$x^2 - 5x + 2 = 0$ $\quad \left(\frac{4\alpha + \beta^5}{5\beta^2}\right)$

۱-

$\alpha + \beta = 5 \rightarrow \alpha = \beta - 5$

$\alpha\beta = 2$

$$\frac{4(\beta - 5) + \beta^5}{5\beta^2} = \frac{4\beta - 20 + \beta^5}{5\beta^2}$$

$\beta^2 - 5\beta + 2 = 0 \rightarrow \beta^2 = 5\beta - 2$

$\beta^3 = \beta \times \beta^2 = \beta(5\beta - 2) = 5\beta^2 - 2\beta$

$\beta^4 = \beta^3 \cdot \beta = (5(5\beta - 2) - 2\beta)\beta = (5(5\beta - 2) - 2\beta)\beta =$

$\beta(12\beta - 10 - 2\beta) = (12\beta - 10)\beta = 24\beta^2 - 10\beta$

$24(5\beta - 2) - 10\beta - 4 \quad 120\beta - 48 - 10\beta = 110\beta - 48$

$\beta^5 = \beta^4 \times \beta = (110\beta - 48)\beta = 110\beta^2 - 48\beta - 4$

$110(5\beta - 2) - 48\beta = 550\beta - 220 - 48\beta = 502\beta - 220$

$\beta^5 = 502\beta - 220$

مرتبه بعدی $\quad 4\alpha + \beta^5 = 4\alpha + 502\beta - 220 - 4$

$\beta = 5$

$4\alpha = 4(5 - \beta) = 20 - 4\beta$

$4\alpha + \beta^5 = (20 - 4\beta) + (502\beta - 220) =$

$498\beta - 200$

حاصل $5\beta^2 - 5(5\beta - 2) = 25\beta - 10$

۱۰ $\quad \frac{498\beta - 200}{25\beta - 10} = \frac{99\beta - 40}{5\beta - 2} - 4 \quad \beta = \frac{5 \pm \sqrt{25 - 8}}{2} = \frac{5 \pm \sqrt{17}}{2}$

$\frac{5 + \sqrt{17}}{2} - 4 \quad 5\beta - 2 = 5 \times \frac{5 + \sqrt{17}}{2} - 2 = \frac{25 + 5\sqrt{17} - 4}{2} =$

$99\beta - 40 = 99 \cdot \frac{5 + \sqrt{17}}{2} - 40 - 4 \quad \frac{396 + 99\sqrt{17}}{2}$

$$\frac{\omega_0 - 4\frac{\pi 99 + 9\cos\sqrt{17}}{2}}{\frac{21+\cos\sqrt{17}}{2}} = \frac{\pi 99 + 9\cos\sqrt{17} - 4\cos\theta - 4}{21+\cos\sqrt{17}}$$

$$(21+\cos\sqrt{17})(21-\cos\sqrt{17}) = 441 - 17\cos^2 17 = 441$$

$$\omega_0 \longrightarrow \frac{\pi 64}{189} = \boxed{19}$$

$-\mu$

$A(\omega_0, -5), B(-11, \omega_0 - 5)$

$$x = \frac{\omega - 110}{2} = \frac{110}{\pi} = 0.175$$

$$y = a(x-h)^2 + k, \quad h = 0.175 \to \frac{-b}{2a} = 0.175 \to \frac{-b}{a} = 1.0$$

$$y = a(x - 0.175)^2 + k$$

$$r_1 + r_2 = \frac{-b}{a} = \frac{1.0}{5}$$

$-\mu$

$x^2 + 2kx + 5 = 0 \to \alpha + \beta = -2k$

$\frac{\omega}{5}k$

$\left[\frac{k^2}{2}\right]$

$\alpha\beta = 5$

$|\alpha - \beta| = \frac{5}{\omega}k$

$(\alpha-\beta)^2 = (\alpha+\beta)^2 - 4\alpha\beta$

$(\alpha-\beta)^2 = (-2k)^2 - 4(5)$

$= 4k^2 - 20$

$$\left(\frac{5}{\omega}k\right)^2 = 5k^2 - 20 \longleftarrow \omega_0$$

$k^2 \to \frac{14}{4}k^2 = 5k^2 - 20$

$\frac{14}{9}k^2 - 5k^2 = -20$

$\frac{14k^2 - 45k^2}{9} = -20$

$-20k^2 = -180 \to k^2 = 9 \to \frac{k^2}{2} = \frac{9}{2}$ $\uparrow 4.5$

$y = a(x-h)^2 + k$ $\quad \alpha^2 + \beta^2 = 5$ $\quad$ ۴-

$s^2 - 2p = 5$

$y = (x-h)^2 + k$

$y = (x-h)^2 + 1$

$A(2, y_1)$, $B(-3, y_2)$ $\rightarrow$ $y_1 - 4a(2-h)^2 + 1 = a(-3-h)^2 + 1 - 4$

$(2-h)^2 = (-3-h)^2$

$4 - 4h + h^2 = 9 + 6h + h^2$

$-10 = 10h \rightarrow h = -1$

$y = 0 - 4 = a(x+1)^2 + 1 \rightarrow a(x+1)^2 = -1$ ریشه‌ها x

$x = -1 \pm \sqrt{\frac{-1}{a}}$

$\alpha = -1 - \sqrt{\frac{-1}{a}}$

$\beta = -1 + \sqrt{\frac{-1}{a}}$

$\alpha^2 + \beta^2 = 5 \rightarrow (-1-s)^2 + (-1+s)^2 = 5$

$s = \sqrt{\frac{-1}{a}}$ $\quad 2 + 2s + s^2 + 2 - 2s + s^2 = 5$

$2 + 2s^2 = 5 \rightarrow s^2 = \frac{3}{2} \rightsquigarrow \frac{-1}{a} = \frac{3}{2} \rightarrow a = \frac{-2}{3}$ $\quad x = 0$, $y = \frac{1}{2}$

رأس سهمی و نقطه $(0, \frac{1}{2})$ قطعی‌اند

۵- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-5 \pm \sqrt{25 + 4m}}{-2}$ $\rightarrow x_1 = \frac{5 + \sqrt{25+4m}}{2}$

$\rightarrow x_2 = \frac{5 - \sqrt{25+4m}}{2}$

$a < 0 \rightarrow m_1$ — منفی‌ترین $\quad m_1 < \frac{9}{2} \rightarrow \frac{5 + \sqrt{25+4m}}{2} < \frac{9}{2} = \sqrt{25 + 4m} < 4$

$m < \frac{9}{4}$

$\Delta > 0 \rightarrow 25 + 4m > 0 \rightarrow m > -6.25$

m صحیح $\rightarrow -6.25 < m < 2.25$

$m = \underbrace{-6, -5, -4, -3}_{\text{۴ عدد}}$

۶- $\frac{-\Delta}{4a} = \frac{144 - 4m(5m-11)}{4m} = \frac{m(5m-1) - 24}{m} \rightarrow \frac{5m}{m}$

$\frac{m(m-1)-2}{m} = 1 \rightarrow m^2 - m - 2 = m \rightarrow m^2 - 2m - 2 = 0$

$m-2)(m+1) = 0 \rightarrow m=2 \;,\; m=\frac{-1}{2}$

$m=2 \rightarrow y = 2x^2 - 12x + 16$ ← تقارن حول x^2 ضربی

$x = \frac{-b}{2a} = \frac{12}{4} = 3$

۷- $\frac{\alpha}{\alpha} = \frac{\beta}{\alpha} \rightarrow \alpha^2 = \alpha\beta \rightarrow \alpha+\beta = -2(\alpha+1)\,,\; \alpha\beta = 2\alpha - 1$

$\beta = \frac{\alpha^2}{\alpha}$ ، جایگذاری

$\alpha + \frac{\alpha^2}{\alpha} = -2(\alpha+1) \xrightarrow{\times\alpha} \alpha\alpha + \alpha^2 = -2\alpha(\alpha+1) \rightarrow \alpha^2 + \alpha\alpha + 2\alpha(\alpha+1) = 0$

$\alpha \times \frac{\alpha^2}{\alpha} = 2\alpha - 1 \rightarrow \frac{\alpha^3}{\alpha} = 2\alpha - 1\,,\; \alpha^2 = \alpha\beta \rightarrow \alpha\beta = 2\alpha - 1$

$\beta = \frac{\alpha^2}{\alpha}$

$\alpha + \frac{\alpha^2}{\alpha} = -2(\alpha+1) \rightarrow \alpha^2 + \alpha\alpha + 2\alpha(\alpha+1) = 0$

$\alpha \times \alpha^2 = \alpha(2\alpha - 1) \rightarrow \alpha(-\alpha\alpha - 2(\alpha(\alpha+1))) = \alpha(2\alpha-1)$

$-\alpha\alpha^2 - 2\alpha(\alpha\alpha + 1)\alpha = \alpha(2\alpha-1) = \alpha^2 + 2(\alpha+1)\alpha + (2\alpha-1) = 0$

اگر α در این معادله صدق کند برقرار است ← حل است $\alpha = \frac{-1}{2}$

۸- $x^4 - 7x^2 - 5 = 0 \rightarrow x^2 = t \rightarrow t^2 - 7t - 5 = 0$

$\Delta = b^2 - 4ac \rightarrow 49 - 4(1)(-5) + 2(-5) = 49 + 20 + 10 = 69$

۹- $c = -4\,,\; b = -4\,,\; a = 12$

$x = \frac{-b}{2a} \qquad y = \frac{-\Delta}{4a}$

$x_0 = \frac{4}{24} = \frac{2}{12}$

$y = 12(\frac{2}{12})^2 - 4(\frac{2}{12}) - 4 = \frac{-4}{12} - 4$

$-4(\frac{2}{12}) - 4$ ←

$\frac{-4}{12} - 4 = \frac{-16}{12} - 4 \rightarrow \frac{(-4+16)}{12} = 1$

$4 = 12k \rightarrow k = 3$ ← $\sin\frac{\pi}{2} = 1$

۱۰- $-mx^2 + mx + 1 = -m - x \rightarrow -mx^2 + mx + 1 + m + x = 0 \rightarrow$

$-m x^2 + (m+1)x + (1+1)^2 + 5m$

$x=1 \rightarrow mx^2 - (m+1)x - (1+m) = 0 \rightarrow \Delta < 0 \rightarrow \Delta = (-(m+1))^2 - (5m)$

$(-(m+1)) = (m+1)^2 + 5m \times (m+1) = (m+1)((m+1) + 5m) \rightarrow$

$(m+1)(6m+1) - 2(m+1)(3m+1) \leq 0$ → $m = -1$, → $m = \frac{-1}{3}$

$m \in \rightarrow -1 < m < \frac{-1}{3} \rightarrow$ غیر قابل قبول