1.2 Applying Algebraic skills to sequences and series

- **Using the Maclaurin series expansion to find a stated number of terms of the power series for a simple function**

1. Find the first four terms of the Maclaurin series for:

(a) $f(x) = e^{2x}$ (b) $f(x) = \sin(3x)$ (c) $f(x) = \ln(1+3x)$ (d) $f(x) = \cos(2x)$

(e) $f(x) = 6x^6 + 5x^5 - 4x^4 + 3x^3 - 2x^2 - x + 7$ (f) $f(x) = 7x^6 - 6x^5 + 5x^4 - 4x^3 + 3x^2 - 2x + 1$

Answers:

1 (a) $f(x) = 1 - 2x^2 + \frac{2x^4}{3} - \frac{4x^6}{45}$

(b) $f(x) = 3x - \frac{9x^3}{2} + \frac{81x^5}{40} - \frac{729x^7}{1680}$

(c) $f(x) = x - \frac{3x^2}{2} + 3x^3 - \frac{27x^4}{4}$

(d) $f(x) = 1 - 2x^2 + \frac{2x^4}{3} - \frac{4x^6}{45}$

(e) $f(x) = 7 - x - 2x^2 + 3x^3$

(f) $f(x) = 1 - 2x + 3x^2 - 4x^3$