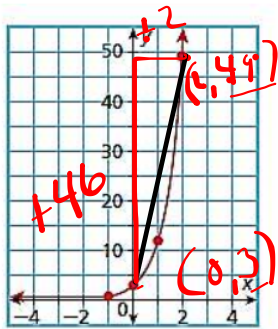
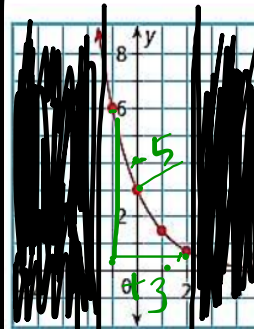


**Average Rate of Change from a Graph**

**Average Rate of Change:** Rate of change or slope for a given interval on a graph. The given interval is written using the inequality notation  $a \leq x \leq b$ , where  $a$  and  $b$  represent the initial and final  $x$ -value of the interval.



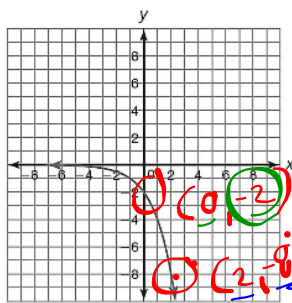
ROC = m  
 $ROC = \frac{\text{rise}}{\text{run}}$   
 $\frac{46}{2} = \boxed{23}$



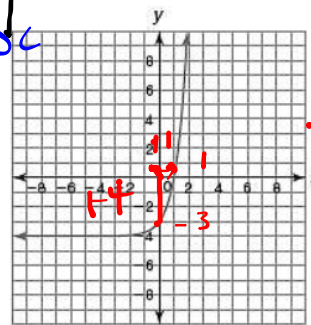
$ROC = -\frac{5}{3}$

Calculate the average rate of change for the interval  $0 \leq x \leq 2$

Calculate the average rate of change for the interval  $-1 \leq x \leq 2$



$\frac{y_2 - y_1}{x_2 - x_1} = ROC$   
 $\frac{-8 - (-2)}{2 - 0} = \frac{-6}{2} = \boxed{-3}$



$\frac{\text{rise}}{\text{run}} = \frac{4}{1} = \boxed{4}$

Calculate the average rate of change for the interval  $0 \leq x \leq 2$

Calculate the average rate of change for the interval  $0 \leq x \leq 1$

**Average Rate of Change from an Equation**

If you are given an equation of a function and asked to calculate the average rate of change for that function over a given interval, you will substitute the initial  $x$ -value and the final  $x$ -value into the function to create two sets of ordered pairs. Then using the ordered pairs, substitute into the slope formula.

a.  $y = 3^x$ ,  $1 \leq x \leq 3$

b.  $y = 2(1/2)^x$ ,  $-4 \leq x \leq 0$

x	y
1	$3^1 = 3$
3	$3^3 = 27$

$\frac{27 - 3}{3 - 1} = \frac{24}{2} = \boxed{12}$

x	y
-4	$2(\frac{1}{2})^{-4} = 32$
0	$2(\frac{1}{2})^0 = 2$

$\frac{2 - 32}{0 - (-4)} = \frac{-30}{4} = \boxed{-\frac{15}{2}}$