

1. Compute:  $\lim_{x \rightarrow \infty} \frac{x^2 - 3x + 5}{x^2 - 4}$

2. What value of  $k$  will make the following function  $f(x)$  continuous at  $x = 2$ ?  $f(x) = \begin{cases} \frac{x^2 - x - 2}{x - 2} & \text{if } x \neq 2 \\ c & \text{if } x = 2 \end{cases}$

3. A table fan manufacturer estimates the total weekly cost of producing  $q$  units is

$$C(q) = 100 + 50q + 10q^2$$

- Derive the marginal cost function.
- What is the actual cost incurred in producing the 101st unit?
- Derive the average cost function.

4. The demand for a good is given by  $p = 400 - 0.02q$  and the total cost of producing the good is  $C(q) = 100q + 200,000$ .  
i) Derive the profit function ( $\pi$ ). ii) Determine the marginal profit. iii) Compute and interpret  $\pi'(2000)$ .