

پایه آمیز

$A(-4, -1)$

$B(2, 1)$

-1

$x_m = \frac{-4+2}{2} = -1$

$y_m = \frac{-1+1}{2} = 0$

وسط دو نقطه:

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در محاسبه صدق می کند

$AB: \frac{1-(-1)}{2-(-4)} = \frac{2}{6} = \frac{1}{3}$

 $\frac{1}{3} \leftarrow m$

$y = ax + b \rightarrow y = \frac{1}{3}x + b \xrightarrow{u(3,1)} 1 = \frac{1}{3}(3) + b \rightarrow b = 0$

$y = \frac{1}{3}x$

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-2

$BC: \sqrt{(2-3)^2 + (-1+1)^2} = \sqrt{1+0} = 1$

فاصله A از BC = ارتفاع AH

$BC: m = \frac{2-3}{-1+1} = \frac{-1}{0}$

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$y = ax + b \xrightarrow{C(-1,3)} 3 = \frac{-1}{3}(-1) + b \rightarrow b = \frac{10}{3}$

$y = -\frac{1}{3}x + \frac{10}{3}$

$BC: A \text{ فاصله} \rightarrow \frac{|y + \frac{1}{3}x - \frac{10}{3}|}{\sqrt{1 + \frac{1}{9}}} \Rightarrow \frac{|1 + \frac{1}{3}(3) - \frac{10}{3}|}{\frac{\sqrt{10}}{3}} = \frac{1 \cdot \frac{3-3-10}{3}}{\frac{\sqrt{10}}{3}} = \frac{10}{\sqrt{10}} = \sqrt{10}$

طول BC = 1

ارتفاع از طول ارتفاع AH

است

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پریا اسینی

$$\left. \begin{array}{l} 2y - x = 1 \\ \div 2 (4y - x = 2) \end{array} \right\} \text{ موازی} \rightarrow \frac{2}{4} = \frac{-1}{-1} \rightarrow a = 2$$

$$5 \text{ قطر دایره} = \text{فاصله دو خط موازی} \rightarrow \left. \begin{array}{l} 2y - x = 1 \\ 2y - x = 1 \end{array} \right\} \frac{|1-1|}{\sqrt{4+1}} = \frac{0}{\sqrt{5}}$$

$$\text{شعاع} = \frac{3}{\sqrt{5}} \rightarrow \text{مساحت} = \pi r^2, 3, 14 \times \frac{3}{\sqrt{5}} \times \frac{3}{\sqrt{5}} = \frac{9}{5} \times 3, 14 = 9, 42$$

$$= \frac{9 \times 3, 14}{5}$$

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$$M \text{ مختصات: } AB \text{ وسط} \rightarrow x_M = \frac{2+4}{2} = 3, y_M = \frac{3+1}{2} = 2$$

$$CM \text{ طول} = M \text{ تا } C \text{ فاصله} = \sqrt{(3-(-1))^2 + (2-(-3))^2} = \sqrt{41}$$

$$\text{طول } CH = AB \text{ فاصله} \rightarrow m_{AB} = \frac{4-3}{1-2} = -1$$

$$y = ax + b \rightarrow y = -x + b \xrightarrow{A(2,3)} 3 = -2 + b \rightarrow b = 5$$

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$$y = -x + 5$$

$$AB \text{ تا } C \text{ فاصله}, \frac{|y+x-5|}{\sqrt{2}} \xrightarrow{C(-1,-3)} \frac{|-3-1-5|}{\sqrt{2}} = \frac{9}{\sqrt{2}}$$

$$\text{فیثاغورس} \rightarrow MH^2 + CH^2 = CM^2 \rightarrow MH^2 + \frac{81}{2} = 41 \rightarrow MH^2 = \frac{1}{2}$$

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

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برای اثبات

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$$AB: (m+1)x - (2m-1)y + 1 = 0$$

$$CD: (2m-1)x + (a-m)y - 1 = 0$$

$$m_{AB} = \frac{-(m+1)}{-(2m-1)} = \frac{m+1}{2m-1}$$

$$m_{CD} = \frac{-(2m-1)}{a-m}$$

$$m_{AB} \times m_{CD} = -1$$

$$\frac{-(2m-1)}{a-m} \times \frac{m+1}{2m-1} = -1 \rightarrow \frac{-2m^2 + 2m + 2m + 1}{1 - m - 2m^2 - 2m + 2m} = -1 \rightarrow$$

$$-2m^2 - m + 2 = 2m^2 - 4m + 2 \rightarrow -4m^2 + 3m - 1 = 0 \rightarrow$$

$$4m^2 - (3m + 1) = 0$$

$$\Delta = b^2 - 4ac = 9 - 4(4)(-1) = 25 \rightarrow \Delta > 0 \text{ دو ریشه حقیقی و متمایز}$$

$$AB: 2y = x - 2 \rightarrow y = \frac{x}{2} - 1$$

$$AC: y = 2x - 1$$

$$BC: y = 5 - x$$

$$\text{مثلاً } A: AB \text{ و } AC \rightarrow 2x - 1 = \frac{1}{2}x - 1 \rightarrow \frac{3}{2}x = 0 \rightarrow$$

$$x = \frac{-1}{\frac{3}{2}} = -\frac{2}{3} = -\frac{1}{1.5}, y = 2(-\frac{1}{1.5}) - 1 = -\frac{5}{3}$$

$$\text{مثلاً } B: AB \text{ و } BC \rightarrow 5 - x = \frac{1}{2}x - 1 \rightarrow \frac{3}{2}x = 6 \rightarrow$$

$$x = \frac{4}{3} \rightarrow x = \frac{2 \times 2}{3} = \frac{4}{3}, y = 5 - \frac{4}{3} = \frac{11}{3}$$

$$\text{مثلاً } C: AC \text{ و } BC \rightarrow 2x - 1 = 5 - x \rightarrow 3x = 6 \rightarrow x = 2, y = \frac{1}{2} \times 2 - 1 = 0$$

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$$A(-\frac{1}{\sqrt{2}}, -\frac{a}{\sqrt{2}}), B(\frac{11}{\sqrt{2}}, \frac{1}{\sqrt{2}}), C(\frac{a}{\sqrt{2}}, \frac{\sqrt{2}}{\sqrt{2}})$$

$$M \rightarrow AB \text{ midpoint} \rightarrow x_M = \frac{\frac{11}{\sqrt{2}} + (-\frac{1}{\sqrt{2}})}{2} = \frac{a}{\sqrt{2}}, y_M = \frac{\frac{1}{\sqrt{2}} - \frac{a}{\sqrt{2}}}{2} = -\frac{a-1}{2\sqrt{2}}$$

$$AM = \sqrt{(\frac{a}{\sqrt{2}} - (-\frac{1}{\sqrt{2}}))^2 + (-\frac{a-1}{2\sqrt{2}} - (-\frac{a}{\sqrt{2}}))^2} = \sqrt{4+1} = \sqrt{5}$$

AH ارتفاع : BC از A فاصله $\rightarrow$ BC هضد $\rightarrow$

$$m_{BC} = \frac{\frac{\sqrt{2}}{\sqrt{2}} - \frac{1}{\sqrt{2}}}{\frac{a}{\sqrt{2}} - \frac{11}{\sqrt{2}}} = \frac{\frac{\sqrt{2}-1}{\sqrt{2}}}{\frac{a-11}{\sqrt{2}}} = -1$$

$$y = -x + b \quad C(\frac{a}{\sqrt{2}}, \frac{\sqrt{2}}{\sqrt{2}}) \rightarrow \frac{\sqrt{2}}{\sqrt{2}} = -\frac{a}{\sqrt{2}} + b \rightarrow b = \frac{1+\sqrt{2}}{\sqrt{2}}$$

$$BC: y = -x + \sqrt{2}$$

$$\text{A فاصله : } \frac{|y + x - \sqrt{2}|}{\sqrt{2}} = \frac{|-\frac{a}{\sqrt{2}} - \frac{1}{\sqrt{2}} - \sqrt{2}|}{\sqrt{2}} = \frac{4}{\sqrt{2}}$$

$$\frac{AM}{AH} = \frac{\sqrt{5}}{\frac{4}{\sqrt{2}}} = \frac{\sqrt{10}}{4}$$

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$$y = -\frac{1}{\sqrt{2}}x + b \rightarrow \sqrt{2}y = -x + \sqrt{2}b \rightarrow \sqrt{2}y - \sqrt{2}b + x = 0 \rightarrow \sqrt{2}y + x - \sqrt{2}b = 0$$

$$d = \frac{|\sqrt{2}y + x - \sqrt{2}b|}{\sqrt{2}} = \frac{|\sqrt{2}(0) + 1 - \sqrt{2}b|}{\sqrt{2}} = \frac{|1 - \sqrt{2}b|}{\sqrt{2}} \rightarrow$$

$$d = \sqrt{2} \rightarrow \frac{\sqrt{2}|b|}{\sqrt{2}} = \sqrt{2} \rightarrow \sqrt{2}|b| = \sqrt{2} \times \sqrt{2} = \sqrt{4} = 2$$

$$|b| = 2$$

$$A \rightarrow \text{تقاطع با محور } y \rightarrow A(0, b)$$

$$B \rightarrow \text{تقاطع با محور } x \rightarrow y = 0 \rightarrow 0 = -\frac{1}{\sqrt{2}}x + b \Rightarrow x = \sqrt{2}b \rightarrow B(\sqrt{2}b, 0)$$

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نویسنده احسانی

$$AB \text{ فاصله} = D_{AB} = \sqrt{(2b-0)^2 + (0-b)^2} = \sqrt{4b^2 + (-b)^2} = \sqrt{5b^2} = |b|\sqrt{5}$$

$$\frac{|b|\sqrt{5}}{|b|\sqrt{5}} = |b|\sqrt{5} = a\sqrt{5} = AB$$

$$L_1: 5my - 4x = 2m$$

-A

$$L_2: y + mx = a + 2 \Rightarrow y = (1-m)x + 2$$

نقطه تقاطع با محور y :

$$L_1 \rightarrow m(0) - 4x = 2m \rightarrow -4x = 2m \Rightarrow x_1 = \frac{-2m}{-4} = \frac{m}{2}$$

$$V_1 \left(\frac{m}{2}, 0 \right)$$

$$L_2 \rightarrow 0 = (1-m)x + 2 \Rightarrow (1-m)x = -2 \Rightarrow x_2 = \frac{-2}{1-m} = \frac{2}{m-1}$$

$$V_2 \left(\frac{2}{m-1}, 0 \right) \rightarrow m \neq 1$$

نقطه تقاطع L_1 و L_2 : $y = (1-m)x + 2$ جایگزینی در L_1 :

$$m((1-m)x + 2) - 4x = 2m$$

$$(m - m^2)x + 2m - 4x = 2m \rightarrow (m - m^2 - 4)x = 2m - 2m \rightarrow$$

$$(m - m^2 - 4)x = 0 \xrightarrow{x(-1)} (m^2 - m + 4)x = 0$$

$$\Delta = (-1)^2 - 4(1)(4) = 1 - 16 = -15 < 0$$

معادله شیب $m^2 - m + 4 < 0$ هیچ ضریب m نمی تواند صفر

شود. پس برای صفر شدن معادله باید $x=0$ باشد.

$$L_2 \xrightarrow{x=0} y = (1-m) \cdot 0 + 2 \Rightarrow y = 2$$

$$V_3(0, 2)$$

$$S = \frac{1}{2}bh = \frac{1}{2} \times \left| \frac{2}{m-1} + \frac{m}{2} \right| \times 2 \rightarrow S = \left| \frac{2}{m-1} + \frac{m}{2} \right|$$

$$\text{مساحت} = \frac{a}{2} \rightarrow \left| \frac{2}{m-1} + \frac{m}{2} \right| = \frac{a}{2}$$

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$$\left| \frac{\epsilon + m(m-1)}{2(m-1)} \right| = \left| \frac{\epsilon + m^2 - m}{2(m-1)} \right|$$

$$\left| \frac{m^2 - m + \epsilon}{2(m-1)} \right| = \frac{\omega}{2} \rightarrow \frac{|m^2 - m + \epsilon|}{2|m-1|} = \frac{\omega}{2} \quad \text{عدد، مثبت}$$

$$\frac{m^2 - m + \epsilon}{m-1} = \omega$$

$$m > 1 \rightarrow m^2 - m + \epsilon = \omega m - \omega \rightarrow m^2 - \omega m + \omega = 0$$

$$(m-3)^2 = 0 \rightarrow m=3 \quad \text{بقدر 1، } m > 1 \quad \text{ق ق}$$

$$m < 1 \rightarrow m^2 - m + \epsilon = -\omega(m-1) \rightarrow m^2 - m + \epsilon = -\omega m + \omega \rightarrow$$

$$m^2 + \epsilon m - 1 = 0$$

$$\Delta = 14 - 4(1)(-1) = 18 \rightarrow \frac{-\epsilon \pm \sqrt{18}}{2} = \frac{-\epsilon \pm 3\sqrt{2}}{2}$$

$$m = -2 \pm \sqrt{5} \quad \text{بقدر 1، } m < 1 \quad \text{ق ق}$$

$$\Delta = 3 \times (-2 + \sqrt{5}) \times (-2 - \sqrt{5}) = 3 \times (-4 - 5) = -27$$

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$$u(2, -2) \rightarrow y = -2 \quad \text{وای خط 2} \quad -9$$

$$u_m = \frac{u+u'}{2} \rightarrow 2 = \frac{u+u'}{2} \Rightarrow u+u' = 4 \Rightarrow u = 4-u'$$

$$y_m = \frac{y+y'}{2} \Rightarrow -2 = \frac{y+y'}{2} \Rightarrow y+y' = -4 \Rightarrow y = -4-y'$$

$$20 \quad y = 2u - 3 \rightarrow -4 - y' = 2(4-u') - 3 \rightarrow$$

$$-4 - y' = 8 - 2u' - 3 \rightarrow -4 - y' = 5 - 2u' \rightarrow -y' = 9 - 2u'$$

$$\rightarrow y' = 2u' - 9 \xrightarrow{\text{نیایی}} y = 2u - 9$$

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نقطه A' (x', y')

$$m_y \times m_{AA'} = -1 \rightarrow m_y = 1$$

$$m_{AA'} = -1 = \frac{y' - y_A}{x' - x_A} = \frac{y' - 2}{x' - 1} \rightarrow \frac{y' - 2}{x' - 1} = -1 \rightarrow$$

$$y' - 2 = -x' + 1 \rightarrow \boxed{y' + x' = 3}$$

$$\text{نقطه میانی } AA' \rightarrow x_M = \frac{x + x'}{2} = \frac{1 + x'}{2}, y_M = \frac{y + y'}{2} = \frac{2 + y'}{2}$$

$$y = x + 1 \rightarrow \frac{2 + y'}{2} = \frac{1 + x'}{2} + 1 \rightarrow 2 + y' = 1 + x' + 2 \rightarrow$$

$$\boxed{2 + y' = x' + 1}$$

$$\left. \begin{array}{l} 2 + y' = x' + 1 \\ y' + x' = 3 \end{array} \right\} \begin{array}{l} 2 + 3 - x' = x' + 1 \rightarrow 2x' = 4 \rightarrow x' = 2 \\ y' + 2 = 3 \rightarrow y' = 1 \end{array}$$

نقطه A(1, 2) نسبت به $y = x + 1$ می شود $y = x + 1$

$$A'(-2, 1)$$

$$2b - a = 2(1) - (-2) = 4$$