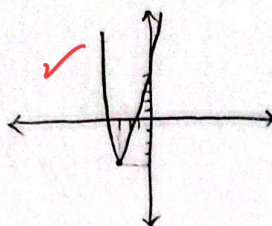


$$y = x^2 + 9x + 20$$

$$\text{Min} \left| \begin{aligned} \frac{-b}{2a} &= \frac{-9}{2} = -4.5 \\ \frac{-\Delta}{4a} &= \frac{-19}{4} = -4.75 \end{aligned} \right. \quad \checkmark$$

$$\Delta = b^2 - 4ac = 81 - 4(20) = 81 - 80 = 1$$



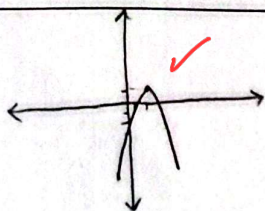
(الف) ۲

(ب)

$$y = -x^2 + 6x - 3$$

$$\text{Max} \left| \begin{aligned} \frac{-b}{2a} &= \frac{-6}{-2} = 3 \\ \frac{-\Delta}{4a} &= \frac{-12}{-4} = 3 \end{aligned} \right. \quad \checkmark$$

$$\Delta = b^2 - 4ac = 36 - 4(-1)(-3) = 36 - 12 = 24$$



$$\frac{-6 \pm \sqrt{24}}{-2} \rightarrow \frac{-6 + \sqrt{24}}{-2} = 1 \quad \text{(الف)}$$

$$\rightarrow \frac{-6 - \sqrt{24}}{-2} = 3 \quad \text{(ب)}$$

(الف) ۱, ۳

(ب)

$$-x^2 + 6x - 3 = 0$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-6 \pm \sqrt{24}}{-2} = \begin{cases} 1 \\ 3 \end{cases}$$

$$2x^2 - 3x + a = 0$$

$$\Delta = b^2 - 4ac = 9 - 4(2)(a) = 9 - 8a \quad 9 - 8a > 0 \rightarrow \frac{9}{8} > a \quad \text{(الف)}$$

$$9 - 8a = 0 \quad a = \frac{9}{8} \quad \frac{9}{8} = a \quad \text{(ب)}$$

$$9 - 8\left(\frac{9}{8}\right) = 9 - 9 = 0$$

$$\frac{9}{8} = a$$

$$9 - 8a < 0 \rightarrow \frac{9}{8} < a \rightarrow \frac{9}{8} < a \quad \text{(ج)}$$

$$\frac{9}{8} \geq a$$

(ج)

$$\text{الف) } x^2 - 2x - 1 = 0 \rightarrow x^2 - 2x + 1 = 2 \rightarrow (x-1)^2 = 2 \quad x-1 = \pm\sqrt{2} \quad x = 1 \pm \sqrt{2}$$

$$\text{ب) } x^2 - x - 1 = 0 \rightarrow x^2 - x + \frac{1}{4} = \frac{5}{4} \quad \left(x - \frac{1}{2}\right)^2 = \frac{5}{4} \quad x - \frac{1}{2} = \pm\sqrt{\frac{5}{4}} \quad x = \frac{1}{2} \pm \frac{\sqrt{5}}{2}$$

$$x - \frac{1}{2} = \pm\sqrt{\frac{5}{4}}$$

۱, ۵

$$\text{الف) } x^2 - 2x - 1 = 0$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{2 \pm \sqrt{4 + 4}}{2} = \frac{2 \pm \sqrt{8}}{2} = \frac{2 \pm 2\sqrt{2}}{2} = 1 \pm \sqrt{2}$$

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

$$\text{ب) } x^2 + x - 5 = 0$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-1 \pm \sqrt{1 + 20}}{2} = \frac{-1 \pm \sqrt{21}}{2}$$

$$\Delta = b^2 - 4ac = 1 - 4(-5) = 1 + 20 = 21$$

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الف) $x^2 - 11x + 28 = 0 \rightarrow (x-7)(x-4) = 0$

$x = \begin{cases} 7 \\ 4 \end{cases}$

2

ب) $x^2 + 3x - 28 = 0 \rightarrow (x+7)(x-4) = 0$

$x = \begin{cases} -7 \\ 4 \end{cases}$

الف) $\omega x^2 - 12x + 7 = 0 \rightarrow x^2 - 12x + 7\omega = 0 \rightarrow (x-7)(x-\omega) = 0$

$x = \begin{cases} 7 \\ \omega = 1 \end{cases}$

ب) $3x^2 - 10x + 7 = 0 \rightarrow x^2 - 10x + 21 = 0 \rightarrow (x-7)(x-3) = 0$

$x = \begin{cases} 7 \\ 3 \end{cases}$

الف) $2x^2 - \omega x + 3 = 0$

$x = \begin{cases} 1 \\ \frac{c}{a} = \frac{3}{2} \end{cases}$

ب) $2x^2 + \omega x + 3 = 0$

$x = \begin{cases} -1 \\ -\frac{c}{a} = -\frac{3}{2} \end{cases}$

ج) $2x^2 - \omega x + 1 = 0$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{\omega \pm \sqrt{1\omega}}{2}$

$\Delta = b^2 - 4ac = \omega^2 - 4(1)(1) = \omega^2 - 4 = 12$

د) $2x^2 + \omega x + 9 = 0$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} =$

$\Delta = b^2 - 4ac = \omega^2 - 4(9)(1) = \omega^2 - 36$

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$x^2 - 3x - 2 = 0$

2

$S = \frac{-b}{a} \quad P = \frac{c}{a}$

الف) $S - 1P = \left(\frac{3}{1}\right) - 2\left(\frac{-2}{1}\right) = 9 + 4 = 13$

ب) $S - 3P = \left(\frac{3}{1}\right) - 2(3)(-2) = 9 + 12 = 21$

الف) $\begin{pmatrix} 7 \\ \omega \end{pmatrix} + \begin{pmatrix} 9 \\ 2 \end{pmatrix} = \frac{7 \times 9 \times \omega}{\cancel{7!} \times \cancel{9!}} + \frac{9 \times \omega \times 2}{\cancel{9!} \times \cancel{2!}} = 21 + 2\omega = 29$

2

ب) $\begin{pmatrix} 9 \\ 2 \end{pmatrix} - \begin{pmatrix} 7 \\ \omega \end{pmatrix} = \frac{9 \times 7 \times \omega}{\cancel{9!} \times \cancel{7!}} - \frac{7 \times \omega \times 2}{\cancel{7!} \times \cancel{2!}} = 18 - 2\omega = 29$