

**WORKSHEET**  
**8/31/2015**

INTRO < 5 minutes

Recall that the slope of the tangent line for a function  $f(x)$  at  $x = a$  is given by the formula

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}.$$

PROBLEM 15 minutes

Use this to compute, for  $f(x) = \sqrt{x}$ ,

1.  $f'(1)$
2.  $f'(4)$
3.  $f'(81)$
4. a general formula for  $f'(x)$  for any value of  $x$ .

Note: you don't have to do these in order!

PROBLEM (10 minutes)

Use this to compute, for  $f(x) = \frac{1}{x}$ ,

1.  $f'(1)$
2.  $f'(2)$
3.  $f'(3)$
4. a general formula for  $f'(x)$  for any value of  $x$ .

Note: you don't have to do these in order!

CONCLUSION (5 mins)

Explain that this gives a way to produce from a function  $f(x)$  a new function  $f'(x)$ , called the derivative of  $f(x)$ .

Comment: positive derivative means slope of tangent line is positive, means function is "going up." negative derivative means slope of tangent line is negative, means function is "going down."

NEXT PROBLEM: GRAPHICAL INTERPRETATION (15 mins)

Sketch the graphs of  $\sin(x)$  for  $x$  between  $-\pi$  and  $\pi$ , but don't identify the function. also a general cubic. Ask them to figure out (based on increasing/decreasing), where the derivative is positive and where it is negative, and sketch the derivatives.

NEXT TIME: TECHNIQUES FOR CALCULATING DERIVATIVES