

# HOLIDAY HOMEWORK

## CLASS - XI

### (MATHEMATICS)

#### 1. Complex Numbers and Quadratic Equations

- (1). Simplify:  $\left\{ i^{17} - \left(\frac{1}{i}\right)^{34} \right\}^2$
- (2). Express  $(\sqrt{5} - \sqrt{3}i)(\sqrt{5} + i\sqrt{3})^2$  in the form of  $a+ib$ .
- (3). Find  $x$  and  $y$ , for which the complex numbers  $-3+ix^2y$  and  $x^2+y+4i$  are conjugate of each other.  
Given  $x, y \in \mathbb{R}$ .
- (4). If  $(1+2i)(2+3i)(3+4i) = a+ib$ , prove that  $a^2+b^2 = 1625$ .
- (5). Express  $\sin 60^\circ + i \cos 60^\circ$  in polar form.
- (6). Solve for 'z'  $z+2 = \frac{1}{4-3i}$

#### 2. Binomial Theorem

1. Find the number of terms in the expansion of  $(a+2b-3c)^n$ .
2. Simplify:  $(x+\sqrt{x-1})^6 + (x-\sqrt{x-1})^6$ .
3. Find the coefficient of  $x^5$  in the expansion of the product  $(1+2x)^6(1-x)^7$ .
4. Fourth term in the expansion of  $(ax+\frac{1}{x})^n$  is  $\frac{5}{2}$ .  
Find the value of 'a' and 'n'.
5. If the coefficient of  $x$ ,  $x^2$  and  $x^3$  in the binomial expansion of  $(1+x)^{2n}$  are in A.P., then prove that  $2n^2-9n+7=0$
6. Find the coefficient of  $x^9$  in the expansion of  $(1+3x+3x^2+x^3)^{15}$ .