

## 1A/B Introducing i

1. Simplify

a)  $(2 + 5i) + (7 + 3i)$

b)  $(2 - 5i) - (5 - 11i)$

c)  $6(1 + 3i)$

2.

a) Write  $\sqrt{-36}$  in terms of  $i$

b) Write  $\sqrt{-28}$  in terms of  $i$

3. Solve the Equation

a)  $x^2 + 9 = 0$

b)  $x^2 + 6x + 25 = 0$

## 1C Multiplying Complex Numbers

1. Simplify

a)  $(2 + 3i)(4 + 5i)$

b)  $(7 - 4i)^2$

c)  $(2 - 3i)(4 - 5i)(1 + 3i)$

2. Simplify

a)  $i^3$

b)  $i^4$

c)  $(2i)^5$

## 1D Complex Conjugates

1. Write down the complex conjugate of:

a)  $2 + 3i$

b)  $5 - 2i$

c)  $1 - i\sqrt{5}$

2. Find  $z + z^*$ , and  $zz^*$ , given that:

a)  $z = 2 - 7i$

b)  $z = 2\sqrt{2} + i\sqrt{2}$

3. Write the following in the form  $a + bi$

a)  $\frac{(10+5i)}{(1+2i)}$

b)  $\frac{(5+4i)}{(2-3i)}$

## 1E Complex Roots of Quadratics

1. Find the quadratic equation that has roots  $3 + 5i$  and  $3 - 5i$

## 1F Complex Roots of Cubics & Quartics

1. Given that -1 is a root of the equation:

$$x^3 - x^2 + 3x + k = 0$$

Find the other two roots of the equation.



2. Given that  $3 + i$  is a root of the quartic equation:

$$2x^4 - 3x^3 - 39x^2 + 120x - 50 = 0$$

Solve the equation completely.