

**REVISION FOR UNIT 2**

**PRACTICE ASSESSMENT 1**

**Outcome 1**

- Find the derivative of the function  $f$  defined by  $f(x) = \sin^{-1}(2x)$ .
- Use implicit differentiation to find an expression for  $\frac{dy}{dx}$  given that  $2x^2 + y^2 = 1$ .
- A curve is defined by the parametric equations  $x = t^2 + 1$ ,  $y = t^4$ .  
Find an expression for  $\frac{dy}{dx}$ .

**Outcome 2**

- Find  $\int \frac{x+3}{x(x+1)} dx$ .
- Use the method of integration by parts to evaluate  $\int_0^{\pi} x \sin x dx$ .
- Find the general solution of the differential equation  $\frac{dy}{dx} = x^2 y$ .

**Outcome 3**

- The complex numbers  $z$  and  $w$  are given by  $z = 1 + i$  and  $w = 3 - 2i$ .
  - Find  $zw$  and plot this complex number on an Argand diagram.
  - Find the modulus and argument of  $z$ .

**Outcome 4**

- An arithmetic sequence begins 1, 5, 9, ...
  - Find the 20<sup>th</sup> term in this sequence.
  - Find the sum of the first 30 terms of this sequence.
- A geometric sequence begins 64, 32, 16, ...
  - Find the 10<sup>th</sup> term in this sequence.
  - Find an expression for the sum of the first  $n$  terms of this sequence.

**PRACTICE ASSESSMENT 2**

**Outcome 1**

- Find the derivative of the function  $f$  defined by  $f(x) = \tan^{-1}(x^2)$ .
- Use implicit differentiation to find an expression for  $\frac{dy}{dx}$  given that  $x^3 - y^3 = 1$ .
- A curve is defined by the parametric equations  $x = \sin t$ ,  $y = \cos t$ .  
Find an expression for  $\frac{dy}{dx}$ .

**Outcome 2**

- Find  $\int \frac{3x-8}{x(x-4)} dx$ .
- Use the method of integration by parts to evaluate  $\int_0^{\pi} x \cos x dx$ .
- Find the general solution of the differential equation  $\frac{dy}{dx} = y \cos x$ .

**Outcome 3**

- The complex numbers  $z$ ,  $w$  and  $u$  are given by  $z = 1 + 2i$ ,  $w = 2 - 3i$  and  $u = 1 + \sqrt{3}i$ .
  - Find  $zw$  and plot this complex number on an Argand diagram.
  - Find the modulus and argument of  $u$ .

**Outcome 4**

- An arithmetic sequence begins 2, 8, 14, ...
  - Find the 30<sup>th</sup> term in this sequence.
  - Find the sum of the first 20 terms of this sequence.
- A geometric sequence begins 2, 6, 18, ...
  - Find the 10<sup>th</sup> term in this sequence.
  - Find an expression for the sum of the first  $n$  terms of this sequence.

### PRACTICE ASSESSMENT 3

#### Outcome 1

1. Find the derivative of the function  $f$  defined by  $f(x) = \sin^{-1}(3x)$ .
2. Use implicit differentiation to find an expression for  $\frac{dy}{dx}$  given that  $3x^2 + 2y^2 = 1$ .
3. A curve is defined by the parametric equations  $x = t^3 + t$ ,  $y = 2t^2$ .  
Find an expression for  $\frac{dy}{dx}$ .

#### Outcome 2

1. Find  $\int \frac{3x-4}{x(x-2)} dx$ .
2. Use the method of integration by parts to evaluate  $\int_0^1 xe^x dx$  in terms of  $e$ .
3. Find the general solution of the differential equation  $\frac{dy}{dx} = 2xy$ .

#### Outcome 3

1. The complex numbers  $z$ ,  $w$  and  $u$  are given by  $z = 1 - 2i$ ,  $w = 3 + i$  and  $u = \sqrt{3} + i$ .
  - (a) Find  $zw$  and plot this complex number on an Argand diagram.
  - (b) Find the modulus and argument of  $u$ .

#### Outcome 4

1. An arithmetic sequence begins 100, 95, 90, ...
  - (a) Find the 50<sup>th</sup> term in this sequence.
  - (b) Find the sum of the first 25 terms of this sequence.
2. A geometric sequence begins 5, 10, 20, ...
  - (a) Find the 15<sup>th</sup> term in this sequence.
  - (b) Find an expression for the sum of the first  $n$  terms of this sequence.