St. Andrew's and St. Bride's High School
Advanced Higher Homework 4

1. Simplify the following, expressing your answers in the form $x + yi$

   (a) $(3+4i)+(1+i)$ (b) $(1+2i)(1-3i)$ (c) $(4-3i)^2$ (d) $(3-i)^2(3+i)$

2. Solve the following quadratic equations giving the roots in the form $z = x + yi$

   (a) $z^2 - 6z + 13 = 0$ (b) $3z^2 - 12z + 15 = 0$

3. Calculate the following divisions, expressing your answer in the form $x + yi$

   (a) $\dfrac{(8+4i)}{(1+3i)}$ (b) $\dfrac{(6+2i)}{(4-2i)}$ (c) $\dfrac{8}{(1+2i)}$

4. Calculate $\sqrt{5-12i}$