

1. Curve C has equation

$$y = x^3 - 7x^2 + 5x + 4$$

(a) Find $\frac{dy}{dx}$

(2)

The point $P(2, -6)$ lies on C

(b) Find the equation of the tangent to C at P

Give your answer in the form $y = mx + c$ where m and c are integers to be found.

(3)

$$\underline{(a)} \quad \frac{dy}{dx} = 3x^{3-1} - 2(7)x^{2-1} + 5x^{1-1} + 0$$

$$= 3x^2 - 14x + 5 \quad (2 \text{ marks})$$

(b) at $(2, -6)$

$$\text{gradient, } m = \frac{dy}{dx}(2) = 3(2)^2 - 14(2) + 5 = -11 \quad (1 \text{ mark})$$

so tangent is $y = -11x + c$

at $(2, -6)$ \Rightarrow $-6 = -11(2) + c$
 $c = 16$ (1 mark)

so tangent is $y = -11x + 16$ (1 mark)