

Year: Month: Date: ( )

$$\overline{AB} \rightarrow m = \frac{\Delta y}{\Delta x} = \frac{1 - (-2)}{2 - 2} = \frac{12}{-2} = -6 \rightarrow y = -6x + 12 \quad (1)$$

B و A نقطه وسط (3, 1)

$$\rightarrow \overline{AB} \text{ عمود منصف } \rightarrow m' = \frac{1}{6} \xrightarrow{(3, 1)} y = \frac{1}{6}x + \frac{5}{2} \rightarrow \boxed{6y - x - 15 = 0}$$

A(2, 1) / B(-2, 1) / C(-2, 3)

$$BC \text{ دایره} = \sqrt{(2)^2 + (2)^2} \quad \boxed{\Delta = BC}$$

$$AH \perp BC \rightarrow BC \text{ دایره} \rightarrow m_{BC} = \frac{3 - 1}{-2 - 1} = \frac{2}{-3} \rightarrow BC \rightarrow y = \frac{2}{3}x + \frac{10}{3}$$

$$AH \perp BC \rightarrow m_{AH} = \frac{3}{2} \xrightarrow{A(2, 1)} y = \frac{3}{2}x - \frac{5}{2} \rightarrow H \text{ نقطه تقاطع } AH = BC$$

$$AH = BC \rightarrow \frac{2}{3}x + \frac{10}{3} = \frac{3}{2}x - \frac{5}{2} \rightarrow (\frac{2}{3} - \frac{3}{2})x = -\frac{10}{3} - \frac{5}{2} \rightarrow \frac{4x - 9x}{6} = -\frac{20 + 15}{6} \rightarrow -5x = -35 \rightarrow x = 7$$

$$1 - (\frac{7}{8}, \frac{1}{8}) \leftarrow \begin{cases} 2\Delta x = 3\Delta \rightarrow x = \frac{3\Delta - 7}{2} \\ y = \frac{1}{2} \end{cases}$$

$$\rightarrow AH \rightarrow \left\{ A(2, 1) \right. \\ \left. H(\frac{7}{8}, \frac{1}{8}) \right\} \rightarrow \sqrt{(\frac{15}{8})^2 + (\frac{7}{8})^2} = \sqrt{\frac{225 + 49}{64}} = \sqrt{\frac{274}{64}} = \frac{\sqrt{274}}{8} = \boxed{2} = AH$$

$$\rightarrow |BC| - |AH| = 5 - 2 = \boxed{3} \leftarrow \text{جواب}$$

$$4y - ax - 2 = 0$$

$$2y - x - 12 = 0$$

$$4y - ax - 2 = 0$$

$$4y - 2x - 12 = 0$$

$$\rightarrow a = 2$$

$$\rightarrow d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|-2 - (-12)|}{\sqrt{1 + 4}} = \frac{10}{\sqrt{5}} = \frac{10}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$$

$$\rightarrow r = d = \frac{4\sqrt{5}}{5} \rightarrow r = \frac{4\sqrt{5}}{5} \rightarrow S = Rr^2 = \boxed{\frac{4}{5}\pi}$$



Year. Month. Date. ( )

$$A(2, 3) / B(4, 1) / C(-1, -2)$$

(۴)

$$M \rightarrow AB \text{ خط } \rightarrow M(3, 2)$$

$$AB \text{ خط } \rightarrow m_{AB} = \frac{3-1}{2-4} = \frac{2}{-2} = -1 \rightarrow y = -x + 5 \rightarrow \text{خط } \rightarrow y = x + 2$$

$$\rightarrow H \rightarrow AB, \text{ خط } \rightarrow x + y = -m + 5 \rightarrow y = -x + 5 \rightarrow x = 3, y = 2$$

$$\rightarrow M(2, 3), H(3, 2) \rightarrow \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2} = \sqrt{\frac{1}{2}} = \frac{1}{\sqrt{2}} \rightarrow MH = \frac{\sqrt{2}}{2}$$

$$(3m-2)x + (8-m)y - 1 = 0 \rightarrow (m-1)x - (3m-4)y + 1 = 0$$

(۵)

$$\rightarrow \frac{-3m+2}{8-m} = \frac{-m+1}{-3m+4} \rightarrow \frac{-3m+2}{8-m} = \frac{-3m+4}{1-m} \rightarrow -3m+2 = -3m+4 \rightarrow -10m+3m^2+2-4m = 0$$

$$3m^2 - 10m - 2 = 0 \rightarrow m = \frac{10 \pm \sqrt{100 + 24}}{6} = \frac{10 \pm \sqrt{124}}{6}$$

$$\begin{cases} AB: m+2y=3 \rightarrow 2y = -m+3 \rightarrow y = -\frac{1}{2}m + \frac{3}{2} \\ AC: y=2m-1 \rightarrow y = 2m-1 \\ BC: m+y=4 \rightarrow y = -m+4 \end{cases}$$

$$AB \cap BC \rightarrow \frac{1}{2}m + \frac{3}{2} = -m + 4 \rightarrow m = 2 \rightarrow y = 1 \rightarrow B(2, 1)$$

$$AC \cap BC \rightarrow y = 2m-1 = -m+4 \rightarrow m = \frac{5}{3} \rightarrow y = \frac{7}{3} \rightarrow C(\frac{5}{3}, \frac{7}{3})$$

$$\rightarrow M = \left(\frac{10}{3}, \frac{7}{3}\right) \rightarrow AC \perp AB \text{ برقرار } \rightarrow \frac{1}{2}x + \frac{3}{2} = -m + 4 \rightarrow m = \frac{4}{3} \times \frac{2}{3} = \frac{8}{9}$$

$$\rightarrow x_A = 1, y_A = 1 \rightarrow A(1, 1), AH \perp BC \rightarrow AH \rightarrow y = x$$

$$\rightarrow AM = \sqrt{\frac{49}{9} + \frac{1}{9}} = \sqrt{\frac{50}{9}} = \frac{5\sqrt{2}}{3}$$

$$\rightarrow AH = \sqrt{1^2 + 1^2} = \sqrt{2} \rightarrow \frac{AM}{AH} = \frac{\frac{5\sqrt{2}}{3}}{\sqrt{2}} = \frac{5}{3} = \frac{AH}{AM}$$



Year: Month: Date: ( )

$$m = -\frac{1}{r} \quad (a_0, b_0) \rightarrow \frac{y}{b} + \frac{x}{a} = 1$$

(۷)

$$\frac{|ab|}{\sqrt{a^2+b^2}} = \frac{|a \times \frac{a}{r}|}{\sqrt{a^2 + \frac{a^2}{r^2}}} = \frac{\frac{a^2}{r}}{\sqrt{\frac{a^2(r^2+1)}{r^2}}} = \frac{\frac{a^2}{r}}{\frac{a\sqrt{r^2+1}}{r}} \rightarrow \frac{|a|}{\sqrt{a^2+b^2}} = \frac{1}{\sqrt{r^2+1}} \rightarrow |a| = 1$$

$$\rightarrow a = \pm 1 \rightarrow b = \pm \delta \rightarrow \sqrt{(1-0)^2 + (0-\delta)^2} = \sqrt{1+\delta^2} = \sqrt{5} \rightarrow \boxed{a = \pm 1, b = \pm \delta}$$

(۸)

$$\begin{cases} y + mx - m - r = my - \varepsilon m - r m \\ y + mx - m - r = y - m \\ my - \varepsilon m - r m = y - m \end{cases}$$

$$\rightarrow \left| \frac{m}{r} - \frac{r}{1-m} \right| = \frac{\delta}{r}$$

$$\boxed{m = -r \pm \sqrt{5}}$$

$$(-r - \sqrt{5})(-r + \sqrt{5}) = \varepsilon - \delta = -1$$

$$m' = r a - m \quad y' = r b - y \rightarrow a = r, b = -r \rightarrow m' = \varepsilon - m, y' = -\varepsilon - y$$

$$y = m' - r \rightarrow (-\varepsilon - y') = r(\varepsilon - m') - r \rightarrow y' = r m' - \varepsilon \rightarrow \boxed{y = r m - \varepsilon}$$

$$y - r = -1(m-1) \rightarrow y = -m + r$$

(۹)

$$m + \delta = -m + r \rightarrow r m = -r \rightarrow m = -1 \rightarrow y = -1 + \delta = \varepsilon \rightarrow (-1, \varepsilon)$$

$$\rightarrow \frac{1+a}{r} = -1 \rightarrow a = -r \quad \frac{r+b}{r} = \varepsilon \rightarrow r+b = r \rightarrow b = 0$$

$$\rightarrow a = -r, b = 0 \rightarrow r b - a = r + r = \boxed{2r}$$

۱۰