

$$\max \text{ طول} = \frac{-b}{2a} = \frac{-b}{-2} = \frac{b}{2} \Rightarrow y_{\max} \Rightarrow \frac{-b^2}{4} + \frac{b^2}{2} + 3 = 7 \Rightarrow -\frac{b^2}{4} + \frac{b^2}{2} - 4 = 0 \xrightarrow{\times 4} -b^2 + 2b^2 - 16 = 0 \Rightarrow b^2 - 16 = 0 \Rightarrow b^2 = 16 \Rightarrow \boxed{b = \pm 4}$$

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الف) صفر تابع ندارد $\rightarrow$ ریشه حقیقی ندارد $\rightarrow \Delta < 0$ $\rightarrow \Delta = f - f(3) = -1$ $\rightarrow \Delta < 0$

ب) $4 - x^2 = b \Rightarrow b^2 - 2b - 16 = 4 \Rightarrow \Delta = f - f(-15) = 44 \rightarrow b = \frac{2 \pm 8}{2} \rightarrow \begin{matrix} 5 \\ -3 \end{matrix}$

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$\rightarrow 4 - x^2 = 5 \rightarrow x^2 = -1$ $\rightarrow$ هیچ مقبری ممکن نیست

$\rightarrow 4 - x^2 = -3 \rightarrow x^2 = 7 \rightarrow x = \pm \sqrt{7} \Rightarrow$ صفرهای تابع $= +\sqrt{7}, -\sqrt{7}$

ریشه بزرگتر: α $\rightarrow$ یکی از ریشه ها α $\rightarrow$ ریشه ها $= \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{14 \pm \sqrt{\Delta}}{8} \rightarrow \beta = \frac{14 + \sqrt{\Delta}}{8} \rightarrow \frac{14 + \sqrt{\Delta}}{8} = \alpha$

و $\beta = \alpha - 2 \Rightarrow \frac{14 - \sqrt{\Delta}}{8} = \frac{14 + \sqrt{\Delta}}{8} - 2 \rightarrow 2 - \frac{\sqrt{\Delta}}{4} = 2 + \frac{\sqrt{\Delta}}{4} - 2 \rightarrow \frac{\sqrt{\Delta}}{4} = 0 \rightarrow \sqrt{\Delta} = 0 \rightarrow \Delta = 0$

$\Delta = b^2 - 4ac = 44 \rightarrow 154 - 4(4m) = 44$

$\rightarrow \boxed{m = 12} \rightarrow f_{x^2} - 14x + 12 = 0 \xrightarrow{\Delta = 44} x = \frac{14 \pm 8}{8} \rightarrow \begin{matrix} 3 = \alpha \\ 1 = \beta \end{matrix}$

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$2\alpha - \beta = 4 \rightarrow \alpha = \frac{4 + \beta}{2} = 2 + \frac{\beta}{2}$ و $S = \frac{q}{p} = 2 \Rightarrow S = \alpha + \beta = 2 + 2\beta = 2 \rightarrow 2\beta = 0 \rightarrow \beta = 0$

$\Rightarrow \alpha = 2 + \beta = 2$ و $\frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{4 \pm \sqrt{\Delta}}{4} \rightarrow \frac{4 + \sqrt{\Delta}}{4} = 2 \Rightarrow \frac{\sqrt{\Delta}}{4} = 0 \Rightarrow \sqrt{\Delta} = 0 \Rightarrow \Delta = 0$

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زمانی که ادریس مقبول
کلیه ریشه ها یعنی ضرب آن ها
برابر است $\Rightarrow \frac{c}{a} = 1 \Rightarrow \frac{m^2 - 2}{-m} = 1 \rightarrow m^2 - 2 = -m \rightarrow m^2 + m - 2 = 0 \rightarrow \Delta = 1 - 4(-2) = 9$

$\Rightarrow m = \frac{-1 \pm 3}{2} \rightarrow \begin{matrix} 1 \\ -2 \end{matrix}$ $\rightarrow$ $-x^2 + 8x - 1 = 0 \rightarrow \Delta = 14 - 4(1) = 12$ $\rightarrow$ $x^2 + 8x + 2 = 0 \rightarrow \Delta = 14 - 4(4) = 0$

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پس هیچ قیاسی

پس فقط $\boxed{m = 1}$ را می توان برای جواب گرفت.

$$x^2 = f \Rightarrow x^2 = \frac{f}{b} \Rightarrow \frac{c}{a} = \frac{f}{b} \Rightarrow x = \frac{f}{b} \rightarrow b = \frac{f}{x}, a = \frac{f}{x^2}$$

$$\rightarrow x + b = \frac{f \cdot x^2}{x \cdot x^2} + \frac{a \cdot x^2}{f \cdot x^2} = \frac{14 + 2x}{x^2} = \frac{f \cdot x}{x^2} = \frac{-b}{a} \Rightarrow \frac{f \cdot x}{x^2} = \frac{m}{1} \rightarrow 1 \cdot m = f \cdot x \Rightarrow m = \frac{f \cdot x}{1}$$

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$$x = x^2 b \Rightarrow x + b = \frac{-b}{a} = f \Rightarrow f \cdot b = f \Rightarrow b = 1, a = x^2 \Rightarrow p = x^2 \Rightarrow \frac{c}{a} = x^2 \Rightarrow m = x^2$$

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$$x^2 + \frac{1}{x^2} = (x + \frac{1}{x})(x + \frac{1}{x^2} + 1) \Rightarrow x^2 + \frac{1}{x^2} = x \cdot x \cdot \boxed{3.1}$$

$$\frac{x^2 + 1}{x} = \frac{x(x+1)}{x} \quad \downarrow$$

$$\left(x + \frac{1}{x}\right)^2 - f - 1 = 89 - 4 = 85$$

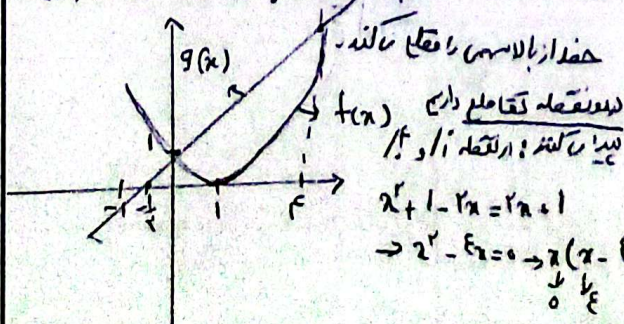
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$$b_{\max} = \frac{-b}{p \cdot a} = \frac{-0.5}{-1} = \frac{0.5}{1} \rightarrow h_{\max} = -1 \cdot \left(\frac{0.5}{1}\right) + \frac{0.5}{1} = \frac{-0.5}{1} + \frac{0.5}{1} = 0$$

زمانی که نقطه به زمین برخورد کند $\Rightarrow \lambda = 0 \Rightarrow 0 = -1 \cdot b + 0.5 \cdot b \rightarrow -1 \cdot b (b - 0.5) = 0 \Rightarrow b = 0.5$

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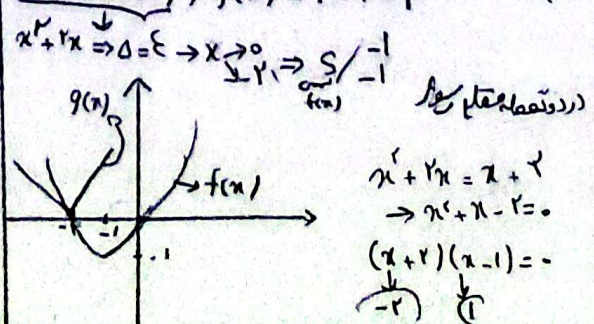
$$f(x) = (x-1)^2, g(x) = x^2 + 1$$



(الف)

$$x^2 + 2x = f(x), g(x) = |x+1|$$

(ب)



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