

1. Given that $f(x) = \frac{2x}{(x+1)}$ Find the equation of the tangent line to the curve at $x=0$. (HINT: You will need to use the limit definition of the derivative as we have not learned a shortcut for this type of function yet.)
2. Given that $g(x) = \frac{1}{\sqrt{x}}$ Find the equation of the tangent line to the curve at $x=1$. (HINT: Here you may use a shortcut that we have learned.)
3. Sketch a graph of a function for which $g(0) = g'(0) = 0, g'(-1) = -1, g'(1) = 3, \text{ and } g'(2) = 1$.
4. Find $f'(a)$ Given that $f(x) = \sqrt{3x+1}$. (HINT: You will need to use the limit definition of the derivative as we have not learned a shortcut for this type of function yet.)

5. Given $\lim_{h \rightarrow 0} \frac{\cos(\pi+h)+1}{h}$. Find the function and the a value represented by this limit.

6. Use the graph to estimate the values of each derivative then sketch a graph of the derivative function.

a. $f'(0) =$

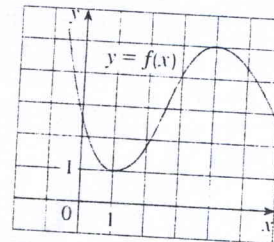
b. $f'(2) =$

c. $f'(4) =$

d. $f'(1) =$

e. $f'(3) =$

f. $f'(5) =$



7. Given the following functions find the derivative of each function and simplify your answers(Hint: You can and should use shortcuts):

a. $f(t) = \frac{1}{2}t^6 - 3t^2 + t$

b. $g(x) = 6\sqrt{x} + 5 \cos x$

c. $f(x) = \frac{x^2 - 2\sqrt{x}}{x}$