Name: _____

AS Further Maths Summer Assignment

Solving Quadratic Equations

Quadratic Equation	$ax^2 + bx + c = 0$	Solving using the formula (see tables)	Roots
$x^2 + 6x + 13 = 0$	$a =$ $b =$ $c =$ $b^2 - 4ac =$		
$x^2 - 4x + 13 = 0$	$a =$ $b =$ $c =$ $b^2 - 4ac =$		
$2x^2 - 2x + 5 = 0$	$a =$ $b =$ $c =$ $b^2 - 4ac =$		

Solving Quadratic Equations (continued)

Quadratic Equation	$ax^2 + bx + c = 0$	Solving using the formula (see tables)	Roots
$x^2 - 10x + 34 = 0$	$a =$ $b =$ $c =$ $b^2 - 4ac =$		
$3x^2 - 4x + 10 = 0$	$a =$ $b =$ $c =$ $b^2 - 4ac =$		
$x - \frac{5}{x} = 3$	$a =$ $b =$ $c =$ $b^2 - 4ac =$		

Powers of i

1. Simplify i^{11} Which answer is correct: ☐ 1 ☐ i ☐ -1 ☐ $-i$ Explain:	5. Simplify $4i^3 + 7i^9$ Which answer is correct: ☐ $11i$ ☐ $3i$ ☐ $-3i$ ☐ -11 Explain:
2. Simplify i^{33} Which answer is correct: ☐ 1 ☐ i ☐ -1 ☐ $-i$ Explain:	6. Simplify $(3i^5)^2$ Which answer is correct: ☐ -9 ☐ $-9i$ ☐ 6 ☐ 9 Explain:
3. Simplify $i^{16}+i^{10}+i^8-i^{14}$ Which answer is correct: ☐ 0 ☐ 1 ☐ 2 ☐ i Explain:	7. Make up a similar question of your own and explain your answer.
4. Simplify $i^{12}.\ 3i^2.\ 2i^8$ Which answer is correct: ☐ $6i$ ☐ -6 ☐ $-6i$ ☐ 6 Explain:	8. Make up a similar question of your own and explain your answer.

Adding and Subtracting Complex Numbers: Practice Questions

1	$(12 + 4i) + (7 - 11i)$	
2	$(7 - 2i) + (9 - 4i)$	
3	$(4 - 6i) + (-5 - i)$	
4	$(3 - 8i) - (2 - 4i)$	
5	$(-12 - 5i) - (-2 - 8i)$	
6	$\left(2+\frac{1}{3}i\right)+\left(3-\frac{5}{6}i\right)$	
7	$\left(4+\sqrt{-16}\right)+\left(-5-\sqrt{-25}\right)$	
8	$z_1 = 5+i \quad z_2 = -4 + 6i$ $z_3 = -11 + 2i$ Calculate $(z_1 + z_2) - z_3$	
9	$\left(4-\sqrt{-50}\right)-\left(3+\sqrt{-8}\right)$	
10	$z_1 = a + bi, z_2 = c + di$ $z_1 + z_2 =$ $z_2 + z_1 =$ $z_1 - z_2 =$ $z_2 - z_1 =$	

Addition and Subtraction of Complex Numbers

1. Add $z = 4 + i$ to each of the following complex numbers:
   o $= 0 + 0i$
   $w_1 = 2 + 2i$
   $w_2 = -3 + 2i$
   $w_3 = 0 + 4i$

2. Represent the complex numberso, w_1, w_2, w_3, as points on an Argand Diagram and then show the results from the above exercise using a directed line (a line with an arrow indicating direction) between each w and its corresponding $w + z$. What do you notice?