COMPLEX NUMBERS AND QUADRATIC EQUATIONS

INTRODUCTION OF COMPLEX NUMBER

EXERCISE

Q.1 Express the following as complex number

(i) $\sqrt{-16}$

(ii) $-b + \sqrt{-4ac}$, $(a, c > 0)$

Q.2 Express the given expression as a complex number.

(i) $\sqrt{x}$ $(x < 0)$

(ii) roots of $x^2 - (2\cos\theta)\, x + 1 = 0$

Q.3 Determine the multiplicative inverse of the complex number $3 + 2i$.

Q.4 Simplify the expression in $i^{n+100} + i^{n+50} + i^{n+48} + i^{n+46}$ where $n \in I$.

Q.5 Determine the values of x and y in the real number set

$$(2 + 3i)\, x^2 - (3 - 2i)\, y = 2x - 3y + 5i$$

Q.6 Determine the square root of the complex number $5 + 12i$

Q.7 Find the solutions for z in the equation $z^2 - (3 - 2i)z = 5i - 5$

Q.8 Considering $x, y \in R$, find the solutions for the equation

$$4x^2 + 3xy + (2xy - 3x^2)i = 4y^2 - (x^2/2) + (3xy - 2y^2)i$$

ANSWER KEY

1. (i) $\pm 4i$

(ii) $-b + i\sqrt{4ac}$

2. (i) $0 + i\sqrt{-x}$

(ii) $(\cos\theta + i\sin\theta)$, $(\cos\theta - i\sin\theta)$

3. $\left(\frac{3}{13} - \frac{2}{13}i\right)$

4. 0

5. $x = 0, y = \frac{5}{2}$ and $x = 1, y = 1$

6. $\pm(3 + 2i)$

7. $z = (2 + i)$ and $(1 - 3i)$

8. $x = K, y = \frac{3K}{2}, K \in R$