

Good afternoon: warm up

Write the equation of the line tangent to  $y$  when  $x=1$ .

$$y = 3\sqrt{x} - \frac{4}{x^3} + 2x^2 - 5x + 2$$

~~$$y = 3x^{1/2} - 4x^{-3} + 4x - 5 + 2$$~~

$$y = 3x^{1/2} - 4x^{-3} + 2x^2 - 5x + 2$$

$\frac{d}{dx}$

$$\frac{dy}{dx} = \frac{3}{2}x^{-1/2} + 12x^{-4} + 4x - 5$$

$$y(1) = 3 - 4 + 2 - 5 + 2 = -2$$

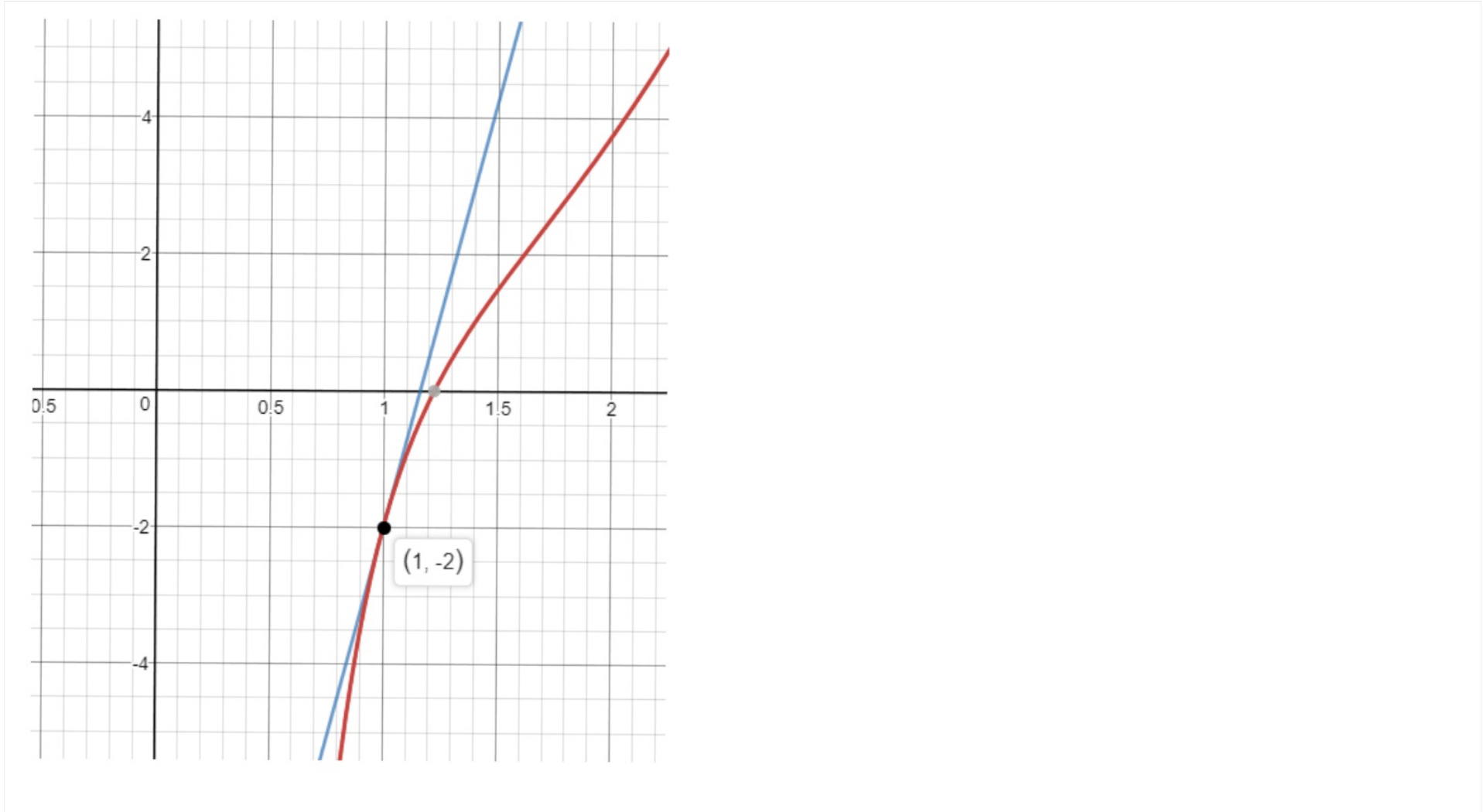
$$\frac{dy}{dx} = \frac{3}{2\sqrt{x}} + \frac{12}{x^4} + 4x - 5$$

$$x=1 = 1.5 + 12 + 4 - 5 = 12.5$$

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

? ? !

$$y - -2 = 12.5(x - 1)$$



There will be time in class for retakes Thursday

DS Wednesday and Thursday will be for retakes.  
No mini lesson Wednesday

Want to upgrade a 96 that was only assessed once?

Ask for an upgrade opportunity Thursday

(basically a retake w/o hw, no harm to current grade)





Add to your formula booklets:

Product Rule

$$\frac{d}{dx}[f(x)g(x)] = f'(x)g(x) + f(x)g'(x)$$
$$f'g + fg'$$

Quotient Rule

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{f'g - fg'}{g^2}$$

Find  $h'(x)$  for  $h(x) = (x^4 + 3x^2 + 6)(2x^2 + 9x - 3)$

$f: x^4 + 3x^2 + 6$        $g: 2x^2 + 9x - 3$   
 $f': 4x^3 + 6x$        $g': 4x + 9$

$$h'(x) = (x^4 + 3x^2 + 6)(4x + 9) + (4x^3 + 6x)(2x^2 + 9x - 3)$$

Find  $j'(\pi/3)$  for  $j(x) = \frac{-x^2}{\sin(x)}$

$f: -x^2$        $g: \sin(x)$   
 $f': -2x$        $g': \cos(x)$

$$\sin^2(x) = (\sin x)^2$$



$$j'(x) = \frac{-2x \cdot \sin(x) - (-x^2) \cdot \cos(x)}{\sin^2(x)}$$

$$j'(x) = \frac{-2x \cdot \sin(x) + x^2 \cdot \cos(x)}{\sin^2(x)}$$

$$j'(\pi/3) = \frac{-2(\pi/3) \sin(\pi/3) + \frac{\pi^2}{9} \cos(\pi/3)}{(\sin \pi/3)^2}$$

$$\frac{-2(\frac{\pi}{3}) \cdot \frac{\sqrt{3}}{2} + \frac{\pi^2}{9} \cdot \frac{1}{2}}{(\frac{\sqrt{3}}{2})^2}$$

$$\frac{-\frac{\sqrt{3}}{3}\pi + \frac{\pi^2}{18}}{\frac{3}{4}}$$

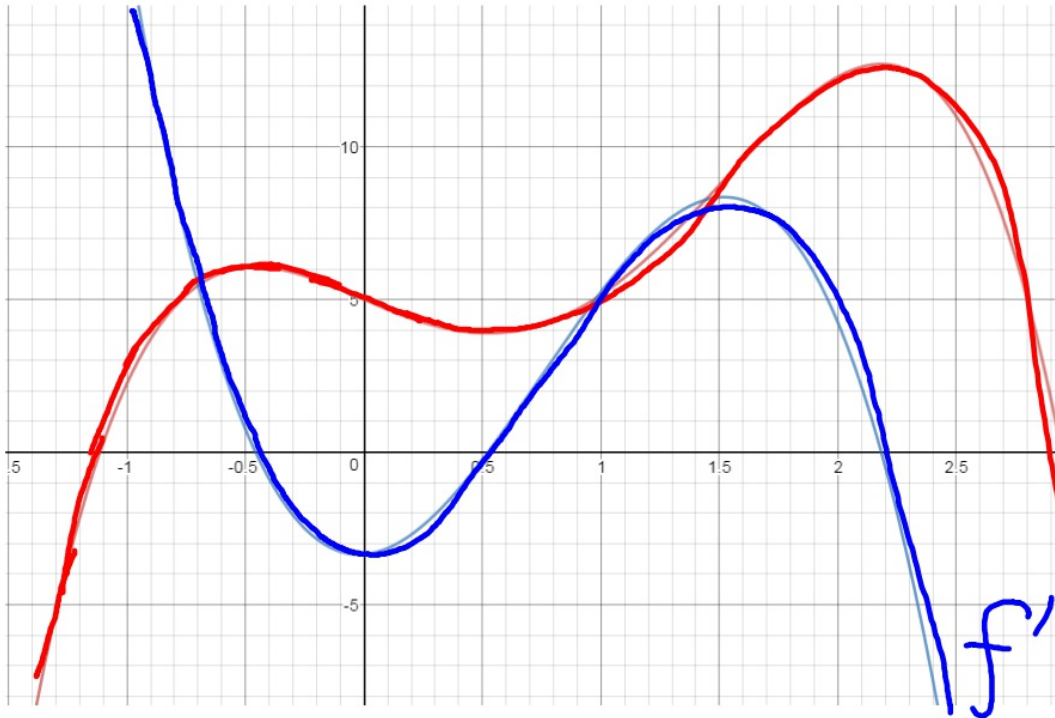


What is the derivative of  $\tan(x)$ ?

to do  
later



## Derivative as a Function



Which one is  $f$  ?  
Which one is  $f'$  ?

values of the blue  
correspond to the  
slopes of the red



## Understanding the Derivative as a Graph

Go to [j.mp/calcgg](http://j.mp/calcgg) on your device

Go through the applets in sequence along with the handout

HW: finish  
the graphs handout  
w/ the website.