Exercise 2.5

Q.1 Evaluate

(i) i^7

Solution:

$$= i^7$$
$$= i^6 . i$$
$$= \left(i^2\right)^3 . i$$
$$= (-1)^3 . i$$
$$= -1 \times i$$
$$= -i$$
$$= -i \text{ Ans}$$

(ii) i^{50}

Solution: i^{50}

$$= \left(i^2\right)^{25}$$
$$= (-1)^{25}$$
$$= -1 \text{ Ans}$$

(iii) i^{12}

Solution:

$$i^{12}$$
$$= \left(i^2\right)^6$$
$$= (-1)^6$$
$$= 1 \text{ Ans}$$

(iv) $(-i)^8$

Solution:

$$(-i)^8$$
$$= i^8$$
$$= \left(i^2\right)^4$$
$$= (-1)^4$$
$$= 1 \text{ Ans}$$

(v) $(-i)^5$

Solution:

$$(-i)^5$$
$$= -i^5$$
$$= -i^4 . i$$
$$= -\left(i^2\right)^2 . i$$
$$= -(-1)^2 . i$$
$$= -(1)(i)$$
$$-i \text{ Ans}$$

(vi) i^{27}

Solution: i^{27}

$$= i^{26} . i$$
$$= \left(i^2\right)^{13} . i$$
$$= (-1)^{13} . i$$
$$= -1 . i$$
$$= -i \text{ Ans}$$

Q.2 Write the conjugate of the following numbers.

(i) $2+3i$

$$= 2-3i$$

(ii) $3-5i$

$$= 3+5i$$

(iii) $-i$

$$= i$$

(iv) $-3+4i$

$$= -3-4i$$

(v) $-4-i$

$$= -4+i$$

(vi) $i-3$

$$= -i-3$$

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

(i) $1+i$

Real = 1

Imaginary = 1

(ii) $-1+2i$

Real = -1

Imaginary = 2

Al-hamd Science academy Notes

(iii) $-3i+2$

Real = 2

Imaginary = - 3

(iv) $-2-2i$

Real = -2

Imaginary = - 2

(v) $-3i$

Real = 0

Imaginary = - 3

(vi) $2+0i$

Real = 2

Imaginary = 0

Q.4 Find the value of x and y if

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

Solution: Given that

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

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

$x+iy=3-3i$

$x=3 \quad y=-3$

$x=3, y=-3$ **Ans**

Al-hama science academy Notes