

What it tells you!

- Slope at any point
- Velocity at any point
- instantaneous rate of change at any point

How to find Slope:

Find a formula for $f'(x)$ and evaluate at point $f'(x_1)$

Equations for Tangents

$$y - y_1 = m(x - x_1)$$

Substitute in original function (pointing to y_1)
given (pointing to x_1)

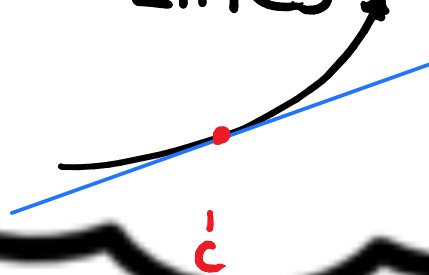
Tells you 'm'

Two Methods

What it looks like

A line that touches a graph at one point locally:

Tangent Lines



Estimation with tangents

At a point x:

$$y = f(a) + f'(a)\Delta x$$

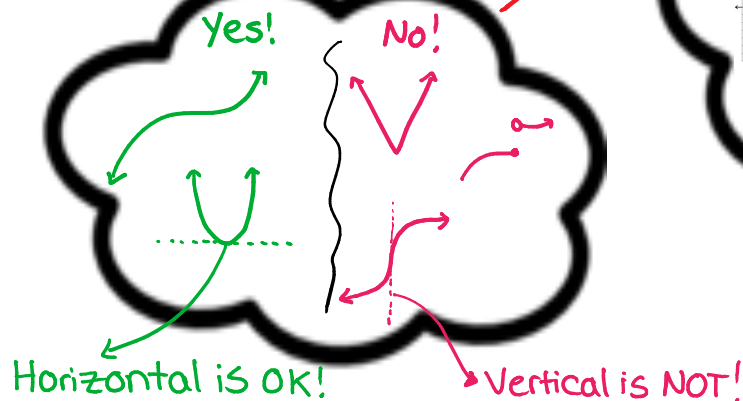
'Nice'y (pointing to y_1) + 'Nice'x (pointing to $x - x_1$)

Tangent Lines at Inverses

Inverse Relationship

Original	Inverse
(a, b)	(b, a)
$f'(a) = M$	$(f^{-1})'(b) = \frac{1}{M}$

Differentiability



Mean Value Theorem (MVT)

IF Differentiable on $[a, b]$, then there is a point c where $f'(c) = \frac{f(b) - f(a)}{b - a}$

Average Rate of Change on $[a, b]$