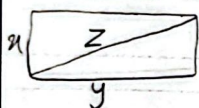


مستطیل اول: $\frac{y}{x} = \frac{5}{4} \Rightarrow y = \frac{5}{4}x$ و مساحت $y \times x = \frac{5}{4}x^2$

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

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

۱



$z = \sqrt{x^2 + y^2}$

$\frac{z}{y} = \frac{\sqrt{x^2 + y^2}}{y} = \frac{1+\sqrt{5}}{2}$ (به توان ۲) $\Rightarrow \frac{x^2 + y^2}{y^2} = \frac{4+2\sqrt{5}}{4}$

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

طول عرض $\frac{y}{x} = \frac{1}{\frac{x}{y}} = \frac{1}{\frac{2}{1+\sqrt{5}}} = \frac{1+\sqrt{5}}{2}$

۲

$\sqrt{2a^2 + 5a} = 2 - 3a$ (به توان ۲) $2a^2 + 5a = 9a^2 + 4 - 12a$, $7a^2 - 17a + 4 = 0 \Rightarrow \Delta = 144$

$a = \frac{17 \pm 12}{14} \Rightarrow a = 2, \frac{5}{14}$

$\frac{a+1}{a} = \frac{3}{2}, \frac{9}{5}$

۳

$\sqrt{x-1} \rightarrow x > 1$, $\sqrt{x+1} \rightarrow x \geq -1 \Rightarrow 1 < x < +\infty$

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

$\frac{-2\sqrt{x-1} \times \sqrt{x+1}}{10-x} = \sqrt{x-1} \Rightarrow 2\sqrt{x+1} = x-10 \rightarrow 4x+4 = x^2+100-20x \rightarrow x^2-24x+96=0$
 $\Delta = 144 \Rightarrow \Delta > 0$, دارن دو ریشه

۴

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

$\frac{1}{\sqrt{2-x}+2} - \frac{1}{2-\sqrt{2-x}} = \frac{2-x}{2\sqrt{2-x}}$ (مخرج مشترک) $\frac{-2\sqrt{2-x}}{x+2} = \frac{\sqrt{2-x}}{2}$

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

۵

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

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

$$(t-1)^2 = \frac{14}{9}, \quad t-1 = \pm \frac{\sqrt{14}}{3}, \quad \frac{1}{x(1-x)} = \frac{\sqrt{14}}{3} \Rightarrow \frac{1}{x} = \frac{\sqrt{14}}{3} \Rightarrow -x^2 + x = \frac{\sqrt{14}}{10}, \quad S = 1$$

$$\frac{1}{x(1-x)} = \frac{\sqrt{14}}{3}, \quad -x^2 + x = \frac{\sqrt{14}}{14} \Rightarrow S_1 = 1, \quad S_1 + S_2 = 2$$

$$x + y \geq 0 \rightarrow \text{حامل مع درادیکال} / -x^2 + 4x - 8 \geq 0 \rightarrow -((x-2)(x-4)) \geq 0 \Rightarrow x > 2, x < 4$$

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

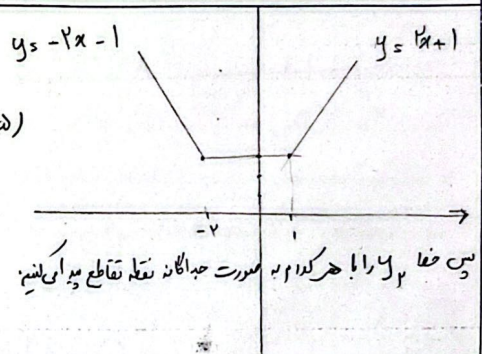
$$\text{استرال هند بازده} \Rightarrow x \leq -\omega, 4$$

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

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

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

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



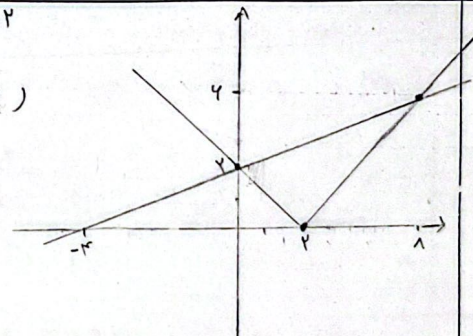
$$y = \sqrt{x^2 - 4x + 4} = \sqrt{(x-2)^2} \Rightarrow y = |x-2|, \quad y = \frac{1}{4}x + 2$$

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

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

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

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



$$\text{بهرز} = \frac{1}{x}, \quad \text{فرداد} = \frac{1}{x+9}, \quad \text{خرد} = \frac{1}{x_0}$$

کدگذاری

$$\frac{1}{x} + \frac{1}{x+9} = \frac{1}{x_0} \rightarrow \frac{x+x+9}{x^2+9x} = \frac{1}{x_0} \Rightarrow 6x+180 = x^2+9x, \quad x^2-3x=180$$

$$x(x-3)=180 \Rightarrow x=180, 3 \Rightarrow \text{بهرز در 3 ساعت} \\ \text{و تقابلی انجام می دهد}$$