Exercise 2.5

Q. 1: Evaluate:

(i) i^7

$= i^6 . i^1$

$= (i^2)^3 . i^1$

$= (-1)^3 . i^1$

$= -i$

(ii) i^{50}

$= i^{50}$

$= (i^2)^{25}$

$= (-1)^{25}$

$= -1$

(iii) i^{12}

$= i^{12}$

$= (i^2)^6$

$= (-1)^6$

$= 1$

(iv) $(-i)^8$

$= i^8$

$= (i^2)^4$

$= (-1)^4$

$= 1$

(v) $(-i)^5$

$= -i^5$

$= -(i^2)^2 . i^1$

$= -(-1)^2 . i^1$

$= -i$

(vi) i^{27}

$= i^{26} . i^1$

$= (i^2)^{13} . i^1$

$= (-1)^{13} . i^1$

$= -i$

Q. 2: Write the conjugate of the following numbers.

(i) $2 + 3i$

let $x = 2 + 3i$

then conjugate is: $\bar{x} = \overline{2 + 3i}$

$= \bar{2} + \overline{3i}$

$= 2 - 3i$

(ii) $3 - 5i$

let $x = 3 - 5i$

then conjugate is: $\bar{x} = \overline{3 - 5i}$

$= \bar{3} - \overline{5i}$

$= 3 + 5i$

(iii) $-i$

let $x = -i$

then conjugate is: $\bar{x} = \overline{-i}$

$= i$

(iv) $-3 + 4i$

let $x = -3 + 4i$

then conjugate is: $\bar{x} = \overline{-3 + 4\imath}$

$= \overline{-3} + \overline{4\imath}$

$= -3 - 4i$

(v) $-4 - i$

let $x = -4 - i$

then conjugate is: $\bar{x} = \overline{-4 - \imath}$

$= \overline{-4} - \bar{\imath}$

$= -4 + i$

(vi) $i - 3$

let $x = -3 + i$

then conjugate is: $\bar{x} = \overline{-3 + \imath}$

$= \overline{-3} + \bar{\imath}$

$= -3 - i$

Q. 3: Write the real and imaginary part of the following numbers.

(i) $1 + i$

Real Part: 1

Img Part: i

(ii) $-1 + 2i$

Real Part: -1

Img Part: $2i$

(iii) $-3i + 2$

Real Part: 2

Img Part: $-3i$

(iv) $-2 - 2i$

Real Part: -2

Img Part: $-2i$

(v) $-3i$

Real Part: 0

Img Part: $-3i$

(vi) $2 + 0i$

Real Part: 2

Img Part: $0i$

Q. 4: Find the value of x and y if $x + iy + 1 = 4 - 3i$.

as: $x + iy + 1 = 4 - 3i$

$(x + 1) + (y)i = (4) + (-3)i$

Comparing real and imaginary parts

Real parts: $x + 1 = 4$

$x = 4 - 1$

$x = 3$

Imaginary parts: $y = -3$