Differentiation 2

1   Sketch $y = x^3 - 2x^2 - 8x$.

         a) Find the equation for $\dfrac{dy}{dx}$

         b) Find the gradient when x = -2
         c) Find the gradient when x = 1.

         d) Find the coordinates of the points where $\dfrac{dy}{dx} = 1$

         e) Find the coordinates of the points where $\dfrac{dy}{dx} = 0$

Label these points on your graph.

2   sketch $y = x^2 - 8x + 12$.

         a) Find the equation for $\dfrac{dy}{dx}$

         b) Find the gradient when x = 2
         c) Find the gradient when x = 5.

         d) Find the coordinates of the points where $\dfrac{dy}{dx} = -2$

         e) Find the coordinates of the points where $\dfrac{dy}{dx} = 0$

Label these points on your graph

         f) Complete the square and show that you get the same coordinates for the bottom of the curve as in the question above.

3   Sketch $y = \frac{1}{3}x^3 - \frac{1}{2}x^2 - 6x$.

         a) Find the equation for $\dfrac{dy}{dx}$

         b) Find the gradient when x = -2
         c) Find the gradient when x = 1.

         d) Find the x values of the points where $\dfrac{dy}{dx} = -2$

         e) Find the x values of the points where $\dfrac{dy}{dx} = 0$

Label these points on your graph

4   Sketch $f(x) = \frac{1}{3}x^3 + x^2 - 8x$.

         a) Find $f'(x)$

         b) Find the gradient when x = -2
         c) Find the gradient when x = 1.
         d) Find the coordinates of the points where $f'(x) = 0$
         e) Find $f''(x) = 0$
         f) When is $f(x)$ an increasing function?

Show this information on your graph