Finding Gradients using Differentiation 1

1) Find the gradient function for the curve $y=x^5$.
Hence find the gradient of the curve at the points:
(a) (1,1) (b) (2, 32) (c) (-1,-1)

2) Differentiate $y = x^3 - 3x^2$.
Hence find the gradient of this graph at the points:
(a) (0, 0) (b) (2, -4) (c) (-1, -4)

3) Find the derivative of $y = x^3 - 12x$
Hence find the gradient of this graph at the points:
(a) (1, -11) (b) (-3, 9) (c) (2, -16)
What does your answer to (c) tell you about the graph at this point?

4) Differentiate:
(a) $y = 4x^7$ (b) $y = 2x^5 - 7x^2 + 6$ $y = 8x^3 - 5x + 4$

Finding Gradients using Differentiation 2

1) Find the gradient function for the curve $y = (x^2 - 3)(x + 5)$.
Hence find the gradient of the curve at the points:
(a) (2, 7) (b) (3, 48) (c) (-1, -8)

2) Differentiate $y = \frac{1}{x^3}$.
Hence find the gradient of this graph at the points:
(a) (1, 1) (b) (2, $\frac{1}{8}$)

3) Find the derivative of $y=\frac{3}{x^2}-\frac{1}{x}$
Hence find the gradient of this graph at the points:
(a) (1, 2) (b) (3,0)

4) Differentiate:
(a) $y = (x - 4)(x + 2)$ (b) $y=\frac{4}{x}-\frac{5}{x^2}$ (c) $y=\frac{3x^4-2x^3}{x^2}$

Finding turning points using differentiation

1) Find the turning point(s) on each of the following curves.

(a) $y=x^3-12x$ (b) $y=12+4x-x^2$ (c) $y=4x-\frac{16}{x^2}$

(d) $y=2x^3-3x^2-36x$

2) For parts (a) and (b) of question 1, find the points where the graph crosses the axis
(ie the value of y when x = 0, and the values of x when y = 0).

Hence draw a sketch showing the general shape of the curve, marking on the x-intercepts and y-intercept, and the turning points.