Revision Class Problems

1. Find the derivatives of the following functions using appropriate rules

a) $f(x) = 6x^3 - 9x + 4$

b) $y = 2t^4 + 10t^2 + 13t$

c) $h(y) = y^{-4} - 9y^{-3} + 8y^{-2} + 12$

d) $f(x) = 10\sqrt[5]{x^3} - \sqrt{x^7} + 6\sqrt[3]{x^8} - 3$

e) $f(x) = \frac{4}{x} - \frac{1}{6x^3} + \frac{8}{x^5}$

2. Applications of derivatives

   a) Find the tangent line to $g(x) = \frac{16}{x} - 4\sqrt{x}$ at $x = 4$

   b) Find the tangent to $f(x) = 7x^4 + 8x^{-6} + 2x$ at $x = -1$

   c) The position of the object at any time t is given by $S(t) = 3t^3 - 40t^2 + 126t$

      i. Determine the velocity of the object at any time t

      ii. Does the object ever stop changing

      iii. When is the object moving to the right and when is the object moving to the left.

3. Find the derivative of the following functions

   a) $y = \sin^2 x$

   b) $f(x) = e^{\sin x}$

   c) $g(x) = \frac{x+1}{x}$

   d) $f(x) = \frac{x+\cos x}{\sin c}$