



Complex numbers Ex 13.1 Q2

$$\begin{aligned}1 + i^{10} + i^{20} + i^{30} &= 1 + i^{4 \times 2} \times i^2 + i^{4 \times 5} + i^{4 \times 7} \times i^2 \\&= 1 + 1 \times i^2 + 1 + 1 \times i^2 \\&= 1 - 1 + 1 - 1 \\&= 0, \text{ which is real number}\end{aligned}$$

Complex numbers Ex 13.1 Q3(i)

$$\begin{aligned}i^{49} + i^{68} + i^{89} + i^{110} &= i^{4 \times 12} \times i^1 + i^{4 \times 17} + i^{4 \times 22} \times i^1 + i^{4 \times 27} \times i^2 \\&= 1 \times i + 1 + 1 \times i + 1 \times i^2 \\&= i + 1 + i - 1 \\&= 2i\end{aligned}$$

$$\therefore i^{49} + i^{68} + i^{89} + i^{110} = 2i$$

Complex numbers Ex 13.1 Q3(ii)

$$\begin{aligned}i^{30} + i^{80} + i^{120} &= i^{4 \times 7} \times i^2 + i^{4 \times 20} + i^{4 \times 30} \\&= 1 \times i^2 + 1 + 1 \\&= -1 + 1 + 1 \\&= 1\end{aligned}$$

$$\therefore i^{30} + i^{80} + i^{120} = 1$$

Complex numbers Ex 13.1 Q3(iii)

$$\begin{aligned}i + i^2 + i^3 + i^4 &= 1 + (-1) + (-i) + 1 \\&= 0\end{aligned}$$

$$\therefore i + i^2 + i^3 + i^4 = 0$$

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