

SAMPLE PAPER 2014 (SET F): PAPER 1

QUESTION 3 (25 MARKS)

Question 3 (a)

$$u = 2 + 3i, v = -1 + i$$

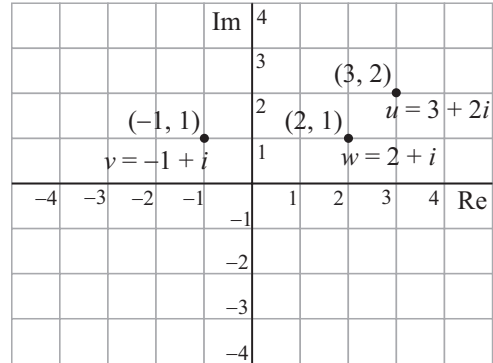
$$w = u - v - 2$$

$$= (3 + 2i) - (-1 + i) - 2 \leftarrow \text{Get rid of brackets.}$$

$$= 3 + 2i + 1 - i - 2 \leftarrow \text{Add numbers and add } i\text{'s.}$$

$$= 2 + i$$

Question 3 (b)



Question 3 (c)

$$u = 2 + 3i, v = -1 + i, w = 2 + i$$

$$\frac{2u + v}{w} \leftarrow \text{Replace } u, v \text{ and } w \text{ by their complex numbers.}$$

$$= \frac{2(3 + 2i) + (-1 + i)}{2 + i} \leftarrow \text{Get rid of brackets.}$$

$$= \frac{6 + 4i - 1 + i}{2 + i} \leftarrow \text{Add numbers and add } i\text{'s.}$$

$$= \frac{5 + 5i}{2 + i} \leftarrow \text{Multiply above and below by the conjugate of the bottom.}$$

$$= \frac{5 + 5i}{2 + i} \times \frac{2 - i}{2 - i}$$

$$= \frac{10 - 5i + 10i - 5i^2}{4 - 2i + 2i - i^2}$$

$$= \frac{10 + 5i - 5(-1)}{4 - \cancel{2i} + \cancel{2i} - (-1)}$$

$$= \frac{10 + 5i + 5}{4 + 1}$$

$$= \frac{15 + 5i}{5}$$

$$= 3 + i$$

FORMULA: Complex Numbers

Conjugates \bar{z}

$$z = a + bi \Rightarrow \bar{z} = a - bi$$

Multiplying a complex number by its conjugate:

$$z\bar{z} = (a + bi)(a - bi) = a^2 + b^2$$