

**MATH1003
ASSIGNMENT 2**

Suggested practice questions (the answers are in the back of the textbook):

- §2.8; 3, 19, 21, 29.
- §4.9; 1, 5, 11, 31, 35.
- §5.3; 19, 25, 51.

1. Differentiate the following functions using the definition of derivative:

(i) $f(x) = \frac{3+x}{1-3x}$,

(ii) $g(x) = x + \sqrt{x}$,

(iii) $C(x) = \frac{1}{x^2}$.

2. Let $f(x) = x^2 + x$. Draw a sketch and calculate the equations of the tangent lines passing through $(2, -3)$.

3. Calculate the following indefinite integrals:

(i) $f(x) = \int (2x - 3)dx$,

(ii) $P(x) = \int \left(\frac{5}{x^6} + 7x^6 \right) dx$,

(iii) $Q(t) = \int \frac{t^{31} - 1}{t^2} dt$.

4. Find an expression for $\int_0^a (3x^2 - 18x + 14)dx$. For what values of a is the integral zero?

5. Find an antiderivative for the function $g(x) = \frac{5 - 4x^3 + 2x^6}{x^6}$.