

Question 1 (7 marks)

Find $\frac{dy}{dx}$ for each of the following functions. There is no need to simplify your answers.

(a) $y = 7x^2 + e^{x^2+3x}$

$$\frac{dy}{dx} = 14x + (2x+3) \cdot e^{x^2+3x}$$

(2 marks)

(b) $y = 3(x + \sqrt{x})^5$

$$y = 3(x + x^{1/2})^5$$
$$\frac{dy}{dx} = 15(x + x^{1/2})^4 \cdot (1 + \frac{1}{2}x^{-1/2})$$

(2 marks)

(c) $y = \frac{\cos(2x+9)}{x^2}$

$$\frac{dy}{dx} = \frac{-2\sin(2x+9) \cdot x^2 - \cos(2x+9) \cdot 2x}{x^4}$$

(3 marks)