Complex Numbers Ex 13.2 Q3(i)

If $z = x + iy$ is a complex number, then the conjugate of z denoted by $\bar{z}$ is defined as $\bar{z} = x - iy$

$$let\ z = 4 - 5i$$
$$\Rightarrow \bar{z} = 4 + 5i$$

Complex Numbers Ex 13.2 Q3(ii)

$$\text{let } z = \frac{1}{3+5i}$$
$$= \frac{1}{3+5i} \times \frac{(3-5i)}{3-5i} \quad \text{(On rationalising the denominator)}$$
$$= \frac{3-5i}{3^2+5^2}$$
$$\Rightarrow z = \frac{3-5i}{9+25}$$

$$So\ \bar{z} = \frac{3+5i}{34}$$
$$= \frac{3}{34} + \frac{5}{34}i$$

Complex Numbers Ex 13.2 Q3(iii)

$$\text{let } z = \frac{1}{1+i}$$
$$= \frac{1}{1+i} \times \frac{(1-i)}{(1-i)}$$
$$= \frac{1-i}{1^2+1^2}$$
$$= \frac{1-i}{2}$$

$$\therefore \bar{z} = \frac{1+i}{2}$$
$$= \frac{1}{2} + \frac{1}{2}i$$

Complex Numbers Ex 13.2 Q3(iv)

$$\text{let } z = \frac{(3-i)^2}{2+i}$$

$$= \frac{3^2 + i^2 - 2 \times 3 \times i}{2+i}$$

$$= \frac{9 - 1 - 6i}{2+i}$$

$$= \frac{8 - 6i}{2+i}$$

$$= \frac{8 - 6i}{2+i} \times \frac{2-i}{2-i}$$

$$= \frac{8(2-i) - 6i(2-i)}{2^2 + 1^2}$$

$$= \frac{16 - 8i - 12i - 6}{4+1}$$

$$= \frac{10 - 20i}{5}$$

$$\Rightarrow z = 2 - 4i$$

Hence

$$\bar{z} = 2 + 4i$$

*********** END **********