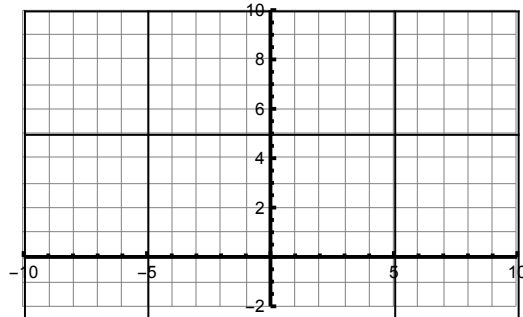


# Derivative at a Point Worksheet

## Corresponding to Section 1.3

1. Given that  $k(x) = 1.5^x$ , we want the derivative at  $x = -2$ .

1.1. Graph this function along with its tangent line at  $x = -2$ . Approximate the slope of this tangent line.



Out[337]=

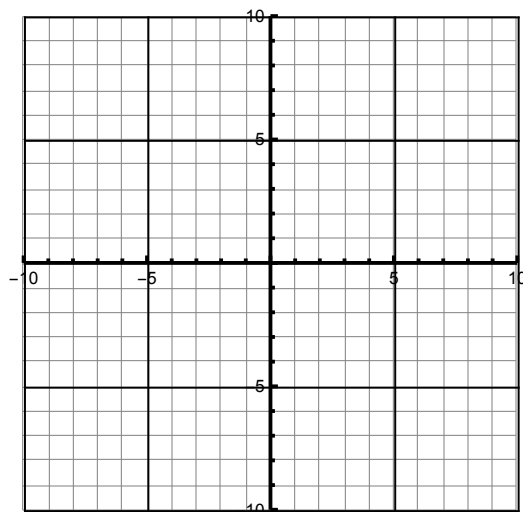
1.2. Approximate the derivative of this function at  $x = 2$  to 3 decimal places by numerically evaluating the difference quotient for  $x$ -values that get progressively closer to 2.

$x$	2.1	2.01	2.001	2.0001	2.00001
$\frac{k(x)-k(2)}{x-2}$					

$k'(2) \approx$  \_\_\_\_\_

2. Given that  $f(x) = 3x - 2$ , we want the derivative at  $x = 1$ .

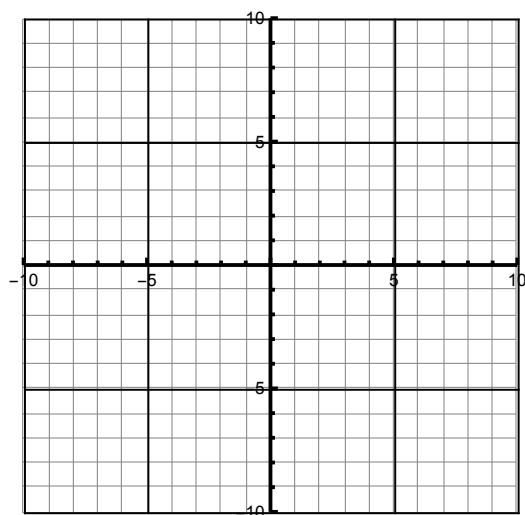
2.1. Graph this function along with its tangent line at  $x = 1$ . Identify the slope of this tangent line.



2.2. Find the derivative of this function at  $x = 1$  using the limit definition.

3. Given that  $g(x) = \frac{x^2}{2}$ , we want the derivative at  $x = 3$ .

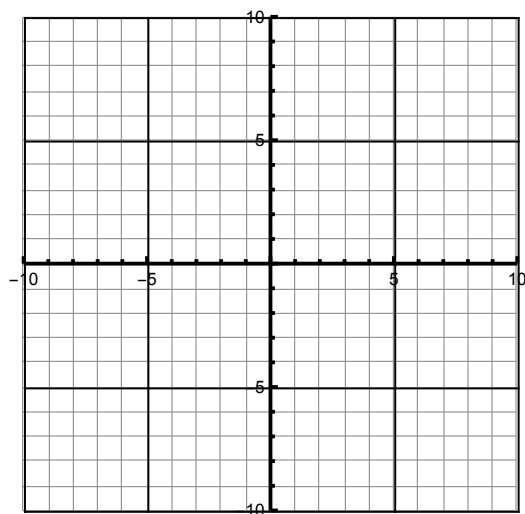
3.1. Graph this function along with its tangent line at  $x = 3$ . Identify the slope of this tangent line.



3.2. Find the derivative of this function at  $x = 3$  using the limit definition.

4. Given that  $h(x) = x^2 - x$ , we want the derivative at  $x = 2$ .

4.1. Graph this function along with its tangent line at  $x = 2$ . Identify the slope of this tangent line.



4.2. Find the derivative of this function at  $x = 2$  using the limit definition.

4.3. Find an equation for the tangent line at  $x = 2$ .