1. Find the radius of convergence of each of the following power series:

i) \[ \sum_{n=1}^{\infty} \left(1 + \frac{3}{n}\right)^n x^n. \]

ii) \[ \sum_{n=1}^{\infty} \frac{(-3)^n}{n!} (x - 1)^n. \]

iii) \[ \frac{x}{5} + \left(\frac{x}{6}\right)^2 + \left(\frac{x}{5}\right)^3 + \left(\frac{x}{6}\right)^4 + \left(\frac{x}{5}\right)^5 + \left(\frac{x}{6}\right)^6 + \cdots. \]

iv) \[ \sum_{n=1}^{\infty} \frac{(3x - 2)^n}{n^2}. \]

2. Find the interval of convergence of each of the following power series:

i) \[ \sum_{n=1}^{\infty} \frac{(-2x)^n}{n^3}. \]

ii) \[ \sum_{n=1}^{\infty} \frac{3^n(x - 2)^n}{n + 1}. \]

iii) \[ \sum_{n=1}^{\infty} \frac{(1 - 3x)^n}{n}. \]

3. By computing derivatives, find the Taylor series of

i) \[ f(x) = e^{2x} \text{ at } x = 3. \]

ii) \[ f(x) = \cos x \text{ at } x = \frac{\pi}{3}. \]