Hand your completed quiz in before the due date. Do not forget to write down your name and student ID number. Marks will be awarded for this quiz based on the clarity of your answers. The marker will pay close attention to the logic of your answers. Please show all your working.

Q1. Simplify $i^{48}$.

Q2. Simplify the following and write the result in the form $a + bi$.
   (a) $(3 - 2i) + (4 + 3i)$.
   (b) $\frac{3 - 2i}{1 + 3i}$.
   (c) $(\sqrt{2} - \sqrt{2})(\sqrt{8} + \sqrt{-2})$.

Q3. Find all real and complex solutions of the equation $2x^2 + 4x + 3 = 0$.

Q4. Solve each inequality and sketch the solution on the real number line.
   (a) $x(x - 1)(x + 2) > 0$.
   (b) $|x - 4| < 3$.

Q5.
   (a) Sketch the graph of $y = x^2 + 4$.
   (b) Find the $x$- and $y$-intercepts of the graph.

Q6. Let $P(-3, 1)$ and $Q(5, 6)$ be two points in the coordinate plane.
   (a) Plot $P$ and $Q$ in the coordinate plane.
   (b) Find the distance between $P$ and $Q$.
   (c) Find the midpoint of the segment $PQ$. (hint: for $P(x_1, y_1)$ and $Q(x_2, y_2)$, the coordinate of the midpoint of the segment $PQ$ is given by $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$).
   (d) Find the slope of the line that contains $P$ and $Q$.
   (e) Find an equation for the circle for which the segment $PQ$ is a diameter.

Q7. Find the center and radius of each circle and sketch its graph.
   (a) $x^2 + y^2 = 25$.
   (b) $x^2 + 6x + y^2 - 2y + 6 = 0$. 