

$$m^2 = \frac{\text{math}}{\text{minute}}$$

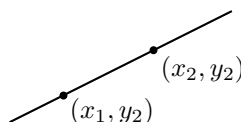
Calculus: *The Derivative*

A Review

Slope

The slope of a line is the measure of its steepness. It is the change in y divided by the change in x . Given two points (x_1, y_1) and (x_2, y_2) the slope is given by,

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$



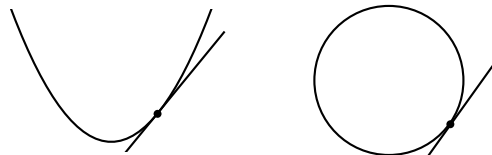
Secant Line

A line passing through two points on a curve.



Tangent Line

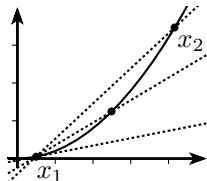
A line that touches a single point on a curve.



The Derivative

Now we want to turn a secant line into a tangent line. We will do this by moving the two points of the secant line very close together until they are essentially the same point.

Derivative: The derivative of a function $f(x)$ at the point $x = x_1$, is the slope of the tangent line that touches the function at $x = x_1$. This is also known as the *instantaneous rate of change* or *instantaneous velocity* at $x = x_1$.



$$\lim_{x_2 \rightarrow x_1} \frac{y_2 - y_1}{x_2 - x_1}$$

