Spiral Review: 6-2 P1 (No Calculator) Calculus Differentiation - A

1. 11M.1.sl.TZ2.4   [6 marks]
   Let $h(x) = \frac{6x}{\cos x}$. Find $h'(0)$.

2. 17M.1.sl.TZ2.6   [6 marks]
   The values of the functions f and g and their derivatives for $x = 1$ and $x = 8$ are shown in the following table.

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
1	2	4	9	-3
8	4	-3	2	5

   Let $h(x) = f(x)g(x)$

   (a) Find $h(1)$ [2]
   (b) Find $h'(8)$ [3]

3. SPNone.1.sl.TZ0.7   [7 marks]
   Given that $f(x) = \frac{1}{x}$, answer the following.

   (a) Find the first four derivatives of $f(x)$.   [4]
   (b) Write an expression for $f^{(n)}(x)$ in terms of x and n. [3]

Spiral Review: 6-2 P1 (No Calculator) Calculus Differentiation - B

1. 11M.1.sl.TZ1.5 [7 marks]
   Let $g(x) = \frac{\ln x}{x^2}$, for $x > 0$.

   (a) Use the quotient rule to show that $g'(x) = \frac{1-2\ln x}{x^3}$ [4]

   (b) The graph of g has a maximum point at A. Find the x-coordinate of A. [3]

2. 09M.1.sl.TZ2.6 [5 marks]
   A function f has its first derivative given by $f'(x) = (x-3)^3$.

   (a) Find the second derivative. [2]

   (b) Find $f'(3)$ and $f''(3)$. [1]

   (c) The point P on the graph of f has x-coordinate 3. Explain why P is not a point of inflexion. [2]

3. 09M.1.sl.TZ2.8 [6 marks]
   Let $f(x) = e^{-3x}$ and $g(x) = \sin(x - \frac{\pi}{3})$.

   (a) Write down [2]

   i. $f'(x)$;
   ii. $g'(x)$.

   (b) Let $h(x) = e^{-3x}\sin(x - \frac{\pi}{3})$. Find the exact value of $h'(\frac{\pi}{3})$. [4]

Spiral Review: 6-2 P1 (No Calculator) Calculus Differentiation - B

1. 09N.1.sl.TZ0.5   [6 marks]
   Consider $f(x) = x^2 + \frac{p}{x}$, $x \neq 0$, where p is a constant.

   (a) Find $f'(x)$ [2]

   (b) There is a minimum value of $f(x)$ when $x = -2$. Find the value of p.   [4]

2. 14M.1.sl.TZ1.7   [7 marks]
   Let $f(x) = px^3 + px^2 + qx$.

   (a) Find $f'(x)$.   [2]

   (b) Given that $f'(x) \geq 0$, show that $p^2 \leq 3pq$.   [5]