

(۱) الف) $x^2 - 5x - 4 = 0$ $x^2 - 5x - 20 = 0$ $(x-9)(x+4) = 0$
 $\downarrow \quad \downarrow$
 $9 \quad -4 \xrightarrow{\div 4} \frac{9}{4} = \frac{13}{2}, \frac{-4}{4} = -\frac{1}{2}$

ب) $x^2 - 11x - 9 = 0$ $(x-9)(x+1) = 0$
 $\downarrow \quad \downarrow$
 $9 \quad -1 \xrightarrow{\div 1} \frac{9}{1} = 9, \frac{-1}{1} = -1$

ج) $x^2 - 4x - 12 = 0$ $(x-4)(x+3) = 0$
 $\downarrow \quad \downarrow$
 $4 \quad -3 \xrightarrow{\div 1} \frac{4}{1} = 4, \frac{-3}{1} = -3$

د) $x^2 - 2x - 15 = 0$ $(x-1)(x+3) = 0$
 $\downarrow \quad \downarrow$
 $1 \quad -3 \xrightarrow{\div 1} \frac{1}{1} = 1, \frac{-3}{1} = -3$

الف) $x^2 - 2x - 15 = 0$ $(x+1)(x-7) = 0$ $x = -1 \leq 7$

ب) $x^2 + 5x + 4 = 0$ $(x+2)(x+3) = 0$ $x = -1 \leq -\frac{3}{2}$

ج) $x^2 + 2x + 1 = 0$ $\Delta = b^2 - 4ac = 4 - 4(1)(1) = 0$ $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm 0}{2} = -1$

د) $3x^2 + 3x - 2 = 0$ $\Delta = 9 - 4(-2)(3) = 9 + 24 = 33$ $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-3 \pm \sqrt{33}}{6} = \pm \frac{\sqrt{33}}{2}$

$A \times B - B^2 = A \times B - B \times B = \{(1, 2), (1, 3)\}$
 $A \times B = \{(1, 2), (1, 3), (2, 2), (2, 3), (3, 2), (3, 3)\}$
 $B \times B = \{(2, 2), (2, 3), (3, 2), (3, 3)\}$

$f(x) = \{(1, m), (2, 1), (-3, m), (-2, m), (1, m+2), (m, 4)\}$
 $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0$
 $m = -1$

$g(x) = \{(1, m^2), (2, 1), (m, 4), (1, m+2), (-2, m), (-1, 3)\}$
 $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0$
 $m = 2$

$a^2 = 3a - 2$
 $a^2 - 3a + 2 = 0$ $(a-2)(a-1) = 0$
 $a = 2$ $a = 1$
 $a = 2 \rightarrow \{(1, 4), (1, 4), (4, 1)\}$
 $a = 1 \rightarrow \{(1, 1), (1, 1), (1, 2)\}$

$$x=1 \quad x^2-1 = ax+b$$

$$0 = a+b$$

$$x=2 \quad ax+b = x^2$$

$$2a+b = 1$$

$$x^2 \begin{cases} a+b=0 \\ 2a+b=1 \end{cases}$$

$$\underline{-b=1 \rightarrow b=-1, a=1}$$

$$ab = (-1)(1) = -1$$

$$x=k \quad 2x-3 = k-3x$$

$$2k-3 = k-3k$$

$$2k-3 = k-3k \rightarrow k = \frac{3}{2}$$

الف) $x=1 \rightarrow y^2-4y=0$ تابع

$$y(y^2-4)=0 \quad y=0 \quad y=\sqrt{4} \quad y=-\sqrt{4}$$

ب) $x=0 \rightarrow |y|=3$ تابع

$$y = \pm 3$$

ج) $y = \pm \sqrt{1-\cos\theta}$ تابع

د) $x=-2 \rightarrow y^2=3$ تابع

$$y = \pm \sqrt{3}$$

الف) $\sqrt[3]{y} = -x^2+2x-2$

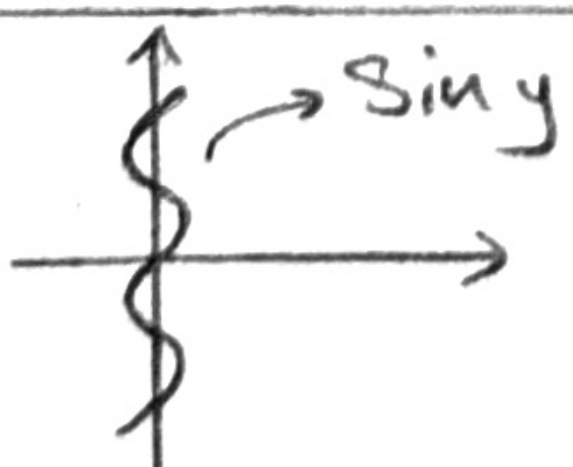
$$\begin{cases} \sqrt[3]{y_1} = -x_1^2+2x_1-2 \\ \sqrt[3]{y_2} = -x_2^2+2x_2-2 \end{cases} \xrightarrow{x_1=x_2} \sqrt[3]{y_1} = \sqrt[3]{y_2}$$

$$y_1 = y_2 \quad \checkmark$$

ب) $y^3+2y = \omega x$

$$\begin{cases} y_1^3+2y_1 = \omega x_1 \\ y_2^3+2y_2 = \omega x_2 \end{cases} \xrightarrow{x_1=x_2} y_1^3+2y_1 = y_2^3+2y_2 \quad \checkmark$$

الف) $x \sin y$ تابع



$\rightarrow$ $\left. \begin{matrix} \text{تابع فرد} \\ \text{ضرب در } x \end{matrix} \right\}$

ب) $t = \sqrt{\frac{x}{y}} \rightarrow t + \frac{1}{t} = 2$

$$t + \frac{1}{t} - 2 = 0$$

$$(t - \frac{1}{t})^2 = 0 \rightarrow t - \frac{1}{t} = 0 \rightarrow t = 1 \rightarrow \frac{x}{y} = 1 \rightarrow x = y$$

$$x \neq 0 \quad \checkmark$$