A-Level Starter Activity

Jotwa Maths

Topic: Finding Functions

Chapter Reference: Pure 1, Chapter 13

6 minutes

1. Find an expression for y when $\frac{dy}{dx} = x^2 + 4x + 1$ and $x = -3$ and $y = 4$. **(2)**

2. The curve $y = f(x)$ passes through the point (3, 5).
Given that $f'(x) = 3 + 2x - x^2$, find an expression for $f(x)$. **(2)**

3. Given that $\frac{dy}{dx} = 10x^{\frac{3}{2}} - 2x^{-\frac{1}{2}}$ and $y = 7$ when $x = 0$, find the value of y when $x = 4$. **(3)**

Solutions

1.

$y = \int (x^2 + 4x + 1)dx$ $y = \frac{1}{3}x^3 + 2x^2 + x + c$	**M1**
At point (-3, 4), $4 = -9 + 18 - 3 + c$ $c = -2$	**M1**
$y = \frac{1}{3}x^3 + 2x^2 + x - 2$	

2.

$f(x) = \int (3 + 2x - x^2)dx$ $f(x) = 3x + x^2 - \frac{1}{3}x^3 + c$	**M1**
At (3, 5) $5 = 9 + 9 - 9 + c$ $c = -4$	**M1**
$f(x) = 3x + x^2 - \frac{1}{3}x^3 - 4$	

3.

$y = \int \left(10x^{\frac{3}{2}} - 2x^{-\frac{1}{2}}\right) dx$ $y = 4x^{\frac{5}{2}} - 4x^{\frac{1}{2}} + c$	**M1**
When y = 0, $x = 7$ $7 = 0 + 0 + c$ $c = 7$	**M1**
$y = 4x^{\frac{5}{2}} - 4x^{\frac{1}{2}} + 7$	
When $x = 4$, $y = 4(32) - 4(2) + 7$ $y = 127$	**M1**