

**Topic:  
Proportional  
Relationships**

Lesson Essential Question:

**How do you identify proportional and non  
proportional relationships using tables & graphs?**

**Key Vocabulary**

<b>x-coordinate</b>	<b>a point located on the <b>x-axis</b>; independent variable</b>
<b>y-coordinate</b>	<b>a point located on the <b>y-axis</b>; dependent variable</b>
<b>coordinate plane</b>	<b>formed when the <b>x</b> and <b>y-axis</b> intersect at the <b>origin</b>. The coordinate plane creates four quadrants.</b>
<b>ordered pair</b>	<b>a pair containing an <b>x</b> and <b>y</b> coordinate, that indicates a specific location on a coordinate plane.</b>
<b>Linear</b>	<b>a set of ordered pairs, connected to form a line</b>

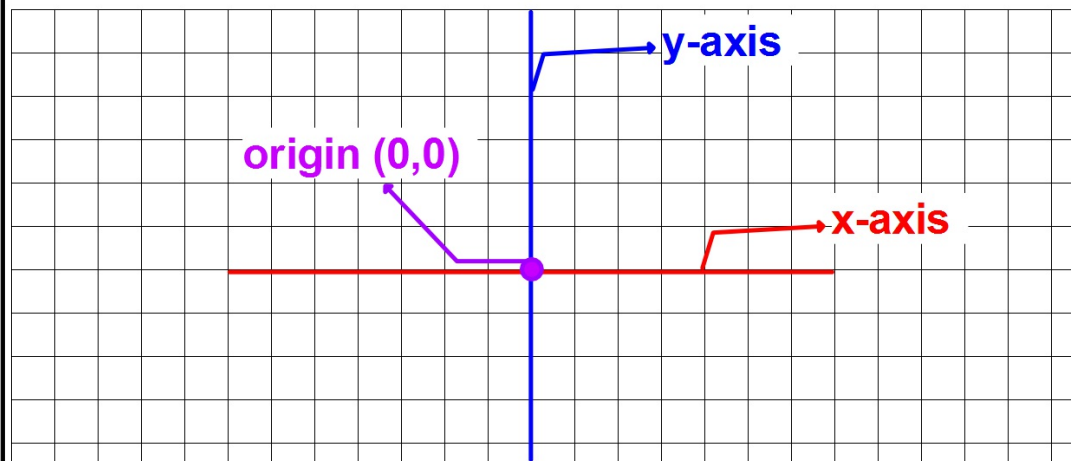
**Topic:  
Proportional  
Relationships**

Lesson Essential Question:  
**How do you identify proportional and non  
proportional relationships using tables & graphs?**

**There has to be  
a constant rate  
of change**

# of tables	# of chairs
1	4
2	6
3	8
4	10
5	12
6	14

**The graph  
must go  
through the  
origin**



**Proportion**

a mathematical equation that shows two ratios are equivalent

**Ratio**

a comparison of two values  
ex) a fraction

**Slope**

Can be represented as a fraction

How do you determine a **proportional relationship**?

From a **table**:  
the cross products of any pair of ratios must be equal

From a **graph**:  
does the line pass through (0,0)?

**USING  
TABLES**

Katrina wants to purchase a new color photo printer. The table shows the number of color pictures the printer can print.

Printer Speed	
Time (min)	Printed Photos
1	14
2	28
3	42
4	56

Is the number of photos printed proportional to the number of minutes? Explain your reasoning.

**STOP &  
THINK**

**What is a proportion? How do I know when something is proportional or not?**

**HOW TO  
SOLVE...**

**Create a proportion between # of printed photos and time**

Show whether each chart represents a proportional relationship or not.

1)

Savings Account	
Week	Account Balance (\$)
1	125
2	150
3	175
4	200

No

2)

Cooling Water	
Time (min)	Temperature (°F)
5	95
10	90
15	85
20	80

No

3)

Calories in Fruit Cups	
Servings	Calories
1	70
3	210
5	350
7	490

Yes

4)

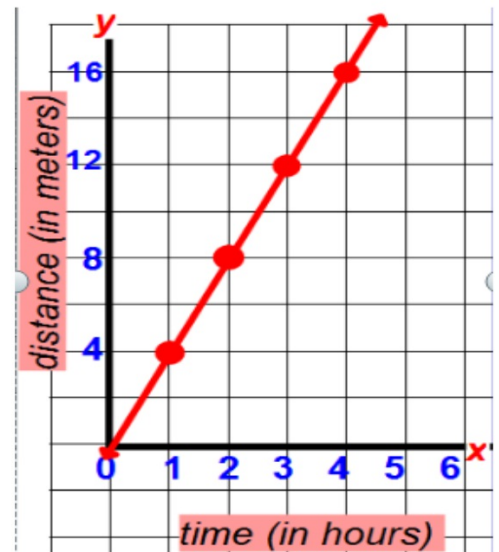
Pizza Recipe	
Number of Pizzas	Cheese (oz)
1	8
4	32
7	56
10	80

Yes

## USING GRAPHS

Mr. Morrison is preparing for an upcoming marathon. He charts his progress on the graph to the right.

Does his graph represent a proportional relationship? Explain your reasoning.



## STOP & THINK

What is his independent variable?  
What is his dependent variable?  
Linear or not?

## HOW TO SOLVE...

The  the origin, so the distance that Mr. Morrison runs is  to his time.

## Finding the slope of a line:

What is slope?

The slope is the slant or change of a line.  
The steeper the line, the larger the slope.  
All Linear Equations have a constant slope.  
You need two points on the line to find it.

In  $y = mx + b$ ,  $m$  is the slope of the line.

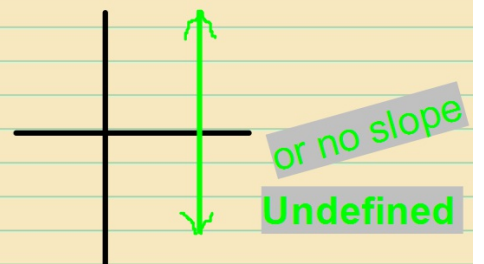
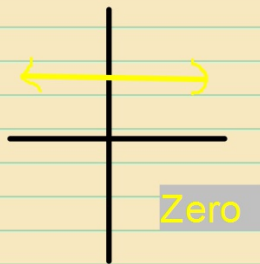
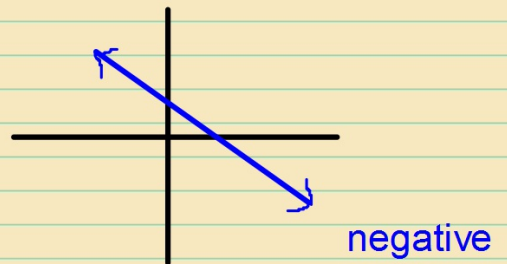
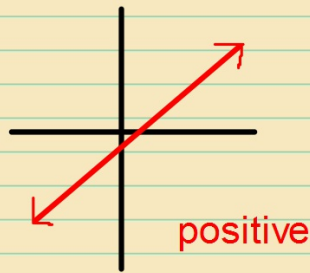
Slope Formula

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{or} \quad m = \frac{\text{rise}}{\text{run}}$$

Example 1

Find the slope of a line that passes through two points:  
(2, 5) and (8, 1)

Types of Slope

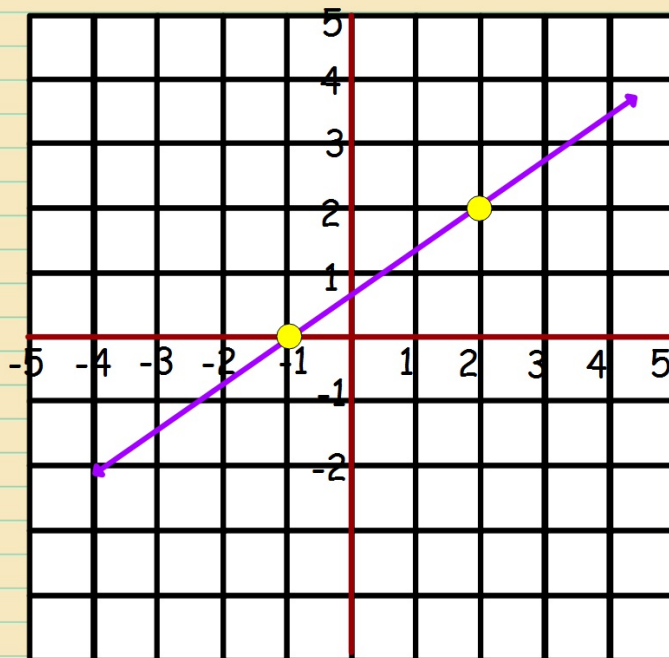




## Finding Slope from a graph

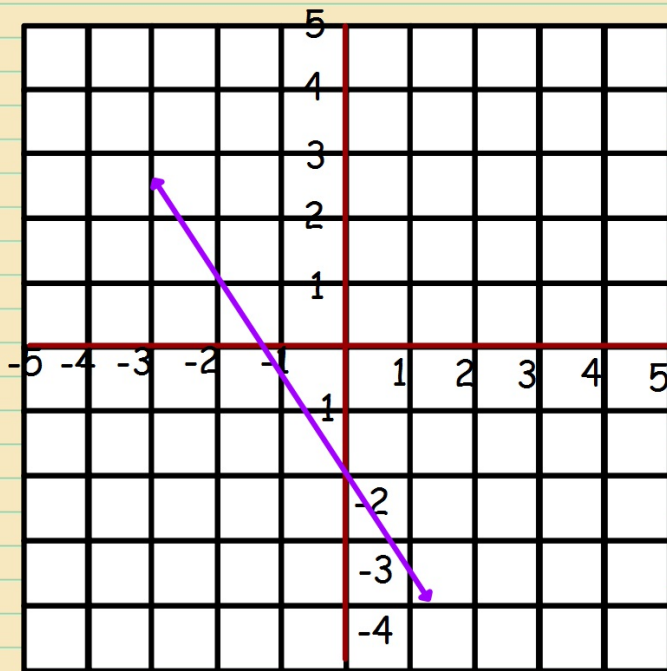
Ex. 2

pick 2 points,  
count rise over  
run, use the  
formula to  
confirm



Ex 3)

Find the  
slope of  
the  
line:



(look from one corner of a square to another corner of a square)

Finding  
Slope from  
a table

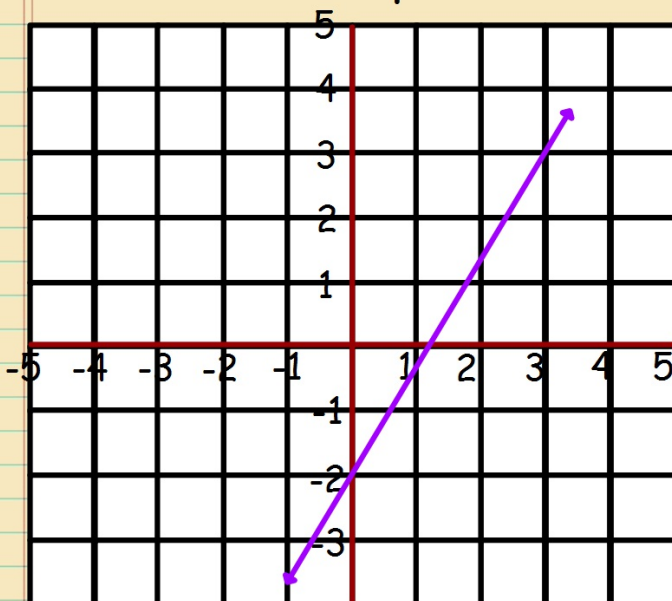
Simply count what the y's are changing by,  
divided by what the x's are changing by.

EX 4)

x	y
0	2
3	4
6	6
9	8

### On Your Own Practice:

1. Find the slope of a line that passes through points  $(6, -12)$  and  $(15, -3)$
2. Find the slope of the line below:



- 3) Find the slope

x	y
0	5
2	10
4	15

## Warm Up

Find the slope of each:

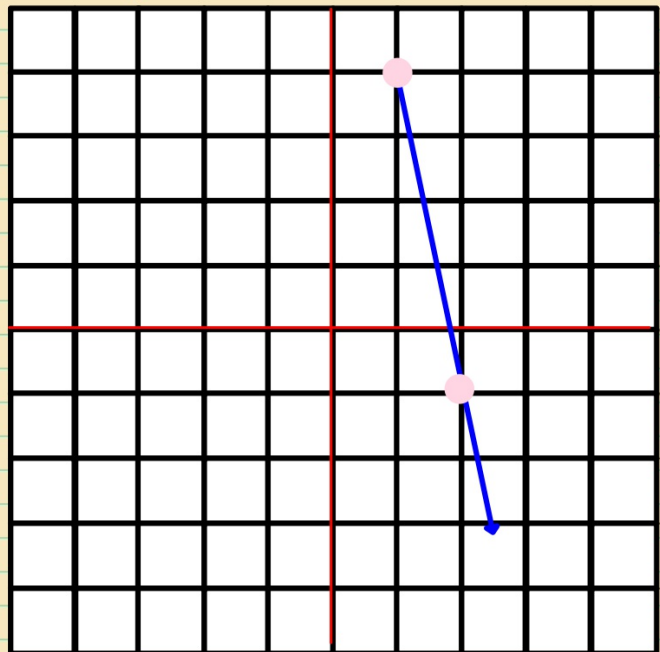
1)  $y = 2x + 4$

2)  $(3, 6)$  and  $(6, 8)$

3)

$x$	$y$
0	-1
1	2
2	5
3	8

4)



**Clean Sheet of Paper: Find the slope of the line passing through these points.**

**a.  $(-2,11)$   $(7,1)$**

**b.  $(4,0)$   $(5, 2)$**

**c.  $(-2,4)$   $(8,4)$**

**d.  $(-4,5)$  $(3,3)$**

**e.  $(-5,0)$  $(-5,4)$**

**f.  $(-2,11)$  $(-2,13)$**