

1. Make up your own function that is **not a polynomial**. Then find its derivative from first principles. Your function must not be from the textbook, and not one of the examples we did in class, etc. **[7 marks]**

2. Make up your own function that is a quotient. In particular, your function should have the form $f(x) = \frac{p(x)}{q(x)}$, where both $p(x)$ and $q(x)$ are **not constants**. i.e. $f(x) = \frac{5}{x^2-2}$ is not ok, since 5 is a constant. Answer the following:
 - a) Find $f'(x)$ using the quotient rule. **[10 marks]**

 - b) Choose any point on $f(x)$. Clearly state the coordinates of your point, then find the equation of the tangent line at this point.

3. Find the derivative of each of the following. Simplify appropriately. **[6 marks]**
 - a) $f(x) = 2x^3 - x^2 + 3x - 1$

 - b) $y = \sqrt[3]{(1 - x^2)}$

4.
 - a) What is the definition of a *critical point*?

 - b) Find **the x-values** of all critical points on the graph of $f(x) = 2(2x^2 - 1)^3(x + 2)^2$. (HINT: do not expand first).

[7 marks]