

2002/2003

MATHS 104

Test 1

Question 1:

- (a) Evaluate $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 - x - 6}$
- (b) Find the derivative of $f(x) = 3x^2 - 5$ by using the definition of the derivative as a limit.

Question 2:

- (a) Find the equation of the tangent line to the curve $y = \sqrt{x+3}$ at $x = 6$.
- (b) Differentiate the following:

(i) $y = \frac{x^5}{5} + \ln(4x^3 + 1) - e^{2x}$

(ii) $y = x^2(x^3 - 1)^4$

Question 3:

A manufacture finds that the cost of producing q units is given by

$$C = 1000 + 50q - 0.2q^2 + 0.001q^3$$

- (a) Find the marginal cost when $q = 20$ units.
- (b) Find \bar{C} and then the rate of change of \bar{C} .