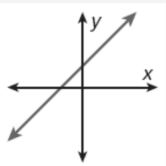
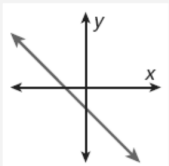
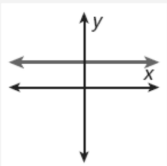
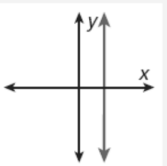
Slopes of Lines
Section 3.5

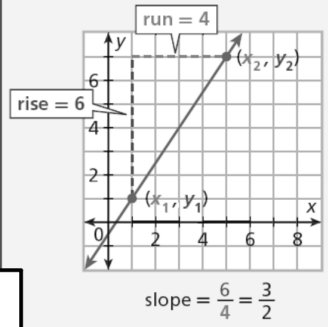
Goals:
1. Find slope of a line
2. Use slopes to determine if two lines are parallel, perpendicular, or neither

The **slope** of a line in a coordinate plane is a number that describes the [ ] of the line. Any two points on a line can be used to determine the slope.

**Summary: Slope of a Line**

| [ ] Slope | [ ] Slope | [ ] Slope | [ ] Slope |
|---|---|---|---|
|  |  |  |  |

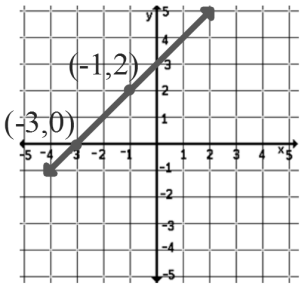
**Slope of a Line**

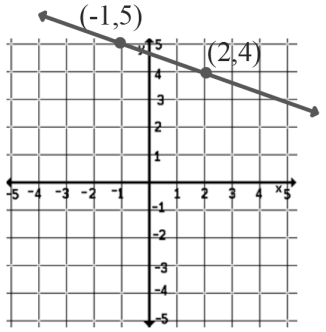
| DEFINITION | EXAMPLE |
|---|---|
| The [ ] is the difference in the $y$-values of two points on a line. |  |
| The [ ] is the difference in the $x$-values of two points on a line. | |
| The **slope** of a line is the ratio of the rise to run. If $(x_1, y_1)$ and $(x_2, y_2)$ are any two points on a line, the slope of the line is $m$ = [ ] | |



Slope =

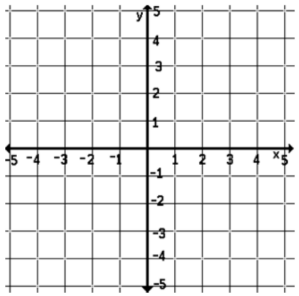
Find the slope of the line:



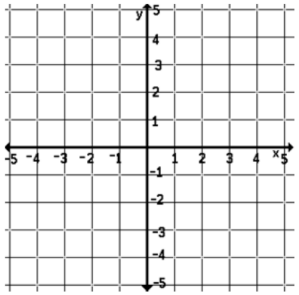



Graph the line containing these points and find their slopes.

(-4,2) and (2, -3)



(-2,3) , (3,5)



Find the slope without graphing.

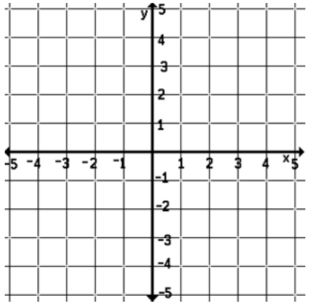
(1,2) and (3,5)

(-2,3) and (7,1)

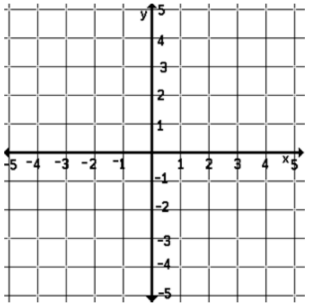
(-4,-6) and (3,-2)

Find the slope of the line that contains the following points

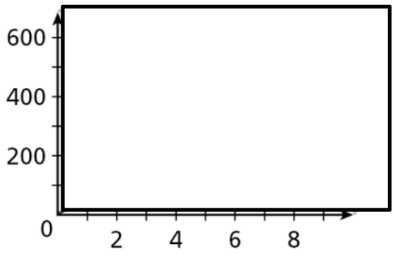
(4,-6) and (4,0)



(7,-2) and (-3,-2)



**Justin is driving from home to his college dormitory. At 4:00 p.m., he is 260 miles from home. At 7:00 p.m., he is 455 miles from home. Graph the line that represents Justin's distance from home at a given time. Find and interpret the slope of the line.**




$m =$

The slope is ☐ which means Justin is

## Slopes of Parallel and Perpendicular Lines

**3-5-1 Parallel Lines Theorem**
In a coordinate plane, two nonvertical lines are parallel if and only if they have the
Any two vertical lines are parallel.

**3-5-2 Perpendicular Lines Theorem**
In a coordinate plane, two nonvertical lines are perpendicular if and only if
Vertical and horizontal lines are perpendicular.

If a line has a slope of $\frac{a}{b}$, then the slope of a perpendicular line is

The ratios $\frac{a}{b}$ and $-\frac{b}{a}$ are called

**Graph each pair of lines. Use their slopes to determine whether they are parallel, perpendicular, or neither.**

**$\overleftrightarrow{UV}$ and $\overleftrightarrow{XY}$ for $U(0, 2)$, $V(-1, -1)$, $X(3, 1)$, and $Y(-3, 3)$**

slope of $\overleftrightarrow{UV}$ =

slope of $\overleftrightarrow{XY}$ =

**$\overleftrightarrow{GH}$ and $\overleftrightarrow{IJ}$ for $G(-3, -2)$, $H(1, 2)$, $I(-2, 4)$, and $J(2, -4)$**

slope of $\overleftrightarrow{GH}$ =

slope of $\overleftrightarrow{IJ}$ =

**$\overleftrightarrow{CD}$ and $\overleftrightarrow{EF}$ for $C(-1, -3)$, $D(1, 1)$, $E(-1, 1)$, and $F(0, 3)$**

slope of $\overleftrightarrow{CD}$ =

slope of $\overleftrightarrow{EF}$ =

**$\overleftrightarrow{WX}$ and $\overleftrightarrow{YZ}$ for $W(3, 1)$, $X(3, -2)$, $Y(-2, 3)$, and $Z(4, 3)$**

slope of $\overleftrightarrow{WX}$ =

slope of $\overleftrightarrow{YZ}$ =

**$KL$ and $MN$ for $K(-4, 4)$, $L(-2, -3)$, $M(3, 1)$, and $N(-5, -1)$**

slope of $\overleftrightarrow{KL}$ =

slope of $\overleftrightarrow{MN}$ =

**$\overleftrightarrow{BC}$ and $\overleftrightarrow{DE}$ for $B(1, 1)$, $C(3, 5)$, $D(-2, -6)$, and $E(3, 4)$**

slope of $\overleftrightarrow{BC}$ =

slope of $\overleftrightarrow{DE}$ =