

D Michaelmas Differentiation I

1. Find $\frac{dy}{dx}$ for the following curves:

(a) $y = x^2 - 2x + 3.$

$$\frac{dy}{dx} = 2x - 2$$

(b) $y = x^3 + 5x^2 + x - 1.$

$$\frac{dy}{dx} = 3x^2 + 10x + 1$$

(c) $y = \frac{3}{x} - 5.$

$$\frac{dy}{dx} = -3x^{-2}$$

(d) $y = 2x^4 - \pi x - \frac{5}{x^2}.$

$$\frac{dy}{dx} = 8x^3 - \pi + 10x^{-3}$$

2. Find the equation of the tangent to $y = x^2 - 4x + 1$ when $x = 1.$

$$y = -2x$$

3. Find the equation of the tangent to $y = x^3 - x^2 + 2x - 1$ when $x = -2.$

$$y = 18x + 19$$

4. Find the equation of the tangent to $y = \frac{5}{x}$ when $x = 2.$

$$y = -\frac{5}{4}x + 5$$