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$$y \leq \frac{-b}{a} \leq v \Rightarrow \frac{-b^2 + 4ac}{4a} \leq v \Rightarrow \frac{-b^2 + 4(-1)(-1)}{4(-1)} \leq v \Rightarrow \frac{-b^2 + 4}{-4} \leq v \Rightarrow b^2 \leq 4 - 4v \Rightarrow b^2 \leq 4(1-v)$$

باید هر دو جواب قابل قبول است.

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الف) $f(x) = x^2 + 3x + 3 \rightarrow x^2 \leq t$
 $t^2 + 3t + 3 \leq 0 \rightarrow \Delta < 0$ (معادله ریشه)
 $\Delta = 9 - 4(3)(3) = -15$ (تقریباً ندارد)

ب) $f(x) = (x-x^2)^2 - 2(x-x^2) - 14 \rightarrow x^2 \leq t$
 $t^2 - 2t - 14 \leq 0 \Rightarrow t \geq 0 \Rightarrow x^2 - x^4 \leq 0 \Rightarrow x^2(1-x^2) \leq 0 \Rightarrow x^2 \leq 1 \Rightarrow x \in [-1, 1]$
 $(x-0)(x+3) < t \Rightarrow x^2 - 3x \leq t \Rightarrow x^2 - 3x - t \leq 0 \Rightarrow x \leq 3 \Rightarrow x \in (-\infty, 3]$
 $x \in [-1, 1] \cap (-\infty, 3] = [-1, 1]$

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$5x^2 - 14x + m \leq 0 \rightarrow \alpha, \beta$ جواب های صحیح
 $\alpha \leq \beta + 2 \Rightarrow \alpha - \beta \leq 2 \Rightarrow \frac{\sqrt{\Delta}}{|a|} \leq 2 \Rightarrow \frac{\sqrt{b^2 - 4ac}}{|a|} \leq 2 \Rightarrow \frac{\sqrt{196 - 4(5)(m)}}{5} \leq 2$
 $\Rightarrow 196 - 20m \leq 40 \Rightarrow 156 \leq 20m \Rightarrow m \geq 7.8 \Rightarrow m \geq 8$
 $5x^2 - 14x + 12 \leq 0 \xrightarrow{(\pm)}$
 $x^2 - 2.8x + 2.4 \leq 0 \Rightarrow x_1 = 1, x_2 = 2$
 $\alpha = 1, \beta = 2, m = 12$
 $5x^2 - 14x + 12 = 0 \Rightarrow \Delta = 0$

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$5x^2 - 4x + m - 1 \leq 0$
 $\alpha - \beta \leq 2 \Rightarrow \beta \geq \alpha - 2$
 $\alpha + \beta \leq 5 \Rightarrow \frac{b}{a} \leq \frac{\gamma}{\mu} \leq 2$
 $\alpha - 2 + \alpha \leq 2 \Rightarrow \alpha \leq 2$
 $\alpha - 2 + 2 \leq 5 \Rightarrow \alpha \leq 5$
 $\alpha \in [2, 5], \beta \in [0, 3]$

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$p \geq \frac{c}{a} \Rightarrow p \geq 0 \Rightarrow \frac{m-1}{5} \geq 0 \Rightarrow m-1 \geq 0 \Rightarrow m \geq 1$
 $5x^2 - 4x = 0 \Rightarrow \Delta = 0$

$-mx^2 + 4x + m^2 - 2 \leq 0$
 $\alpha \leq \frac{1}{\beta}$
 $p \leq \alpha \cdot \beta \leq \frac{1}{\beta} \cdot \beta \leq 1 \Rightarrow \frac{c}{a} \leq \frac{m^2 - 2}{-m} \leq 1 \Rightarrow -m \leq m^2 - 2 \Rightarrow m^2 + m - 2 \geq 0 \Rightarrow (m+2)(m-1) \geq 0$
 $m \in (-\infty, -2] \cup [1, \infty)$
 $\alpha \cap \beta \Rightarrow m \geq 1$

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معادله در
 ریشه
 تقریباً دارد
 $\Rightarrow \Delta \geq 0 \Rightarrow b^2 - 4ac \geq 0 \Rightarrow (2 - 4(-m)(m^2 - 2)) \geq 0 \Rightarrow 4m^3 + 8m - 4 \geq 0 \Rightarrow m^3 + 2m - 1 \geq 0$
 $1 + 4m^2 - 4m \geq 0 \Rightarrow (m+2)(m-1) \geq 0$
 $m \in (-\infty, -2] \cup [1, \infty)$
 $\Delta \leq 4 - 4(-1)(m^2 - 2) \Rightarrow \Delta \leq 4 + 4m^2 - 8 \Rightarrow \Delta \leq 4m^2 - 4 \Rightarrow \Delta \leq 4(m^2 - 1) \Rightarrow \Delta \leq 4(m-1)(m+1)$
 (ریشه تقریباً ندارد)

$$\begin{array}{r} m^2 + 2m + 1 \\ -m^2 + 2m + 2 \\ \hline -2m^2 - 4m + 3 \\ +2m^2 + 4m \\ \hline 3 \end{array}$$

$\alpha\beta^r \leq \epsilon$ $(\alpha\beta)^r \leq \epsilon$ $\beta \leq \frac{\epsilon}{\alpha}$ $\alpha \leq \frac{\epsilon}{\beta}$	$\pi^r - m\pi + r_s = 0$ $S \geq \frac{b}{a} \leq \alpha + \beta \Rightarrow \alpha + \beta \leq \frac{r_r}{r_r} + \frac{14}{r_r} \leq m \Rightarrow m \leq \frac{r_r}{14}$ $P \leq \frac{c}{a} \leq r \leq \alpha\beta$ $2r - \frac{r_r}{14} + r \geq 0 \checkmark$	1, 1, 50 6
$\pi^r - \epsilon\pi + m_s = 0 \rightarrow \alpha, \beta$ $\alpha \leq r\beta$ $\alpha + \beta \leq S \leq \frac{b}{a} \leq \epsilon \Rightarrow r\beta + \beta \leq r \Rightarrow \beta \leq 1, \alpha \leq r\beta \leq r$ $\alpha - \beta \leq \frac{c}{a} \leq m \Rightarrow m \leq r(\alpha - \beta) \Rightarrow m \leq r$	$2r - \epsilon\pi + r \geq 0 \checkmark$	1, 1, 50 7
$\pi^r - v\pi + r_s = 0$ $P \leq \frac{c}{a} \leq \alpha\beta \leq r \Rightarrow \beta \leq \frac{r}{\alpha} \Rightarrow \beta \leq \frac{r}{\alpha}$ $S \leq \frac{b}{a} \leq v$ $\alpha + \frac{r}{\alpha} \leq \beta \leq \frac{r}{\alpha} \Rightarrow \alpha + \frac{r}{\alpha} \leq \frac{r}{\alpha} \Rightarrow \alpha \leq r$	$2r - v\pi + r \geq 0 \checkmark$	5 8
$h_{\max} \leq y \leq S$ $y \leq \frac{b}{a} \leq v$ $y \leq \frac{b}{a} \leq v$	نقطه‌ای ضربه زدن به تیر زمان برخورد تیر نقطه‌ای برخورد تیر تیر به زمین	5 9
$(x-1)^r \leq r\pi + 1 \Rightarrow$ $\pi \leq 0 \rightarrow y \leq 1$ $y \leq 0 \rightarrow \pi \leq -1$	نقطه‌ای برخورد تیر نقطه‌ای برخورد تیر نقطه‌ای برخورد تیر نقطه‌ای برخورد تیر	5 10

$m \leq -r, m \leq 1$