



Complex Numbers Ex 13.2 Q1(i)

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

$$\therefore (1+i)(1+2i) = -1 + 3i$$

Complex Numbers Ex 13.2 Q1(ii)

$$\begin{aligned}
 \frac{3+2i}{-2+i} &= \frac{3+2i}{-2+i} \times \frac{-2-i}{-2-i} && [\text{Rationalising the denominator}] \\
 &= \frac{3(-2-i) + 2i(-2-i)}{(-2)^2 - (i)^2} && [\because (a+ib)(a-ib) = a^2 + b^2] \\
 &= \frac{-6 - 3i - 4i + 2}{4 + 1} && [\because -i^2 = 1] \\
 &= \frac{-4 - 7i}{5} \\
 &= -\frac{4}{5} - \frac{7}{5}i
 \end{aligned}$$

$$\therefore \frac{3+2i}{-2+i} = -\frac{4}{5} - \frac{7}{5}i$$

Complex Numbers Ex 13.2 Q1(iii)

$$\begin{aligned}
 \frac{1}{(2+i)^2} &= \frac{1}{2^2 + (i)^2 + 2 \times 2 \times i} \\
 &= \frac{1}{4 - 1 + 4i} \\
 &= \frac{1}{3 + 4i} \\
 &= \frac{1}{(3+4i)} \times \frac{(3-4i)}{(3-4i)} && [\text{on rationalising the denominator}] \\
 &= \frac{3-4i}{3^2 + 4^2} && [\because (a+ib)(a-ib) = a^2 + b^2] \\
 &= \frac{3-4i}{25} \\
 &= \frac{3}{25} - \frac{4}{25}i
 \end{aligned}$$

$$\therefore \frac{1}{(2+i)^2} = \frac{3}{25} - \frac{4}{25}i$$

Complex Numbers Ex 13.2 Q1(iv)

$$\begin{aligned}
 \frac{1-i}{1+i} &= \frac{(1-i)}{(1+i)} \times \frac{(1-i)}{(1-i)} && \text{(Rationalising the denominator)} \\
 &= \frac{(1-i)^2}{1^2+1^2} && [\because (a+ib)(a-ib) = a^2+b^2] \\
 &= \frac{1^2+i^2-2 \times i \times 1}{2} \\
 &= \frac{-2i}{2} \\
 &= -i \\
 &= 0-i
 \end{aligned}$$

$$\therefore \frac{1-i}{1+i} = 0-i$$

***** END *****