Learning outcomes: Chapter 2

- 1. You should understand that the *derivative function* can be used to obtain the gradient of a polynomial, and the standard notation for the derivative is $\frac{dy}{dx}$.
- 2. You should be able to obtain the derivative of simple polynomials from first principles.
- **3.** You should know that, for simple polynomial terms $y = kx^n$,

$$\frac{dy}{dx} = nkx^{n-1}$$

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- 4. You should be able to use the derivative function to calculate the gradient of a polynomial at a specific point.
- 5. You should be able to use differentiation to solve simple optimisation problems:
 - By recognising that, at turning points, $\frac{dy}{dx} = 0;$
 - By using the above fact to find the co-ordinates of such turning points;
 - By using the second derivative test to verify the nature of the turning points.
- 6. You should be able to obtain *first* and *second order partial derivatives* from simple polynomials involving two or three variables.

Prize question*

Differentiate the function

$$f(x) = \frac{1}{\sqrt{1-x}}$$

from first principles, with respect to x.

* To be handed in to me in the lecture on Friday, 27th November 2015