A-Level Starter Activity

Jahwa Maths

Topic: Differentiation and Tangents

Chapter Reference: Pure 1, Chapter 12

7 minutes

1. The point A lies on the curve $y = \frac{12}{x^2}$ and the x-coordinate of A is 2.

a. Find an equation of the tangent to the curve at A. Give your answer in the form $ax + by + c = 0$, where a, b and c, are integers. **(3)**

b. Verify that the points where the tangent at A intersects the curve again has the coordinates (-1, 12). **(3)**

2. The curve C has the equation $y = x - 3x^{-\frac{1}{2}} + 3$ and passes through the point P (4, 1). Show that the tangent to C at P passes through the origin. **(3)**

Solutions

1a.

$\frac{dy}{dx} = -24x^{-3}$	**M1**
At A, $y = 3$, gradient = -3	**M1**
$y - 3 = -3(x - 2)$ $3x + y - 9 = 0$	**M1**

1b.

Tangent: $x = -1$, $-3 + y - 0 = 0$ $y = 12$	**M1**
For the curve, $x = -1$, $y = \frac{12}{1} = 12$	**M1**
Therefore, tangent intersects curve at (-1, 12)	**M1**

2.

$\frac{dy}{dx} = 1 - \frac{3}{2}x^{-\frac{1}{2}}$ Gradient at $P = \frac{1}{4}$	**M1**
$y - 1 = \frac{1}{4}(x - 4)$	**M1**
$y = ¼\,x$ which passes through (0,0)	**M1**