

نام و نام خانوادگی پاسخنامه تشریحی تکلیف شماره ۱۸۰۰ کلاس ... بازدهی ... درصد ...

$$\frac{L}{\omega} = \frac{C}{\omega} \Rightarrow \frac{L}{\omega} = \frac{C}{\omega} \Rightarrow L = C\omega \Rightarrow S_1 = \frac{1}{2} C \omega^2 = 20 \omega^2$$

L: طول
ω: عرض

$$\frac{L'}{\omega} = \frac{1+\sqrt{5}\omega}{2} \Rightarrow L' = \frac{1+\sqrt{5}\omega}{2} \Rightarrow S_2 = \frac{1}{2} L' \times \omega = 14 \omega^2 \left(\frac{1+\sqrt{5}}{2} \right)$$

$$\frac{S_2}{S_1} = \frac{14 \omega^2 \left(\frac{1+\sqrt{5}}{2} \right)}{20 \omega^2} = \frac{7}{10} \left(\frac{1+\sqrt{5}}{2} \right) = \frac{7}{10} \left(\frac{1+\sqrt{5}}{2} \right)$$

که جواب

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$$\frac{\sqrt{L^2 + \omega^2}}{L} = \frac{1+\sqrt{5}\omega}{2} \Rightarrow \sqrt{L^2 + \omega^2} = \frac{1+\sqrt{5}\omega}{2} L$$

$$\sqrt{L^2 + \omega^2} = \frac{1+\sqrt{5}\omega}{2} L \Rightarrow \frac{L^2 + \omega^2}{L^2} = \left(\frac{1+\sqrt{5}\omega}{2} \right)^2 \Rightarrow \frac{\omega^2}{L^2} = \frac{(1+\sqrt{5}\omega)^2 - 4}{4}$$

$$\Rightarrow \frac{\omega^2}{L^2} = \frac{1 + 2\sqrt{5}\omega + 5\omega^2 - 4}{4} = \frac{5\omega^2 + 2\sqrt{5}\omega - 3}{4} \Rightarrow \frac{L^2}{\omega^2} = \frac{4}{5\omega^2 + 2\sqrt{5}\omega - 3}$$

که جواب

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$$3a + \sqrt{2a^2 + 4a} = 2 \Rightarrow \sqrt{2a^2 + 4a} = 2 - 3a \Rightarrow 2a^2 + 4a = 4 - 12a + 9a^2 \Rightarrow 7a^2 - 16a + 4 = 0$$

$$\Rightarrow \Delta = 16^2 - 4 \times 7 \times 4 = 16 \Rightarrow \sqrt{\Delta} = 4 \Rightarrow a = \frac{16 \pm 4}{14} \Rightarrow a = \frac{12}{14} = \frac{6}{7} \text{ or } a = \frac{20}{14} = \frac{10}{7}$$

$$\text{if } a = \frac{6}{7} \Rightarrow \sqrt{2 \times \left(\frac{6}{7}\right)^2 + 4 \times \frac{6}{7}} + 2 = 2 \Rightarrow 10 \neq 2$$

$$\text{if } a = \frac{10}{7} \Rightarrow \sqrt{2 \times \left(\frac{10}{7}\right)^2 + 4 \times \frac{10}{7}} + 2 = 2 \Rightarrow \sqrt{\frac{140 + 40}{49}} + \frac{2}{7} = \frac{14}{7} + \frac{2}{7} = \frac{16}{7} = 2 \Rightarrow 2 = 2 \checkmark$$

$$a = \frac{10}{7} \Rightarrow \frac{a+1}{a} = \frac{\frac{10}{7} + 1}{\frac{10}{7}} = \frac{17}{10} = \frac{17}{10} \Rightarrow \frac{17}{10} = \frac{17}{10} \Rightarrow \text{جواب}$$

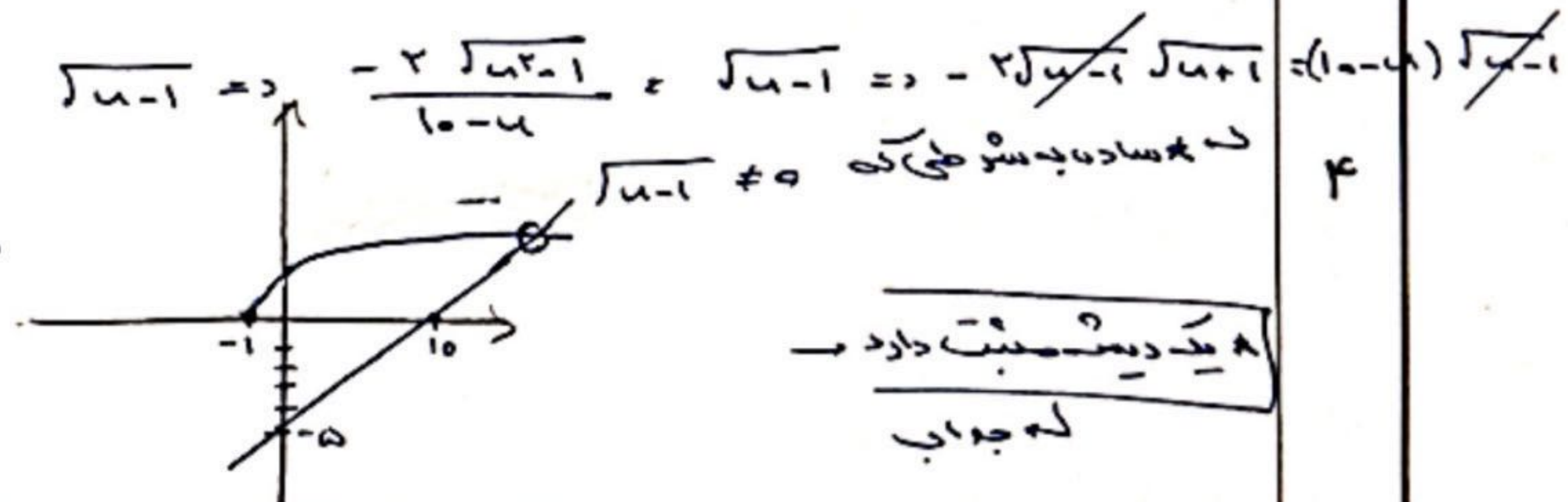
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$$\frac{\sqrt{u+1}}{\sqrt{u-1} + 2} - \frac{\sqrt{u+1}}{\omega - \sqrt{u-1}} = \frac{u-1}{\sqrt{u-1}} \Rightarrow \frac{\sqrt{u+1} (\omega - \sqrt{u-1}) - \sqrt{u+1} (\sqrt{u-1} + 2)}{\omega - (u-1)} = \frac{u-1}{\sqrt{u-1}}$$

$$\Rightarrow \frac{3\sqrt{u+1} - \sqrt{u^2-1} - \sqrt{u^2-1} - 2\sqrt{u+1}}{\omega - u} = \frac{u-1}{\sqrt{u-1}} \Rightarrow \frac{-\sqrt{u^2-1} - \sqrt{u+1}}{\omega - u} = \frac{u-1}{\sqrt{u-1}}$$

$$\Rightarrow -\sqrt{u^2-1} - \sqrt{u+1} = (u-1)(\omega - u) \Rightarrow \sqrt{u+1} = \frac{u-1}{\omega - u}$$

$$\begin{aligned} * u=0 &\Rightarrow y=-5 \\ * u=10 &\Rightarrow y=0 \end{aligned} \Rightarrow \frac{u}{\omega} - 5 = y$$



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$$\frac{1}{\sqrt{2-u} + 2} - \frac{1}{2 - \sqrt{2-u}} = \frac{2-u}{\omega \sqrt{2-u}} \Rightarrow \sqrt{2-u} = t \Rightarrow \frac{1}{t+2} - \frac{1}{2-t} = \frac{2-t}{\omega - t^2} = \frac{-2t}{\omega - t^2} = \frac{t^2}{\omega - t^2} \Rightarrow -10 = \omega - t^2$$

$$\Rightarrow -10 = \omega - (2-u) \Rightarrow -10 = \omega - 2 + u \Rightarrow u = -12$$

که جواب

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$$\frac{1}{u^2} + \frac{1}{(1-u)^2} = \frac{140}{9} \Rightarrow u = \frac{1}{4} + t \Rightarrow \frac{1}{(\frac{1}{4}+t)^2} + \frac{1}{(\frac{1}{4}-t)^2} = \frac{140}{9} \Rightarrow \frac{1}{(\frac{1}{2}-t^2)^2} = \frac{140}{9}$$

$$\Rightarrow \frac{1}{(\frac{1}{2}-t^2)^2} = \frac{140}{9} \Rightarrow \frac{9}{16} + 9t^2 = \frac{140}{9} \Rightarrow 81t^2 + 11 = 140 \Rightarrow 81t^2 = 129 \Rightarrow t^2 = \frac{43}{27}$$

$$\Rightarrow t = \pm \sqrt{\frac{43}{27}} \Rightarrow u = \frac{1}{4} \pm \sqrt{\frac{43}{27}}$$

$$\sqrt{-u^2+4u-1} \Rightarrow u^2-4u+1 \leq 0 \Rightarrow (u-2)(u-1) \leq 0 \Rightarrow [1, 2]$$

$$\sqrt{-u^2+4u+100} \Rightarrow u^2-4u-100 \leq 0 \Rightarrow (u-2)(u+100) \leq 0 \Rightarrow u \in [2, 102]$$

$$\Rightarrow (u-2)(u+100)(u-1) \leq 0 \Rightarrow (-\infty, -100] \cup [1, 2] \cup [102, \infty)$$

$$\sqrt{16+4u+100-100} + \sqrt{16+4u+100-100} = 16+4u+100-100 = 16+4u$$

$$y = |u+2| + |u-1| \text{ و } y+u=10$$

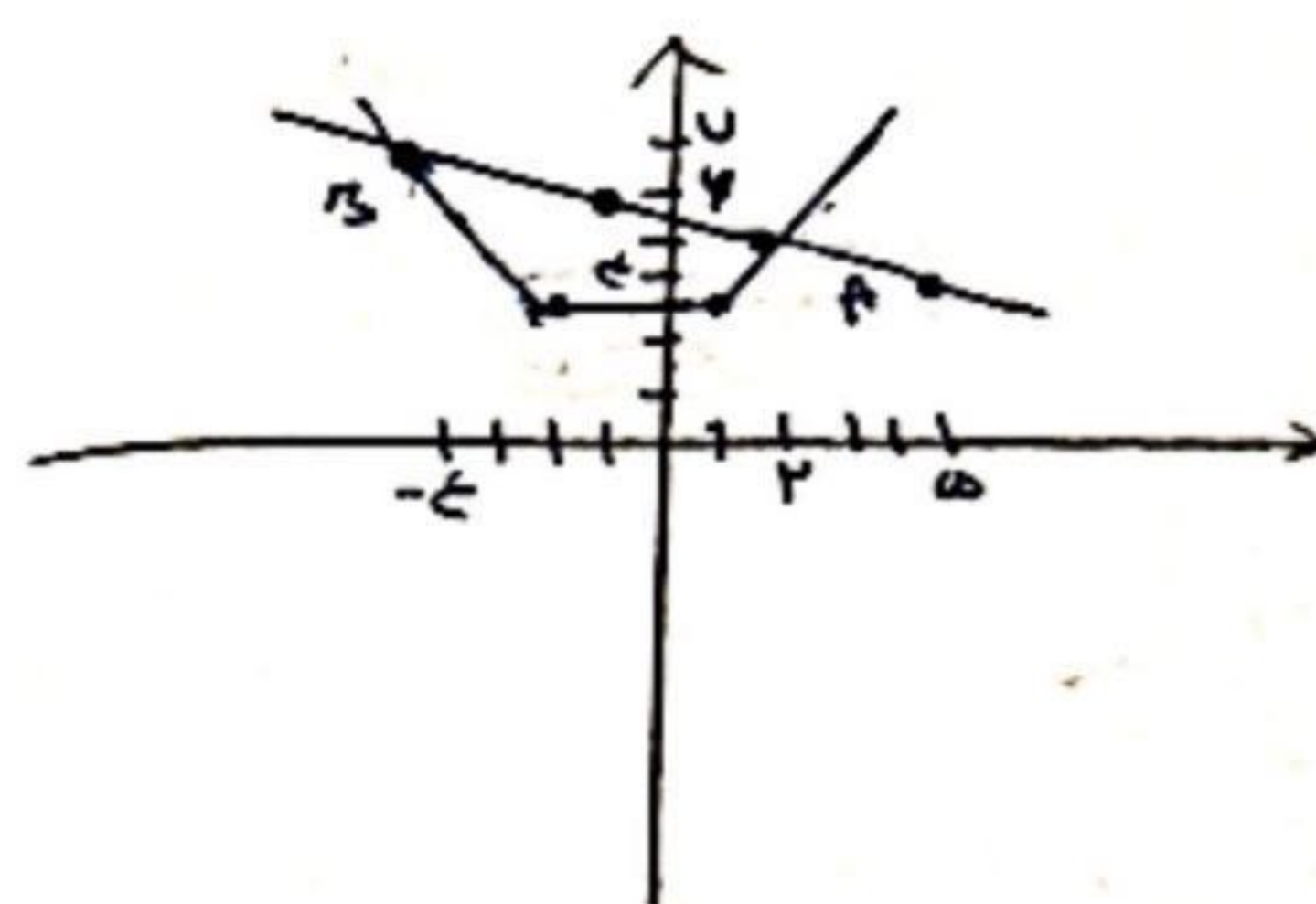
$$\begin{array}{r|l} -2 & 1 \\ \hline -u-1 & u+1 \end{array}$$

$$\hookrightarrow y = -u+1$$

$$\Rightarrow u \geq 1 \text{ و } u \leq -1$$

$$\begin{cases} y+u=10 \\ y-u=-1 \end{cases} \Rightarrow \begin{cases} -2u=9 \\ u=-4.5 \end{cases}$$

$$\begin{cases} y-2u=1 \\ y+u=10 \end{cases} \Rightarrow \begin{cases} -3u=9 \\ u=-3 \end{cases}$$



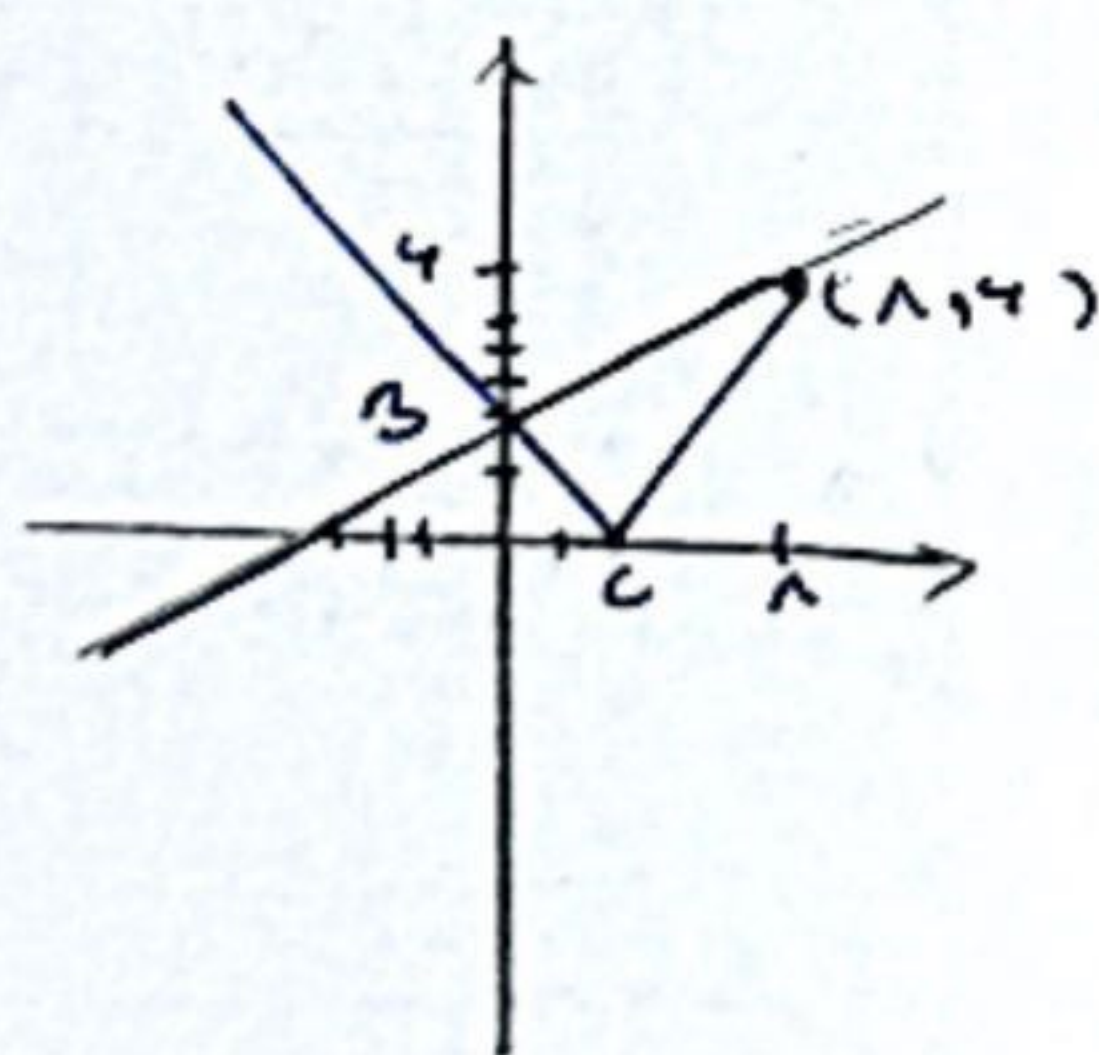
$$AB = \sqrt{\Delta u^2 + \Delta y^2} = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$$

$$y = \sqrt{u^2-4u+16} \Rightarrow \sqrt{(u-2)^2+12} = |u-2|$$

$$\begin{array}{r|l} 2 & \\ \hline -u+2 & u-2 \end{array}$$

$$\begin{cases} y+u=10 \\ -y+\frac{u}{2}=-2 \end{cases} \Rightarrow \begin{cases} \frac{3}{2}u=8 \\ u=\frac{16}{3} \end{cases}$$

$$\begin{cases} y-u=-2 \\ -y+\frac{u}{2}=-2 \end{cases} \Rightarrow \begin{cases} -\frac{1}{2}u=-4 \\ u=8 \end{cases}$$



$$AB = \sqrt{(10-(-2))^2 + (8-4)^2} = \sqrt{144+16} = \sqrt{160} = 4\sqrt{10}$$

$$BC = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$$

$$S = \frac{2\sqrt{5} \times 4\sqrt{10}}{2} = 20$$

$$\text{مطلوب : } u$$

$$\text{فرموله : } u+9$$

$$\text{مطلوب : } y$$

$$\frac{1}{u} + \frac{1}{u+9} = \frac{1}{y} \Rightarrow \frac{u+9}{u^2+9u} = \frac{1}{y} \Rightarrow 110+45u = u^2+9u$$

$$\Rightarrow u^2-41u-110=0 \Rightarrow u = \frac{41 \pm \sqrt{1761}}{2} \Rightarrow \Delta = 1761 = 42^2 \Rightarrow \Delta = 42 \times 42 = (42 \times 42 - 110)$$

$$\Rightarrow \Delta = 1761 \text{ و } \sqrt{\Delta} = 42$$

$$u = \frac{41 \pm 42}{2} \Rightarrow u = \frac{83}{2} \text{ و } u = -\frac{1}{2}$$

$$\hookrightarrow u = -\frac{1}{2} \Rightarrow y = -\frac{1}{2} \Rightarrow y = -\frac{1}{2}$$

$$\Rightarrow u = 41 \Rightarrow y = 41$$