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. Express the quadratic function \( f(x) = x^2 - x - 6 \) in standard form, and sketch its graph.

Q2. Find the maximum or minimum value of the quadratic function \( g(x) = 2x^2 + 6x + 3 \).

Q3. Graph the polynomial \( P(x) = -(x + 2)^3 + 27 \), showing clearly all \( x \)- and \( y \)-intercepts.

Q4. Use long division to find the quotient and remainder
(a) when \( 2x^5 + 4x^4 - x^3 - x^2 + 7 \) is divided by \( x - 2 \).
(b) when \( x^4 - 4x^2 + 2x + 5 \) is divided by \( x - 2 \).

Q5. Let \( P(x) = 2x^3 - 5x^2 - 4x + 3 \).
(a) Find the complete factorisation of \( P \). (Hint: \( P(3) = 0 \).)
(b) Find all zeros of \( P \).
(c) Sketch the graph of \( P \).

Q6. Find all real and complex zeros of \( P(x) = x^3 - x^2 - 4x - 6 \). (Hint: \( P(3) = 0 \).)

Q7. Find a forth-degree polynomial that has zeros \( 3i, -3i \), with \( -1 \) a zero of multiplicity 2.

Q8. Sketch the graphs of the following functions and find vertical or horizontal asymptotes if they exist.
(a) \( f(x) = \frac{x^3+6x^2+9x}{x+3} \).
(b) \( g(x) = \frac{x^2+x-20}{x^2-25} \).

Q9 (Optional). Solve the inequality \( x \leq \frac{6-x}{2x-5} \).