

- 1) Let $f(x) = e^{\frac{x}{3}} + 5\cos^2 x$. Find $f'(x)$.
- 2) Let $f(x) = x^3 - 2x^2 - 1$.
- (a) Find $f'(x)$.
- (b) Find the gradient of the curve of $f(x)$ at the point $(2, -1)$.
- 3) Let $f(x) = 6\sqrt[3]{x^2}$. Find $f'(x)$.
- 4) Let $f(x) = (3x + 4)^5$. Find
- (a) $f'(x)$;
- 5) Let $f(x) = (2x + 7)^3$ and $g(x) = \cos^2(4x)$. Find
- (a) $f'(x)$;
- (b) $g'(x)$.
- 6) (a) Let $f(x) = e^{5x}$. Write down $f'(x)$.
- (b) Let $g(x) = \sin 2x$. Write down $g'(x)$.
- (c) Let $h(x) = e^{5x} \sin 2x$. Find $h'(x)$.
- 7) Let $f(x) = 3\cos 2x + \sin^2 x$.
- (a) Show that $f'(x) = -5\sin 2x$.
- 8) Differentiate each of the following with respect to x .
- (a) $y = \sin 3x$ *[1 mark]*
- (b) $y = x \tan x$ *[2 marks]*
- (c) $y = \frac{\ln x}{x}$ *[3 marks]*

9)

[Maximum mark: 5]

A function f has its first derivative given by $f'(x) = (x-3)^3$.

- (a) Find the second derivative. *[2 marks]*
- (b) Find $f'(3)$ and $f''(3)$. *[1 mark]*
- (c) The point P on the graph of f has x -coordinate 3. Explain why P is not a point of inflexion. *[2 marks]*

10)

Let $g(x) = 2x \sin x$.

- (a) Find $g'(x)$. *[4 marks]*