac34$

$y = \frac34 x \pm 5\sqrt{(\frac34)^2+1} \Rightarrow y = \frac34 x \pm \frac{25}{4} \begin{cases} \text{مماس اول } y = \frac34 x + \frac{25}{4} \to 3x-4y+25=0 \\ \text{مماس دوم } y = \frac34 x - \frac{45}{4} \to 3x-4y-25=0 \end{cases}$

$\begin{matrix} x<0 \\ y>0 \end{matrix}$ ناحیه دوم از $\begin{cases} (-3,3) \to -9-12+25=0 \checkmark \\ (-3,-3) \to -9+12-25=0 \text{ ✗} \end{cases}$

~~$3x-4y+25=0$~~

✓ $\begin{cases} 4x+3y+25=0 \end{cases} \Rightarrow \begin{matrix} x=-7 \\ y=1 \end{matrix}$ ✓ $\qquad x \times y = -7 \times 1 = -7$

۱۲

$$m_{CD} = m_{AB} = -\frac{3}{4} \longrightarrow \frac{3}{-1-2x} = -\frac{3}{4} \rightarrow x = \frac{3}{2}$$

$$m_{AB} \times m_{BC} = -1 \longrightarrow -\frac{3}{4} \times \frac{y-1}{-\frac{3}{2}} = -1 \longrightarrow y = -1$$

$$|AB| = \sqrt{16+9} = 5$$

$$|BC| = \sqrt{\frac{9}{4}+4} = \frac{5}{2}$$

$$\longrightarrow P = 15$$

۱۳

$$\text{شیب} = \frac{2m}{1-m^2} = \tan 60 = \sqrt{3} \rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0$$

اختلاف مقادیر m (ریشه ها) $= \frac{\sqrt{\Delta}}{|a|} = \frac{4}{\sqrt{3}}$

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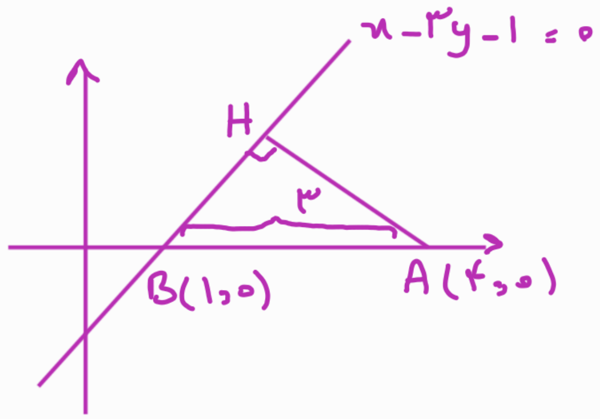
۱۸ ابتدا شکل سوال را رسم کرده و طول ضلع AH را می‌یابیم

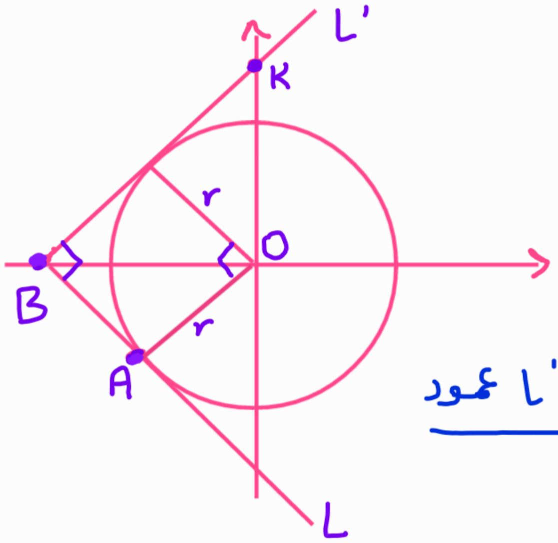


$$|AH| = \frac{|4-0-1|}{\sqrt{9+1}} = \frac{3}{\sqrt{10}}$$

$$\underset{\frac{9}{10}}{\cancel{(AH)^2}} + (BH)^2 = \underset{9}{\cancel{(AB)^2}} \longrightarrow BH = \frac{9}{\sqrt{10}}$$

$$S_{\triangle} = \frac{9}{\sqrt{10}} \times \frac{3}{\sqrt{10}} \times \frac{1}{2} = \frac{27}{20} = 1{,}35$$

۱۵



$$m_{OA} = \frac{4}{3} \xrightarrow{\text{عمود بر } L} m_L = -\frac{3}{4}$$

$$L: y+4 = -\frac{3}{4}(x+3) \to y = -\frac{3}{4}x - \frac{25}{4}$$

$$\xrightarrow{\text{عمود } L \text{ و } L'} m_{L'} = \frac{4}{3} \to L': y - \frac{4}{3}x - K = 0$$

$$OL' = OA = \sqrt{9+16} = 5 \quad \text{شعاع}$$

$$OL' = \frac{|-K|}{\sqrt{1+\frac{16}{9}}} = 5 \to K = \frac{25}{3} \to L': y = \frac{4}{3}x + \frac{25}{3}$$

مختصات B محل تقاطع L و L' $\Rightarrow (-7, -1) \xrightarrow{\text{حاصل ضرب}} \boxed{7}$