

## 2.3) Maclaurin series

## Worked example

Find the Maclaurin series for  $\frac{1}{1-x}$

## Your turn

Find the Maclaurin series for  $\sqrt{1+x}$

$$\sqrt{1+x} = 1 + \frac{x}{2} - \frac{x^2}{8} + \frac{x^3}{16} - \dots$$

## Worked example

Find the Maclaurin series for  $\ln(1 + x)$

## Your turn

Find the Maclaurin series for  $e^x$

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots + \frac{x^n}{n!} + \cdots$$

## Worked example

Find the Maclaurin series for  $\cos^2 x$  up to and including the term in  $x^4$

## Your turn

Find the Maclaurin series for  $\sin^2 x$  up to and including the term in  $x^4$

$$x^2 - \frac{x^4}{3} + \dots$$

## Worked example

- (a) Find the Maclaurin series for  $\cos x$
- (b) Use the first three terms of the series to find an approximation for  $\cos 30^\circ$

## Your turn

- (a) Find the Maclaurin series for  $\sin x$
- (b) Use the first two terms of the series to find an approximation for  $\sin 10^\circ$

(a)  $\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots + (-1)^r \frac{x^{2r}}{(2r)!} + \dots$

(b) 0.17365 (5 dp)