

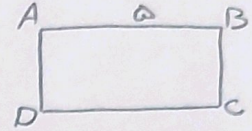
$A(-2, K) \quad B(x, m) \quad \text{شیب: } -\frac{1}{4} \quad S_{ABCD} = ?$

شیب خط: $\frac{m-K}{x-(-2)} = -\frac{1}{4} \rightarrow \frac{m-K}{x+2} = -\frac{1}{4} \rightarrow 4(m-K) = -x-2 \rightarrow m-K = -\frac{x+2}{4}$

طول ضلع AB: $\sqrt{(x+2)^2 + (m-K)^2} = \sqrt{x^2 + 4x + 4 + \frac{(x+2)^2}{16}} = \sqrt{\frac{17x^2 + 20x + 20}{16}} = \frac{\sqrt{17x^2 + 20x + 20}}{4}$

مساحت مربع: $AB^2 = \left(\frac{\sqrt{17x^2 + 20x + 20}}{4}\right)^2 = \frac{17x^2 + 20x + 20}{16}$

$A(-1, 4) \quad B(3, 1) \quad C(x, y) \quad D(-1-x, y+2) \quad \text{مساحت مستطیل: ?}$



طول ضلع AB: $\sqrt{(3+1)^2 + (1-4)^2} = \sqrt{4^2 + (-3)^2} = \sqrt{16+9} = \sqrt{25} = 5$

جمع طول های رأس های مقابل برابر است: $x + (-1) = 3 + (-1-x) \rightarrow x-1 = 2-x \rightarrow 2x = 3 \rightarrow x = \frac{3}{2}$

$AC = BD \Rightarrow \sqrt{\left(\frac{3}{2} - (-1)\right)^2 + (y-4)^2} = \sqrt{\left(\frac{3}{2} - (-1-x)\right)^2 + (y+2)^2} \rightarrow \frac{25}{4} + y^2 - 8y + 16 = \frac{121}{4} + y^2 + 4y + 4$
 $\Rightarrow 12y = 12 + \frac{25-121}{4} \rightarrow 12y = 12 - \frac{96}{4} \rightarrow y = -1$

$AD = \sqrt{\left(\frac{3}{2} - (-1-x)\right)^2 + 2^2} = \frac{5}{2} \Rightarrow 2\left(\frac{5}{2} + \frac{5}{2}\right) = 10$

$2mx + (m^2 + 1)y = 3 \rightarrow (m^2 + 1)y = -2mx + 3$

شیب خط: $-\frac{2m}{m^2+1}$ زاویه ۹۰ درجه با شیب مستقیم: $\text{شیب} = \tan 90^\circ \rightarrow -\frac{2m}{m^2+1} = \sqrt{3} \rightarrow -2m = \sqrt{3}m^2 + \sqrt{3}$
 $\rightarrow \sqrt{3}m^2 + 2m + \sqrt{3} = 0 \rightarrow m^2 + \frac{2}{\sqrt{3}}m + 1 = 0$

افتلاف: $\frac{\sqrt{\Delta}}{a} = \frac{\sqrt{\frac{4}{3} - 4}}{1} = \sqrt{\frac{4-12}{3}} = \sqrt{\frac{-8}{3}} = \frac{2\sqrt{6}}{3}$

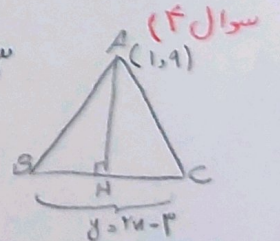
$A(1, 9) \quad B(3, 3) \quad C(5, 11) \quad AH = ?$

مقدار شیب BC: $m = \frac{11-3}{5-3} = \frac{8}{2} = 4$

$y-3 = 4(x-3) \rightarrow y-3 = 4x-12 \rightarrow y = 4x-9$

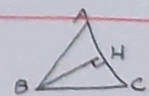
$AH = \text{فاصله نقطه A از خط BC} \rightarrow d = \frac{|ax+by+c|}{\sqrt{a^2+b^2}} = \frac{|4(1) + (-1)(9) - 3|}{\sqrt{4^2 + (-1)^2}} = \frac{|4-9-3|}{\sqrt{17}} = \frac{|-8|}{\sqrt{17}} = \frac{8}{\sqrt{17}}$

$= \frac{8\sqrt{17}}{17} \rightarrow AH = \frac{8\sqrt{17}}{17}$



$AB: y+2x=7 \quad AC: 4y-3x=17$
 $y = -2x+7 \quad 4y = 3x+17$

$BC: 2y-7x=-19 \quad BH = ?$
 $2y = 7x-19$

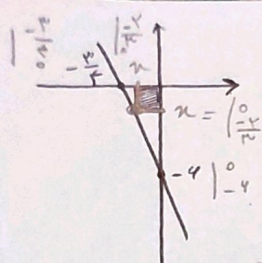


$B \rightarrow AB, BC: 2(-2x+7) = 7x-19 \rightarrow -4x+14 = 7x-19 \rightarrow 11x = 33 \rightarrow x = 3, y = -2(3)+7 = 1$
 $C \rightarrow BC, AC: 4\left(\frac{7}{4}x - \frac{19}{4}\right) = 3x+17 \rightarrow 7x-19 = 3x+17 \rightarrow 4x = 36 \rightarrow x = 9, y = 1$
 $A \rightarrow AB, AC: 4(-2x+7) = 3x+17 \rightarrow -8x+28 = 3x+17 \rightarrow 11x = 11 \rightarrow x = 1, y = 5$

$A(1, 5), B(3, 1), C(9, 1)$

فاصله نقطه B از خط AC: $d = \frac{|(-3)(3) + 4(1) - 17|}{\sqrt{(-3)^2 + 4^2}} = \frac{|-9+4-17|}{\sqrt{9+16}} = \frac{|-22|}{\sqrt{25}} = \frac{22}{5} \Rightarrow BH = \frac{22}{5}$

سوال ۹)



$(0, -4) \quad (-\frac{3}{4}, 0)$

شیب: $\frac{-4 - 0}{0 - (-\frac{3}{4})} = \frac{-4}{\frac{3}{4}} = -\frac{16}{3} = -1$

$b = -4$

$y = -1x - 4$

تقاطع $n = y \rightarrow x = -1x - 4 \rightarrow 2x = -4 \rightarrow x = -2$



$\Rightarrow \sqrt{2(\frac{2}{\sqrt{2}})^2} = \frac{2\sqrt{2}}{\sqrt{2}} = 2$

$1 - ax = 1, ay - x = a - 1$

قطر = 5

رأس: $(b, 2)$

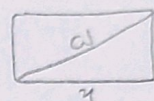
مساحت = ?

$ay - ax^2 - a = 0$

$ay = x - (a-1) = 0$

دو نقطه ای اند

$\Rightarrow a^2 = 1 \rightarrow a = \pm 1$



سوال ۱۷)

$\frac{|C - c|}{\sqrt{a^2 + b^2}} = \frac{|a - (a-1)|}{\sqrt{a^2 + 1}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\Rightarrow \sqrt{2} - \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} = n$

$\Rightarrow S = \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{1}{2}$

$A(4, 0)$

$x - 3y = 1$

$(\frac{1}{3}, \frac{1}{3})$

$S_{\Delta} = ?$

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

$\rightarrow a = -3$

$\rightarrow -3x + b = y$

$\rightarrow b = 12 \rightarrow -3x + 12 = y$

$\rightarrow -3x + 12 = y$

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

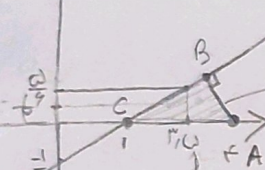
$\rightarrow -3x + 12 = \frac{x-1}{3} \rightarrow 34 - 9x = x - 1$

$\rightarrow x = 34$

$\rightarrow y = 0.9 \Rightarrow B: \begin{pmatrix} 34 \\ 0.9 \end{pmatrix}$

$\Rightarrow \frac{3 \times 0.9}{2} = 1.35$

سوال ۱۸)



چون یکی از اضلاع قائمه است $\Rightarrow$ مساحت $\Delta = \frac{1}{2} \times \text{ضلع قائم} \times \text{ضلع قائم}$

چون زاویه اول است و بیشترین مساحت را می خواهد ضلع دوم (وتر) را می محور ۲ ها است

$\rightarrow y = 0.9 \Rightarrow B: \begin{pmatrix} 34 \\ 0.9 \end{pmatrix}$

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$(-\frac{1}{3}, a), (-\frac{1}{3}, b)$

$m_{\Delta} = \sqrt{3}$

قطر مربع = ?

معادله خط

$y = \sqrt{3}x + C$

$(-\frac{1}{3}, a) \rightarrow a = (\sqrt{3} \times -\frac{1}{3}) + C \rightarrow a = -\frac{\sqrt{3}}{3} + C$

$(-\frac{1}{3}, b) \rightarrow b = (\sqrt{3} \times -\frac{1}{3}) + C \rightarrow b = -\frac{\sqrt{3}}{3} + C$

$\rightarrow \sqrt{(\frac{1}{3} + \frac{1}{3})^2 + (b-a)^2} = \sqrt{(\frac{1}{3})^2 + (-\frac{\sqrt{3}}{3} + C + \frac{\sqrt{3}}{3} - C)^2} = \sqrt{\frac{1}{9} + \frac{3}{9}} = \sqrt{\frac{4}{9}} = \sqrt{\frac{1}{9}} = \frac{1}{3}$

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سوال ۱۹)

$(-3, -4)$

حاصل ضرب طول و عرض = مساحت نقطه برخورد خط

$r = \text{شعاع دایره} \rightarrow (-3, -4) \Rightarrow r = \sqrt{(-3-0)^2 + (-4-0)^2} = \sqrt{9+16} = \sqrt{25} = 5$

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سوال ۱۰)

$a = \frac{4}{3}$

$3y = 4x + 3b \rightarrow y = \frac{4}{3}x + b$

$\Rightarrow \frac{4}{3}x + b = y$

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$a = -\frac{4}{3}$

$\Rightarrow y = -\frac{4}{3}x - \frac{20}{3}$

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