

المعادلة الثانية

$$x^2 - 4x = -1$$

$$x^2 - 4x + 4 = -1 + 4$$

$$(x-2)^2 = 1 \quad x-2 = \pm 1 \quad \begin{cases} x=2 \\ x=3 \end{cases}$$

$$x^2 + 11x = -1$$

$$x^2 + 11x + 12 = -1 + 12$$

$$(x+3)^2 = 9 \quad x+3 = \pm 3 \quad \begin{cases} x=-3 \\ x=-6 \end{cases}$$

$$x^2 - 2x + 9 = (x-2)(x-3) = 0 \quad \begin{cases} x=2 \\ x=3 \end{cases}$$

$$x^2 - 2x - 12 = (x-4)(x+3) = 0 \quad \begin{cases} x=4 \\ x=-3 \end{cases}$$

$$x^2 - 3x - 2 = 0 \quad a=1 \quad b=-3 \quad c=-2$$

$$\Delta = b^2 - 4ac = (-3)^2 - 4(1)(-2) = 9 + 8 = 17$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{3 \pm \sqrt{17}}{2} \quad x = \frac{3 + \sqrt{17}}{2} \quad x = \frac{3 - \sqrt{17}}{2}$$

$$12x^2 - 12x + \frac{1}{4} = 0 \quad a=12 \quad b=-12 \quad c=\frac{1}{4}$$

$$\Delta = b^2 - 4ac = (-12)^2 - 4(12)(\frac{1}{4}) = 144 - 12 = 132$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{12 \pm \sqrt{132}}{24} \quad x = 1 + \frac{\sqrt{33}}{6} \quad x = 1 - \frac{\sqrt{33}}{6}$$

$$x^2 - 12x + 12 = 0 \quad (x-1)(x-12) = 0 \quad \begin{cases} x=1 \\ x=12 \end{cases}$$

$$12x^2 + x - 12 = 0 \quad a=12 \quad b=1 \quad c=-12$$

$$\Delta = b^2 - 4ac = (1)^2 - 4(12)(-12) = 1 + 576 = 577$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-1 \pm \sqrt{577}}{24} \quad x = \frac{-1 + \sqrt{577}}{24} \quad x = \frac{-1 - \sqrt{577}}{24}$$

$$2x^2 - 12x + 12 = 0 \quad x^2 - 6x + 6 = 0$$

$$(x-3)(x-2) = 0 \quad \begin{cases} x=3 \\ x=2 \end{cases}$$

$$12x^2 - 10x + 12 = 0 \quad x^2 - 10x + 12 = 0$$

$$(x-1)(x-12) = 0 \quad \begin{cases} x=1 \\ x=12 \end{cases}$$

$$Kx^2 - \omega x - 1 = 0 \quad a = -\omega \quad b = -1 \quad c = -1$$

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$$\Delta = (\omega)^2 - 4(-1)(-1) = \omega^2$$

$$x = \frac{-\omega \pm \sqrt{\omega^2}}{2(-1)} \quad x = \frac{\omega - \sqrt{\omega^2}}{2} \quad x = \frac{\omega + \sqrt{\omega^2}}{2}$$

$$Kx^2 - x + 1 = 0 \quad a = 1 \quad b = -1 \quad c = 1$$

$$\Delta = (-1)^2 - 4(1)(1) = 1 - 4 = -3$$

no real roots

$$Kx^2 - Kx + 1 = 0 \quad a = 1 \quad b = -K \quad c = 1$$

$$\Delta = (-K)^2 - 4(1)(1) = 0$$

$$x = \frac{-(-K) \pm \sqrt{0}}{2(1)} = 1 \quad x = 1$$

$$Kx^2 - x + 1 = 0 \quad a = 1 \quad b = -1 \quad c = 1$$

$$\Delta = (-1)^2 - 4(1)(1) = -3$$

no real roots

$$Kx^2 - \omega x + a = 0 \quad a = 1 \quad b = -\omega \quad c = a$$

$$\Delta = b^2 - 4ac = (\omega)^2 - 4(1)(a) = \omega^2 - 4a$$

$$\omega^2 - 4a > 0 \rightarrow \omega^2 > 4a \rightarrow a < \frac{\omega^2}{4}$$

$$\omega^2 - 4a = 0 \rightarrow 4a = \omega^2 \rightarrow a = \frac{\omega^2}{4}$$

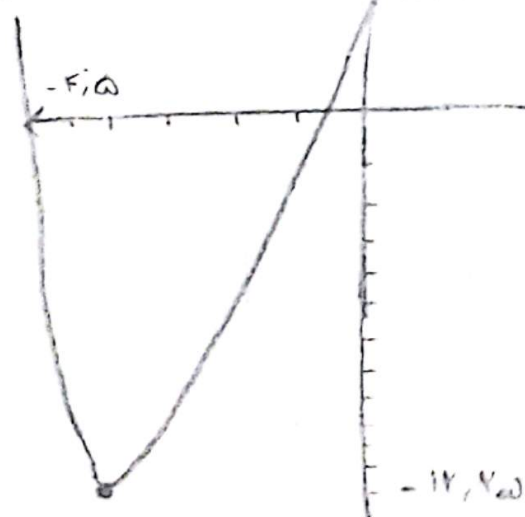
$$\omega^2 - 4a < 0 \rightarrow \omega^2 < 4a \rightarrow a > \frac{\omega^2}{4}$$

$$\omega^2 - 4a \geq 0 \rightarrow a \leq \frac{\omega^2}{4}$$

$$y = x^2 + 9x + 1 \quad a = 1 \quad b = 9 \quad c = 1$$

$$\min \left\{ x = -\frac{b}{2a} = \frac{-9}{2} = -4.5 \right.$$

$$y = \left(-\frac{9}{2}\right)^2 + 9\left(-\frac{9}{2}\right) + 1 = \frac{81}{4} - \frac{81}{2} + 1 = \frac{81 - 162 + 4}{4} = \frac{-77}{4}$$



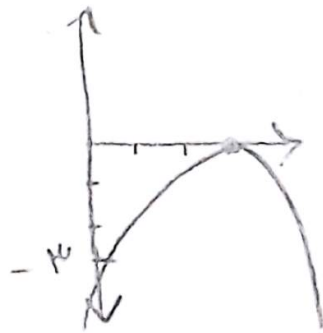
$$y = x^p + px - q$$

$$\max \left\{ \begin{aligned} x &= \frac{-b}{2a} = \frac{-q}{2x-1} = p \end{aligned} \right.$$

$$y = -(p)^p + q(p) - q = -q + p - q = 0$$

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$x = p$  ( -

$$px - px^p = 0 \rightarrow -px^p + px + 0 = 0 \quad a = -p \quad b = p \quad c = 0$$

$$x_1 + x_2 = -\frac{b}{a} = -\frac{p}{-p} = \frac{p}{p} \quad x_1 x_2 = \frac{c}{a} = \frac{0}{-p} = 0$$

$$p = 0 \quad S = \frac{p}{p} \quad S^p - p = \left(\frac{p}{p}\right)^p - p(0) = \frac{p}{p}$$

$$S^p - p = \left(\frac{p}{p}\right)^p - p(0) = \frac{1}{p}$$

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