

[a] If $x = 3 + 2i$, $y = \frac{4 - 2i}{1 - i}$

, find $x + y$ in the form of a complex number.

$$-2i \times i = -2i^2$$

$$-2i \times 1 = -2i$$

[b] If the product of the two roots of the equation: $2x^2 + 6x + c = 0$ equals $\frac{5}{2}$

, find the value of c , then find the solution set of the equation in the set of complex numbers.

a) $x = 3 + 2i$ ✓

$$y = \frac{(4 - 2i)(1 + i)}{(1 - i)(1 + i)} = \frac{4 + 4i - 2i - 2i^2}{1 - i^2}$$

$$y = \frac{6 + 2i}{2} = 3 + i$$

$$x + y = 3 + 2i + 3 + i = 6 + 3i$$

b) $LM = \frac{c}{a}$

$\frac{5}{2} = \frac{c}{2}$ $c = 2 \times \frac{5}{2} = 5$ $c = 5$

$a = 2$
 $b = 6$
 $c = c$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-6 \pm \sqrt{6^2 - 4 \times 2 \times 5}}{2 \times 2}$$

$$= \frac{-6 \pm \sqrt{-4}}{4} = \frac{-6 \pm 2i}{4} = \frac{2(-3 \pm i)}{4}$$

$$x = \frac{-3}{2} \pm \frac{1}{2}i$$

$$\therefore S.S = \left\{ \frac{-3}{2} + \frac{1}{2}i, \frac{-3}{2} - \frac{1}{2}i \right\} \neq$$

[a] If the two roots of the equation : $x^2 - 3x + 2 + \frac{1}{m} = 0$ are equal

, find the value of : m

[b] Find the value of k which makes one of the two roots of the equation :

$x^2 + 3x + k = 0$ double the other root.

$$\textcircled{a} \quad b^2 - 4ac = 0$$

$$a=1, b=-3$$

$$(-3)^2 - 4 \times 1 \times (2 + \frac{1}{m}) = 0$$

$$c = 2 + \frac{1}{m}$$

$$9 - 8 - \frac{4}{m} = 0 \quad \Rightarrow \quad 1 - \frac{4}{m} = 0$$

$$\frac{4}{m} = 1$$

$$\boxed{m = 4}$$

\textcircled{b} if 1st root $\neq L$ \Rightarrow 2nd root $\Rightarrow \textcircled{2L}$

$$a = 1$$

$$b = 3$$

$$c = k$$

$$L + M = -\frac{b}{a}$$

$$L \cdot M = \frac{c}{a}$$

$$L + 2L = -\frac{3}{1}$$

$$-1 \times -2 = \frac{k}{1}$$

$$3L = -3$$

$$\boxed{k = 3}$$

$$\boxed{L = -1}$$

$$\boxed{M = -2}$$

$$L_1 M_1 \neq$$

[a] If L, M are the two roots of the equation: $2x^2 + 2x + 3 = 0$,

find the equation whose two roots are

$$\frac{2}{L}, \frac{2}{M}$$

$$L_2 = \frac{2}{L_1}$$

[b] Find the simplest form of the expression: $(3 - 2i)^2 (3 + 2i)$

$$M_2 = \frac{2}{M_1}$$

① $x^2 - (L_2 + M_2)x + L_2 M_2 = 0$

$$a = 2 \quad b = 2 \quad c = 3$$

$$L + M = -\frac{b}{a}$$

$$L \cdot M = \frac{c}{a}$$

$$L + M = -\frac{2}{2}$$

$$L \cdot M = \frac{3}{2}$$

$$L + M = -1$$

$$\ominus + \frac{1}{2}$$

$$\frac{8}{3}$$

$$x^2 - \left(\frac{2}{L_1} + \frac{2}{M_1}\right)x + \frac{2}{L_1} \cdot \frac{2}{M_1} = 0$$

$$\frac{2}{L_1} + \frac{2}{M_1} = \frac{2M_1 + 2L_1}{L_1 M_1} = \frac{2(L_1 + M_1)}{L_1 M_1} = \frac{2 \cdot -1}{\frac{3}{2}}$$

$$\frac{2}{L_1} + \frac{2}{M_1} = -\frac{4}{3}$$

$$\frac{2}{L_1} \cdot \frac{2}{M_1} = \frac{4}{L_1 M_1} = \frac{4}{\frac{3}{2}} = \frac{8}{3}$$

$$x^2 + \frac{4}{3}x + \frac{8}{3} = 0 \quad \neq 3$$

$$3x^2 + 4x + 8 = 0$$