

Name: *Solution*

Student Number:

## Problem 1

Differentiate the following functions.

(a)  $y = (2\pi - 1)^{100}$

$y' = 0$  because  $(2\pi - 1)^{100}$  is a constant no matter how it looks like!

(b)  $f(t) = 2t^3 - 3t^2 - 4t$

$$f'(t) = 6t^2 - 6t - 4$$

(c)  $g(x) = (5x^2 - 2)(x^3 + 3x)$

$$g'(x) = \underset{\substack{\uparrow \\ \text{product rule}}}{(5x^2 - 2)' (x^3 + 3x) + (5x^2 - 2) (x^3 + 3x)'} \\ = 10x(x^3 + 3x) + (5x^2 - 2)(3x^2 + 3)$$

(d)  $h(x) = \frac{1 + 2x}{3 - 4x}$

$$h'(x) = \frac{(1 + 2x)' (3 - 4x) - (3 - 4x)' (1 + 2x)}{(3 - 4x)^2} \\ \underset{\substack{\uparrow \\ \text{Quotient rule}}}{=} \frac{2(3 - 4x) - (-4)(1 + 2x)}{(3 - 4x)^2}$$