## 4.4: Find Slope and Rate of Change

Goals: *Find slope of a line given two points
*Find slope of a graphed line
*Find and interpret rate of change

| Definition | Formulas |  |
| :---: | :---: | :---: |
| SLOPE - | Formula | When To Use |
| The ratio of vertical change to horitzontal change of a line | $m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}$ | When given two points |
| SYNONYM: | $m=\frac{\text { rise }}{\text { run }}$ | When a line is graphed |
| Steepness of a line | $m=\frac{\Delta y}{\Delta x}$ | When a line is graphed |
| Direction | Zero vs. Undefined |  |
|  |  | defined <br> f the zero is under ine the slope is fined" |
| Negative - as $x$ increases $y$ decreases |  | o as $x$ increases $y$ s the same |

Find the slope of the line that passes through the given points. (Be sure to write down the formula you are using)

Ex: $(5,2)$ and $(4,-1)$

$$
\begin{aligned}
& m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}} \\
& m=\frac{-1-2}{4-5} \\
& m=\frac{-3}{-1} \\
& m=3
\end{aligned}
$$

Ex: $\left(\frac{9}{2}, 5\right)$ and $\left(\frac{1}{2},-3\right)$

$$
\begin{aligned}
& m=\frac{-3-5}{\frac{1}{2}-\frac{9}{2}} \\
& m=\frac{-8}{\frac{-8}{2}} \\
& m=\frac{-8}{-4} \\
& m=2
\end{aligned}
$$

Ex: $(-5,1)$ and $(-5,3)$

$$
\begin{aligned}
& m=\frac{3-1}{-5-(-5)} \\
& m=\frac{2}{0} \\
& m=\text { undefined }
\end{aligned}
$$

Ex: $(-2,3)$ and $(4,6)$

$$
m=\frac{6-3}{4-(-2)}
$$

$$
m=\frac{3}{6}
$$

$$
m=1 / 2
$$

Ex: $(3,4)$ and $(-2,4)$

$$
m=\frac{4-4}{-2-3}
$$

$$
m=\frac{0}{-5}
$$

$$
m=0
$$

## Find the slope of the line graphed.

For each graph, use the formula $\frac{\text { rise }}{\text { run }}$

## Ex: <br> 

$$
m=5
$$

Ex:


$$
m=\frac{3}{4}
$$



$$
m=-\frac{3}{7}
$$


$m=-2$
*don't forget the slope is negative if the line goes down from left to right

Ex:


$$
m=\frac{2}{3}
$$



$$
m=-3
$$

*create points if necessary

