

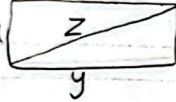
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مستطیل اول: $\frac{y}{x} = \frac{5}{4} \Rightarrow y = \frac{5}{4}x$ و مساحت $y \times x = \frac{5}{4}x^2$

مستطیل دوم: $\frac{y_2}{x} = \frac{1+\sqrt{5}}{2} \Rightarrow y_2 = \frac{1+\sqrt{5}}{2}x$ و مساحت $y_2 \times x = \frac{(1+\sqrt{5})}{2}x^2$

$\frac{\text{مستطیل ۲}}{\text{مستطیل ۱}} = \frac{\frac{1+\sqrt{5}}{2}x^2}{\frac{5}{4}x^2} = \frac{2}{5}(1+\sqrt{5})$

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 $z = \sqrt{x^2 + y^2}$ $\frac{z}{y} = \frac{\sqrt{x^2 + y^2}}{y} = \frac{1+\sqrt{5}}{2}$ $\frac{x^2 + y^2}{y^2} = \frac{4+2\sqrt{5}}{4}$

$\frac{x^2 + y^2}{y^2} = \frac{3+\sqrt{5}}{2} \Rightarrow \frac{x^2}{y^2} + \frac{y^2}{y^2} = \frac{3+\sqrt{5}}{2} \Rightarrow \frac{x^2}{y^2} = \frac{1+\sqrt{5}}{2}$

$\frac{\text{طول}}{\text{عرض}} = \frac{y}{x} \Rightarrow \frac{y^2}{x^2} = \frac{2}{1+\sqrt{5}} \times \frac{1-\sqrt{5}}{1-\sqrt{5}} = \frac{2-\sqrt{5}}{-2} = \frac{\sqrt{5}-1}{2}$

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$\sqrt{2a^2 + 4a} = 2 - 3a$ $\frac{\text{ب توان ۲}}{\Rightarrow} 2a^2 + 4a = 9a^2 + 4 - 12a$ $7a^2 - 16a + 4 = 0 \Rightarrow \Delta = 144$

$a = \frac{16 \pm 12}{14} \Rightarrow a = \frac{4}{3}, \frac{2}{7}$ $2 - 3a > 0 \rightarrow a < \frac{2}{3}$

$\frac{a+1}{a} = \frac{4}{3}, \frac{9}{2}$

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$\sqrt{x-1} \rightarrow x > 1$, $\sqrt{x+1} \rightarrow x \geq -1 \Rightarrow 1 \leq (1, +\infty)$

$\frac{\sqrt{x+1}}{\sqrt{x-1} + 3} - \frac{\sqrt{x+1}}{3 - \sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}} \rightarrow \frac{(\sqrt{x+1} \times 3 - \sqrt{x-1}) - (\sqrt{x+1} \times 3 + \sqrt{x-1})}{10 - x} = \sqrt{x-1}$

$\frac{-2\sqrt{x-1} \times \sqrt{x+1}}{10-x} = \sqrt{x-1} \Rightarrow 2\sqrt{x+1} = x-10 \rightarrow 4x+4 = x^2+100-20x \rightarrow x^2-24x+96=0$

$\Delta = 144 \Rightarrow \Delta > 0$, دارن دو ریشه مثبت

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$\sqrt{2-x} \rightarrow x < 2$

$\frac{1}{\sqrt{2-x} + 2} - \frac{1}{2 - \sqrt{2-x}} = \frac{2-x}{2\sqrt{2-x}}$ $\frac{-2\sqrt{2-x}}{x+2} = \frac{\sqrt{2-x}}{2}$

$\frac{-2}{x+2} = \frac{1}{2}$, $x+2 = -4$, $x = -6 \rightarrow$ فاقد ریشه مثبت

$$\frac{1}{x^2} + \frac{1}{(1-x)^2} = \frac{14}{9} \rightarrow \left(\frac{1}{x} + \frac{1}{1-x}\right)^2 - \frac{2}{x(1-x)} = \frac{14}{9}$$

$$\left(\frac{1}{x(1-x)}\right)^2 - \frac{2}{x(1-x)} = \frac{14}{9} \Rightarrow \frac{1}{x(1-x)} = t, \quad t^2 - 2t = \frac{14}{9} \Rightarrow t^2 - 2t + 1 = \frac{14}{9} + 1 = \frac{23}{9}$$

$$(t-1)^2 = \frac{23}{9}, \quad t-1 = \pm \frac{\sqrt{23}}{3}, \quad \frac{1}{x(1-x)} = \frac{1 \pm \sqrt{23}}{3} \Rightarrow \frac{1}{x(1-x)} = \frac{1+\sqrt{23}}{3} \Rightarrow -x^2 + x = \frac{3}{1+\sqrt{23}}, \quad S = 1$$

$$\frac{1}{x(1-x)} = \frac{1+\sqrt{23}}{3}, \quad -x^2 + x = \frac{3}{1+\sqrt{23}} \Rightarrow S_1 = 1, \quad S_1 + S_2 = 2$$

$$x + y \geq 0 \rightarrow \text{عامل مع در دایره باشد} \quad / \quad -x^2 + 4x - 4 \geq 0 \rightarrow -((x-2)(x-2)) \geq 0 \Rightarrow x \geq 2, \quad x \leq 2$$

$$-x^3 + 4x^2 + 2\omega x - 100 \geq 0 \rightarrow -x^2(x-4) + 2\omega(x-4) \geq 0 \rightarrow (x-4)(2\omega - x^2) \geq 0 \rightarrow x \leq 4, \quad x \geq 4, \quad x \geq -\omega$$

$$1 - x^2 + 4x^2 + 2\omega x - 100 \geq 0 \rightarrow x \in [-10, 5] \cup [5, 10]$$

$$\text{استرال هنداره} \Rightarrow x \leq \frac{10}{\sqrt{23}}, \quad x \in [5, 10]$$

$$2) \quad x + \sqrt{-x^2 + 4x - 4} \geq 0 \Rightarrow x \geq 0$$

$$3) \quad x^2 + \sqrt{-x^2 + 4x - 4} \geq 0 \rightarrow \text{همیشه}$$

$$x = 2 - 2 + 2 = 2$$

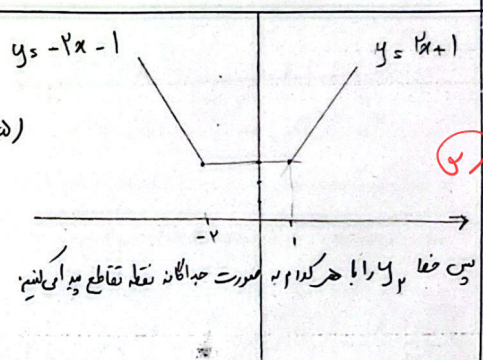
مقادیر جواب

$$y = |x+2| + |x-1|, \quad 3y + x = 17 \rightarrow y = \frac{-x+17}{3}$$

$$-\frac{x+17}{3} \leq -x+1 \Rightarrow 4x+13 = -x+17, \quad x=2, \quad y=5 \rightarrow (2, 5)$$

$$-\frac{x+17}{3} \leq -x-1 \Rightarrow -4x-13 = -x-17 \Rightarrow x=-4, \quad y=5$$

$$AB = \sqrt{(4)^2 + (2)^2} = \sqrt{20} = 2\sqrt{5}$$



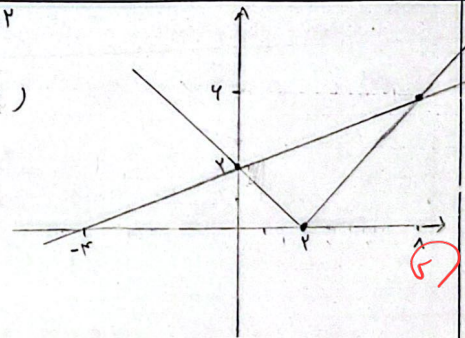
$$y = \sqrt{x^2 - 4x + 4} = \sqrt{(x-2)^2} \Rightarrow y \leq |x-2|, \quad y = \frac{1}{4}x + 2$$

$$\text{if } x-2 \geq 0 \rightarrow \frac{1}{4}x + 2 = x-2, \quad x=8, \quad y=4 \rightarrow (8, 4)$$

$$\text{if } x-2 < 0 \rightarrow \frac{1}{4}x + 2 = 2-x, \quad x=0, \quad y=2 \rightarrow (0, 2)$$

$$|x-2| = 0 \rightarrow x=2 \rightarrow (2, 0)$$

$$S = \frac{1}{4} \begin{vmatrix} 0 & 2 & 1 \\ 2 & 0 & 1 \\ 8 & 4 & 1 \end{vmatrix} = \frac{1}{4} x(2 \cdot 1 - 4) = 12$$



$$\text{بهرز} = \frac{1}{x}, \quad \text{فرهاد} = \frac{1}{x+9}, \quad \text{حرد} = \frac{1}{x_0}$$

کدیلان

$$\frac{1}{x} + \frac{1}{x+9} = \frac{1}{x_0} \rightarrow \frac{x+x+9}{x^2+9x} = \frac{1}{x_0} \Rightarrow 6x+18 = x^2+9x, \quad x^2-3x=18$$

$$x(x-3)=18 \Rightarrow x=18, \quad 34 \Rightarrow \text{بهرز در 34 ساعت} \\ \text{و تقابلی انجام می دهد}$$