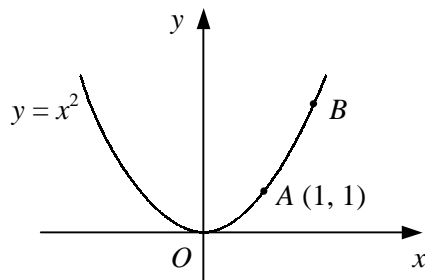


You will need to use a calculator for this worksheet

1



The diagram shows the curve $y = x^2$ which passes through the point $A (1, 1)$ and the point B .

- a** Copy and complete the table to find the gradient of the chord AB when the x -coordinate of B takes each of the given values.

x -coordinate of B	y -coordinate of B	gradient of AB
2	4	$\frac{4-1}{2-1} = 3$
1.1	1.21	
1.01		
1.001		

- b** Suggest a value for the gradient of the tangent to the curve $y = x^2$ at the point $(1, 1)$.
- c** Repeat part **a** using 0, 0.9, 0.99 and 0.999 as the x -coordinates of B and comment on your answer to part **b**.
- 2 Use a similar table of values to that in question 1 to find a value for the gradient of the tangent to the curve $y = x^2$ at the point A when A has the coordinates
- a** (2, 4) **b** (4, 16) **c** (1.5, 2.25) **d** (-3, 9)
- 3 **a** Using your answers to questions 1 and 2, suggest an expression in terms of x for the gradient of the curve $y = x^2$ at the point (x, y) .
- b** Write down the gradient of the curve $y = x^2$ at the points
- i** (6, 36) **ii** (2.4, 5.76) **iii** (-3.2, 10.24)
- 4 By considering the gradient of a suitable sequence of chords, find a value for the gradient of each curve at the given point.
- a** $y = x^4$ at (1, 1) **b** $y = x^2 - 5x + 3$ at (2, -3)
- c** $y = \sqrt{x}$ at (4, 2) **d** $y = \frac{2}{x}$ at (2, 1)
- 5 **a** By considering the gradient of a suitable sequence of chords, find a value for the gradient of the curve $y = x^3$ at the points
- i** (1, 1) **ii** (2, 8) **iii** (3, 27)
- b** Suggest an expression of the form kx^n for the gradient of the curve $y = x^3$ at the point (x, y) .
- c** Find the gradient of the curve $y = x^3$ at the points
- i** (4, 64) **ii** (-2, -8) **iii** (1.5, 3.375)