

1) $4n^2 - 5n - 4 = 0 \rightarrow n^2 - 5n - 4 = 0 \rightarrow (n-9)(n+4) = 0 \rightarrow n = 9 = \frac{9}{1} \quad n = -4 = -\frac{4}{1}$ (1)

2) $3n^2 - 11n - 20 = 0 \rightarrow n^2 - 11n - 20 = 0 \rightarrow (n-9)(n+1) = 0 \rightarrow n = 9 = \frac{9}{1} \quad n = -1 = -\frac{1}{1}$

3) $5n^2 - 8n - 12 = 0 \rightarrow n^2 - 8n - 12 = 0 \rightarrow (n-4)(n+3) = 0 \rightarrow n = 4 = \frac{4}{1} \quad n = -3 = -\frac{3}{1}$

4) $2n^2 - 5n - 12 = 0 \rightarrow n^2 - 5n - 12 = 0 \rightarrow (n-8)(n+3) = 0 \rightarrow n = 8 = \frac{8}{1} \quad n = -3 = -\frac{3}{1}$

1) $n^2 - 5n - 12 = 0 \rightarrow (n-8)(n+3) = 0 \rightarrow n = 8 \quad n = -3$ (2)

2) $2n^2 + 4n + 2 = 0 \rightarrow n^2 + 2n + 1 = 0 \rightarrow (n+1)(n+1) = 0 \rightarrow n = -1 \quad n = -1 = -1$

3) $n^2 + 2n + 2 = 0 \quad \Delta = 4 - 4 = 0 \rightarrow \Delta < 0 \rightarrow \text{لا يوجد حلا حقيقي}$

4) $2n^2 + 3n - 2 = 0 \rightarrow \Delta = 9 + 16 = 25 \rightarrow n = \frac{-3 \pm \sqrt{25}}{4} = \frac{-3 \pm 5}{4}$

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

1) $f(n) = \{(r, m), (r, 1), (-r, m), (-r, 1), (r, m+2), (m, 2)\}$ (4)

$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow m = 2 \rightarrow \{(r, 2), (r, 1), (-r, 2), (-r, 1), (r, 4), (2, 2)\} \times$
 $m = -1 \rightarrow \{(r, -1), (r, 1), (-r, -1), (-r, 1), (r, 1), (-1, 2)\} \checkmark$

2) $g(n) = \{(r, m^2), (r, 1), (m, 2), (r, m+2), (-r, m), (-1, 2)\}$

$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = 2 \rightarrow \{(r, 2), (r, 1), (2, 2), \dots\} \times$

$m = -1 \rightarrow \{(r, 1), (r, 1), (-1, 2), (r, 1), (-r, -1), (-1, 2)\} \times$

لا يوجد حلا حقيقي

$$f(n) = (1, n^2) (1, 5n-2) (n^2, 4n+2)$$

④

$$n^2 - 5n + 2 = 0 \rightarrow (n-2)(n-1) = 0 \rightarrow n=2 \quad n=1$$

$$n=2 \rightarrow \{(1, 4) (1, 8) (4, 1)\} \checkmark \quad n=1 \rightarrow \{(1, 1) (1, 1) (1, 1)\} \times$$

$$f(n) = \begin{cases} n^2 - 1 & n \leq 1 \\ an + b & 1 \leq n \leq 2 \\ n^2 & n \geq 2 \end{cases}$$

⑦

$$n=1 \rightarrow 1^2 - 1 = a + b \rightarrow a = -b$$

$$n=2 \rightarrow 2a + b = 1 \rightarrow 2a - a = 1 \rightarrow a = 1 \rightarrow b = -1$$

$$\rightarrow a \times b = 1 \times -1 = \boxed{-1}$$

$$f(n) = \begin{cases} kn + 2 & n \geq k \\ 2 - kn & n \leq k \end{cases}$$

$$n=k \rightarrow 2k + 2 = 2 - 2k \rightarrow 4k = 0 \rightarrow k = 0$$

⑧

$$k = \frac{V}{a} = 1/4$$

$$k + k - 2 = 2 - 2k$$

$$1) y^2 - 4y = n^2 - 4n + 2 \quad n=1 \rightarrow y^2 - 4y = 0 \rightarrow y(y-4) = 0 \rightarrow y(y-\sqrt{4})(y+\sqrt{4}) = 0 \quad \text{⑨}$$

$$\rightarrow y=0 \quad y=\sqrt{4} \quad y=-\sqrt{4} \rightarrow \text{مطلوب}$$

$$2) |n| + |y| = 2 \quad n=0 \rightarrow |y| = 2 \rightarrow y = \pm 2 \rightarrow \text{مطلوب}$$

$$3) |y| = \sqrt{1 - \cos n} \quad n=\pi \rightarrow |y| = \sqrt{1 - (-1)} = \sqrt{2} \rightarrow |y| = 1 \rightarrow y = \pm 1 \rightarrow \text{مطلوب}$$

$$4) y^2 + n^2 + 2n + 1 = 0 \rightarrow y^2 + (n+1)^2 = 0 \rightarrow y=0, n=-1 \rightarrow \text{مطلوب}$$

$$5) \sqrt[3]{y} + n^2 = 2n - 2 \rightarrow y = (-n^2 + 2n - 2)^3 \rightarrow y_1 = (-n^2 + 2n - 2)^3 \quad y_2 = (-n^2 + 2n - 2)^3 \quad y_3 = (-n^2 + 2n - 2)^3 \quad \text{⑩}$$

$$\therefore y_1'' + y_2'' = \sin x \quad \left\{ \begin{array}{l} y_1'' + y_2'' = \sin x \\ y_1' + y_2' = \sin x \end{array} \right. \rightarrow y_1'' - y_2'' = y_1' - y_2' \rightarrow y_1'' - y_1' = y_2'' - y_2' = 0$$

$$\rightarrow (y_1 - y_2)(y_1' + y_2' + y_1 y_2') + y_2'(y_1 - y_2) = 0 \rightarrow (y_1 - y_2)(y_1' + y_2' + y_1 y_2' + y_2') = 0$$

صفر است

تابع $y = \sin x \rightarrow y = 0 \rightarrow y = \sin 0 = 0$ تابع $y = \sin x$ است

$$\therefore \int \sqrt{\frac{x}{y} + \sqrt{\frac{y}{x}}} dx = \int \frac{x}{y} + \frac{y}{x} + \sqrt{\frac{xy}{y}} = \int \frac{x^2}{y} + \frac{y^2}{x} = \frac{x^3}{3y} + \frac{y^3}{3x} = \frac{x^3 + y^3}{3x} = \frac{1}{3}$$

$$x^2 + y^2 = \sin x \rightarrow x^2 + y^2 - \sin x = 0 \rightarrow (x - y)^2 = 0 \rightarrow x = y$$

چون برای هر x تنها یک y در جواب داریم