Three Trig Rules to know:

$$\sin^2(x) + \cos^2(x) = 1$$

Divide these by $\sin^2(x)$ or $\cos^2(x)$ to get the other ones.

$$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \sin\beta\cos\alpha$$

from these you can make double angle formulas

$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$$

What is a derivative?

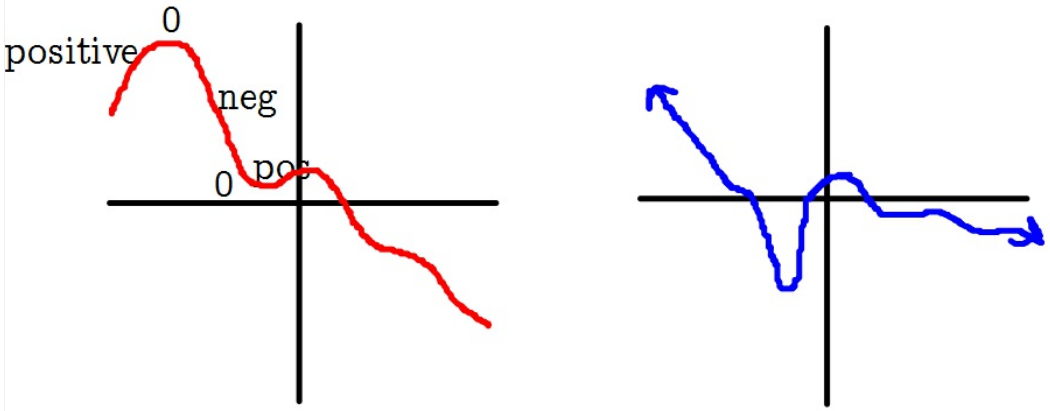
A derivative is a(n):

- limit of the difference quotient
- slope of a curve (slope is a number)
- can be a numerical value OR a function (outputs)
- input an x value, output the slope AT the x-value
- operator (something you can do to math; both sides of an equation)

Notation:

symbol	how to say	comments
$f'(x)$	(pronounced "f prime of x")	this function takes an x, outputs slopes at x
y'	("y prime")	can be risky to use
$\frac{dy}{dx}$	("dy dx" "the derivative of y with respect to x)	NOT a fraction best one to use imo
$\frac{d}{dx}\left[f(x)\right]$	("derivative of f of x with respect to x")	shows operator

Most functions have derivative functions



f(x)

f'(x)

Equation of the tangent line: let's do #1 on the wksht together

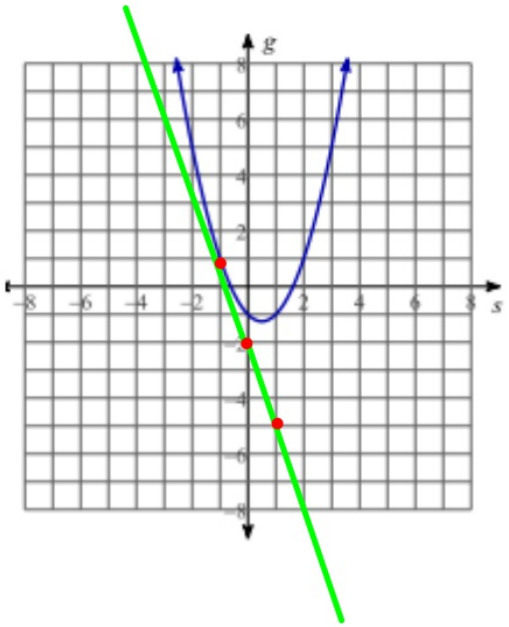
$g(s) = s^2 - s - 1$

$g'(s) = 2s - 1 - 0$ Use the power rule we discovered on our calculators: the derivative of x^n is nx^{n-1}

$g'(s) = 2s - 1$ Simplify

Now use the point given: (-1, 1). The s-value (or x-value...the input) is -1. Plug this into g'(s) to get the slope of the tangent line.

$g'(-1) = 2 * -1 - 1$
$g'(-1) = -2 - 1$
$g'(-1) = -3$



This is the slope: -3 we already have a point (-1,1)
So now use Algebra I skills to write the equation of a line

$y-y_1 = m(x-x_1)$
$y - 1 = -3(x + 1)$
$y - 1 = -3x - 3$
$y = -3x - 2$