1. Find the x-intercepts and the y-intercept of the following function

$$(a) f(x) = x^2 - 7x + 12 \qquad\qquad (c) f(x) = x^2 - 8x + 12$$

$$(b) f(x) = x^2 - 9x + 14 \qquad\qquad (d) f(x) = x^2 + 6x + 8$$

2. Determine the vertical and horizontal asymptotes of the following functions

$$\text{(a) } y = f(x) = \frac{3x^2}{x^2 - 16} \qquad \text{(b) } y = f(x) = \frac{3x^2}{x^2 - 9} \qquad \text{(c) } y = f(x) = \frac{4x + 3}{x - 7}$$

3. Determine the vertical and horizontal asymptotes of the following functions.

$$\text{(a) } y = f(x) = \frac{2x^2}{x^2 - 16} \qquad \text{(b) } y = f(x) = \frac{3x}{x + 5} \qquad \text{(c) } y = f(x) = \frac{4x^2}{x^2 - 25}$$

4. Consider the function $y = f(x) = x^4 - 6x^2 + 2$

   (a) Find the y intercept of f(x).
   (b) Find and classify the critical points of f(x) as local maxima or local minima or points of inflection.
   (c) Find all points of inflection.
   (d) Find the x values for which $y = f(x)$ is concave up/down.
   (e) Determine the behaviour of y as $x \to +\infty$ and as $x \to -\infty$.
   (f) Sketch the graph of $y = f(x)$ illustrating clearly the features of the curve obtained in parts (i v).

5. The concentration of a drug in a patient's bloodstream 7 hours after it was injected is given by
$$A(h) = \frac{0.21h}{h^2 + 4}$$

   (a) Find the axis intercepts of $A(h)$.
   (b) Find and classify the critical points of $A(h)$ as local maxima or local minima.
   (c) Determine the behaviour of $A(h)$ as $h \to +\infty$.
   (d) Sketch the graph of $y = A(h)$ for $h \geq 0$ illustrating clearly the features of the curve obtained in parts (i - iii).