Exercise 2.5

Q1. Evaluate.

(1) i^7

Solution:

$= i^6 \times i$

$= \left(i^2\right)^3 \times i$

$= (-1)^3 \times i$

$= (-1) \times -i$

$= -i$

(2) i^{50}

Solution:

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

$= (-1)^{25}$

$= -1$

(3) i^{12}

Solution:

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

$= (-1)^{25}$

$= -1$

(4) $(-i)^8$

Solution:

$= (i^2)^4$

$= (-1)^4$

$= 1$

(5) $(-i)^5$

Solution:

$= -i^4 \times i$

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

$= -i$

(6) i^{27}

Solution:

$= i^{26} \times i$

$= (i^2)^{23} \times i$

$= (-1)^{23} \times i$

$= (-1) \times i$

$= -i$

Q2. Write the conjugate of the following numbers.

(1) $2+3i$

Solution:

$z = 2+3i$

$\bar{z} = 2-3i$

(2) $3-5i$

Solution:

$\bar{z} = 3 + 5i$

(3) $-i$

Solution:

$z = -i$

$\bar{z} = i$

(4) $-3 + 4i$

Solution:

$z = -3 + 4i$

$\bar{z} = -3 - 4i$

(5) $-4 - i$

Solution:

$z = -4 - i$

$\bar{z} = -4 + i$

(6) $i - 3$

Solution:

$z = i - 3$

$\bar{z} = -i - 3$

Q3: Write the real and imaginary parts of the following number.

Solution:

(1) $1 + i$ $\mathrm{Re}(z) = 1$ $\mathrm{Im}(z) = 1$

(2) $-1 + 2i$ $\mathrm{Re}(z) = -1$ $\mathrm{Im}(z) = 2$

(3) $-3i + 2$ $\mathrm{Re}(z) = 2$ $\mathrm{Im}(z) = -3$,

(6) $2+0i\,\mathrm{Re}(z)=2\,\mathrm{Im}(z)=0$

Q4. Find the value of x and y if $x+iy+1=4-3i$ **.**

Solution:

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

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

By comparing real and imaginary part we get

x+1=4 and y=-3

x=4-1 and y=-3

x=3 and y=-3