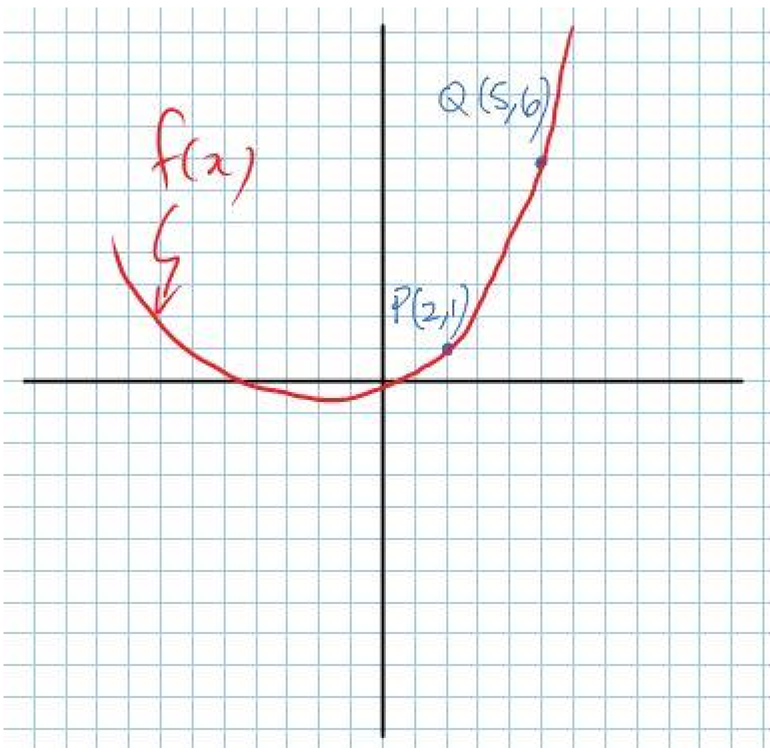
1.2 The Slope of a Tangent

This concept is a key to unlocking the tool box of Differential Calculus.

We'll begin by looking at a couple of examples.

Example 1.2.1

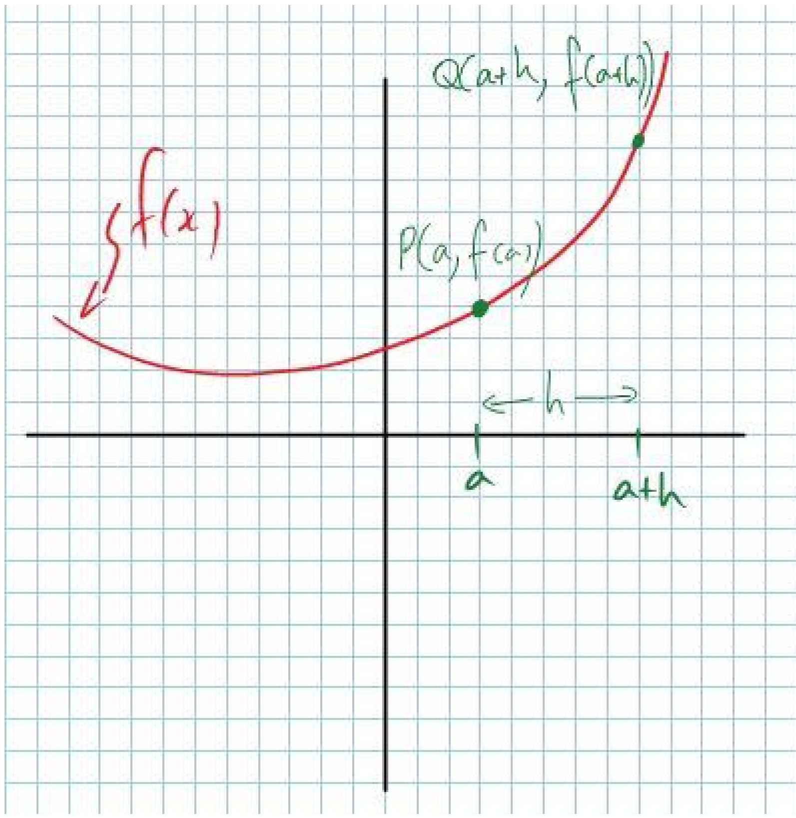
Consider the diagram:



Question: Why can we **always** calculate the slope of a secant?

Example 1.2.2

Consider the diagram:



Example 1.2.3

Given $f(x) = x^2 + 1$ ***numerically*** approximate the slope of the tangent to the function at the point $P(1,2)$

Pictures are as much your **friends** as Factors are

Algebraic Technique

In making h smaller and smaller (that is, as we let   ), we are actually using what we call a **limit technique**.

If we write for the slope of a secant to a function

$$m_{\sec} = \frac{f(a+h) - f(a)}{h}$$

then, $m_{\tan} =$

Example 1.2.4

Determine the slope of the tangent to $f(x) = 3x^2 + 1$ at $x = 2$.

Example 1.2.5

Calculate the slope of the tangent to $g(x) = \sqrt{x+1}$ at $x = 3$.

Class/Homework for Section 1.2

Pg. 18 – 21 #4,6 – 9, 11, 16, 20 – 22.