

$$g = -n^2 + bn + 3$$

$$\downarrow$$

$$\text{من} \left| \begin{array}{l} -\frac{b}{2a} \\ -\frac{\Delta}{4a} \end{array} \right. \rightarrow -\frac{b^2 + 12}{-4} = \checkmark$$

$$\downarrow$$

$$b^2 + 12 = 48$$

$$\downarrow$$

$$b^2 = 36 \rightarrow \frac{b = \pm 6}{b = -6} \checkmark$$

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الف) $f(n) \Rightarrow n^2 + 2n^2 + 3 = 3n^2$ $\xrightarrow{x=2t}$ $t^2 + 2t + 3 = 0$

$\Delta < 0 \rightarrow$ جواب حقیقی ندارد $\checkmark$

و جدید ندارد $\leftarrow$ جواب حقیقی برای x ندارد $\checkmark$

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ب) $f(n) \Rightarrow (5-n^2)^2 - 2(5-n^2) - 15 = 0 \rightarrow (5-n^2-5)(5-n^2+3) = 0$

$\downarrow$ $-n^2-1=0 \rightarrow n^2 = -1 \rightarrow$ جواب حقیقی ندارد $\checkmark$

$\downarrow$ $-n^2+3=0 \rightarrow n^2 = 3 \rightarrow \frac{n = \pm\sqrt{3}}{n = \sqrt{3}} \checkmark$

$$5n^2 - 14n + m = 0$$

$$\downarrow$$

$$\Delta = 196 + 20m$$

$$5 - 14 + m = 0 \rightarrow m = 9 \checkmark$$

$$\downarrow$$

$$5 = 2\alpha + 2\beta - \frac{b}{a} = 5 \rightarrow 2\alpha + 2\beta = 10 \rightarrow \alpha = 1 \checkmark \quad \beta = 3 \checkmark$$

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$$3n^2 - 9n + m - 1 = 0 \rightarrow 3\alpha + 3\beta - \frac{b}{a} = 4$$

$$\downarrow$$

$$3\alpha - 3\beta = 4 \rightarrow 3\alpha + 3\beta - 3\beta = 4 \rightarrow 3\alpha = 4 \rightarrow \alpha = \frac{4}{3}$$

$$\rightarrow m - 1 = 0 \rightarrow m = 1 \checkmark$$

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$$-mn^2 + 6n + m^2 - 4 = 0$$

$$\downarrow$$

$$\Delta = 36 - 4m(m-4)$$

$$\rightarrow D = 36 - 4m(m-4)$$

$$\frac{m^2 - 4}{-m} = 1$$

$$\downarrow$$

$$m^2 - 4 = -m$$

$$m^2 + m - 4 = 0$$

$$\downarrow$$

$$(m+4)(m-1) = 0 \rightarrow \frac{m = 1}{m = -4}$$

$$m = 1 \checkmark \rightarrow -n^2 + 6n - 1 = 0$$

$$m = -4 \rightarrow 4n^2 + 6n + 3 = 0 \rightarrow 4(n^2 + \frac{3}{2}n + \frac{9}{4}) = 0 \rightarrow 4(n + \frac{3}{2})^2 = 0 \rightarrow n = -\frac{3}{2}$$

$\checkmark$ $\rightarrow$ هیچ مضاعف $\checkmark$

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$$n^2 - mn + p = 0 \rightarrow p, \Delta, m = \dots$$

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$$\Delta = m^2 - 4p = 0 \rightarrow m = \frac{4p}{2} = 2p \rightarrow m = \frac{4p}{2} \checkmark$$

$$n^2 - (m+n) = 0 \rightarrow \Delta = m^2 - 4(-m-n) = 0 \rightarrow \Delta = m^2 + 4m + 4n = 0 \rightarrow m = \frac{-4 \pm \sqrt{16 - 16n}}{2} = -2 \pm \sqrt{1-n} \checkmark$$

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$$n^2 - \sqrt{n} + p = 0 \rightarrow \Delta = 1 - 4p = 0 \rightarrow p = \frac{1}{4} \rightarrow \Delta = 1 - 4 \cdot \frac{1}{4} = 0 \rightarrow n = \frac{1}{2} \checkmark$$

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$$h(t) = -\frac{1}{2}gt^2 + v_0 t \rightarrow h=0 \rightarrow -\frac{1}{2}gt^2 + v_0 t = 0 \rightarrow t = 0 \text{ or } t = \frac{2v_0}{g} \rightarrow t = \frac{2v_0}{g} \checkmark$$

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$$(n-1)^2 = 2n+1 \rightarrow n^2 - 2n + 1 = 2n+1 \rightarrow n^2 - 4n = 0 \rightarrow n(n-4) = 0 \rightarrow n = 0 \text{ or } n = 4 \checkmark$$

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