5.2 – Graphing a Proportional Relationship

The most direct relationship that can exist between two numbers is when they are equal to each other. A few examples of this concept are $1 = 1$, $7 = 7$, and $-4 = -4$. To represent all the possible examples, we can use the equation $y = x$ and its graph. To graph this, we will construct a table to organize our points.

Set 1

x	$y = x$	y	(x,y)

Proportional Relationships

A proportional relationship is a relationship in which two quantities vary directly with each other. In other words, if one quantity is doubled the other will also be doubled, if you triple a quantity the other will also be tripled and so on. A proportional relationship is represent by the equation $y = mx$. In the equation, m represents the constant of proportionality. The value of m will determine if quantities are being doubled, tripled, quadrupled, etc.

Set 2

Use the following table to determine coordinate pairs for $y = 2x$.

x	$y = 2x$	y	(x,y)

What was the value of m?

In respect to the x–coordinate, the y – coordinate was (circle one):   doubled   tripled   quadrupled

Write an equation that would illustrate a relationship of tripling between x and y :

Write an equation that would illustrate a relationship of quadrupling between x and y :

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Set 3				What was the value of *m*?

Set 3

Use the following table to determine coordinate pairs for $y = 0.5x$.

x	$y = 0.5x$	*y*	(*x,y*)

What was the value of *m*?

In respect to the *x*–coordinate, the *y* – coordinate was (circle one): doubled   halved   quartered

Write an equation that would illustrate a relationship of quartering between *x* and *y* :

Graphing a Proportional Relationship

To represent all the possible examples of a proportional relationship, we use an equation to determine a few points and graph them in the Cartesian Plane. To begin we will ***use the tables that were created in Set 2 and Set 3*** to graph the proportional relationships they represent.
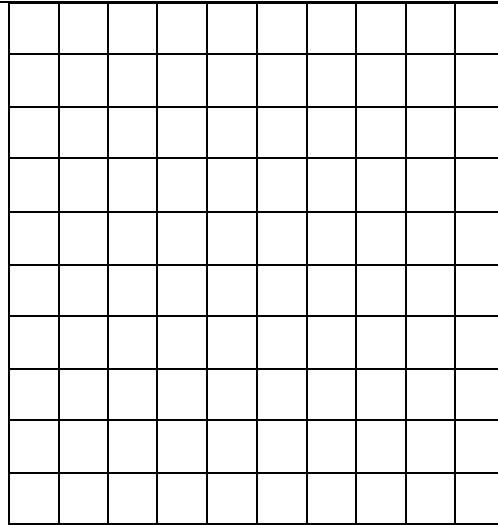
Set 4

Doubling

Halving

Set 5

Create a table and graph that illustrates a proportional relationship of tripling between the *x* and *y* coordinates.
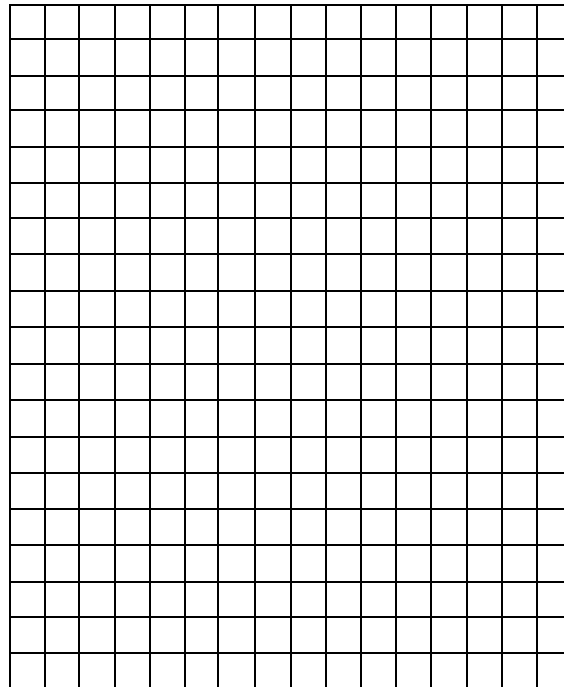
x	*y =*	*y*	(*x*,*y*)

Name two points on the graph that are not included in the table.

Create a table and graph that illustrates a proportional relationship of quadrupling between the *x* and *y* coordinates.

x	*y =*	*y*	(*x*,*y*)

Name two points on the graph that are not included in the table.

Review – Graph the proportional relationships represented by the given equations.
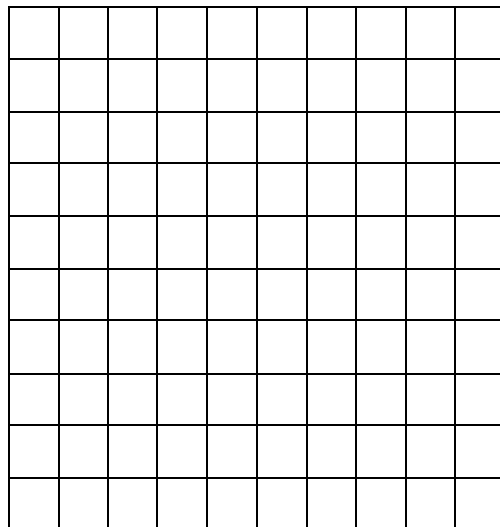
R#1

x	y = 5x	y	(x,y)

Name two points on the graph that are not included in the table.
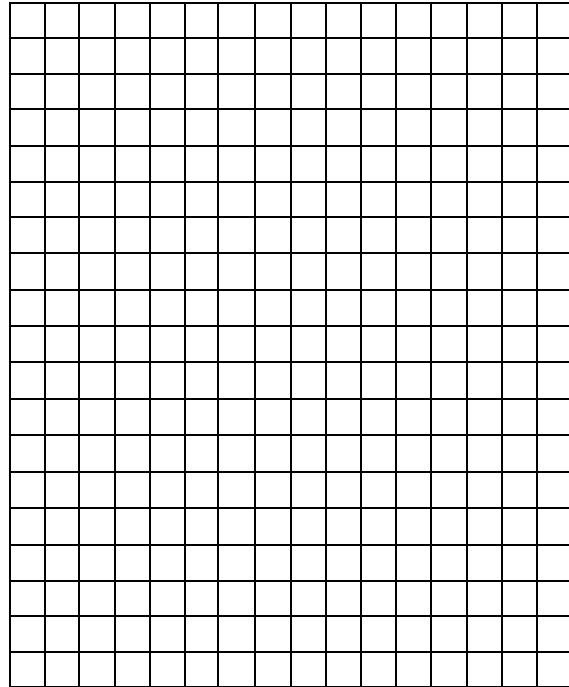
R#2

x	y = 1.5x	y	(x,y)
-2			
0			
2			
4			

Name two points on the graph that are not included in the table.

R#3

x	$y = 2.5x$	y	(x,y)
-4			
2			
0			
2			

Name two points on the graph that are not included in the table.
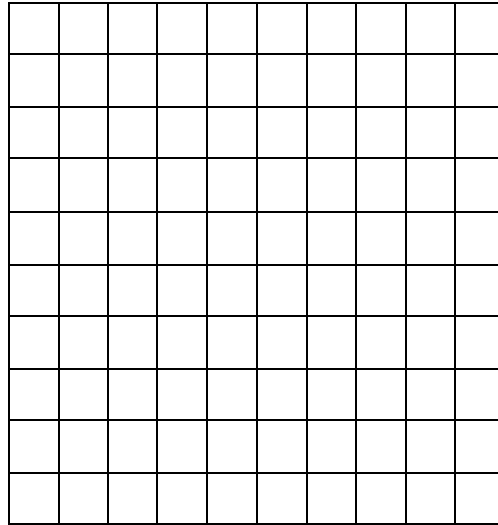
Homework

Using the set of numbers {-2, -1, 0, 1, 2, 3} for x – values, create a table using the equations below. The heading for your first row of each table should look like this.
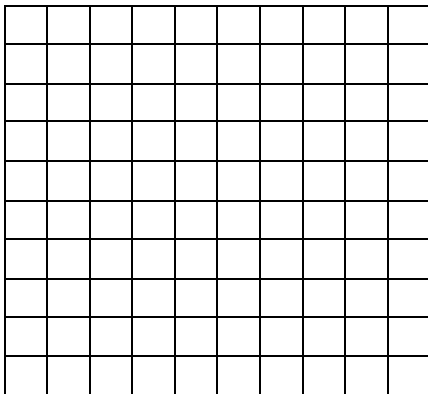
x	$y =$	y	(x,y)

1) $y = 5x$ **2)** $y = 3x$ **3)** $y = x$ **4)** $y = 0.5x$ **5)** $y = 0.25x$

6) $y = -4x$ **7)** $y = -4x$ **8)** $y = -0.75x$ **9)** $y = -x$ **10)** $y = -6x$

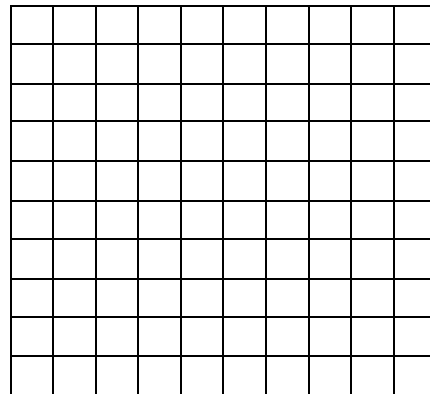Graph the following tables using the graphs found below each of them.
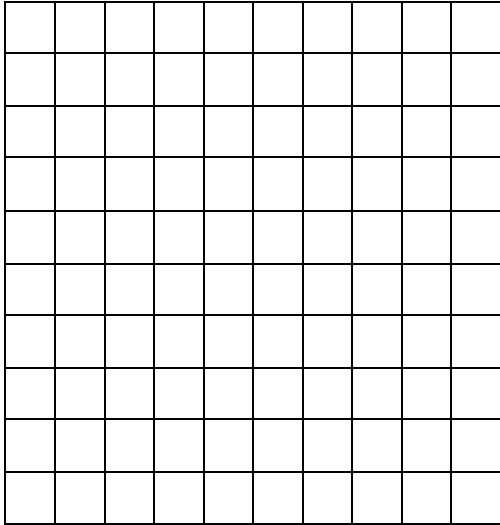
x	$y = 0.25x$	y	(x,y)
0			
4			
8			
12			

x	$y = 0.75x$	y	(x,y)
-2			
0			
2			
4			

11)

12)

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x	$y = 1.2x$	y	(x,y)
-5			
0			
5			

13)

x	$y = 3.5$	y	(x,y)
-2			
-1			
0			
1			
2			

14)
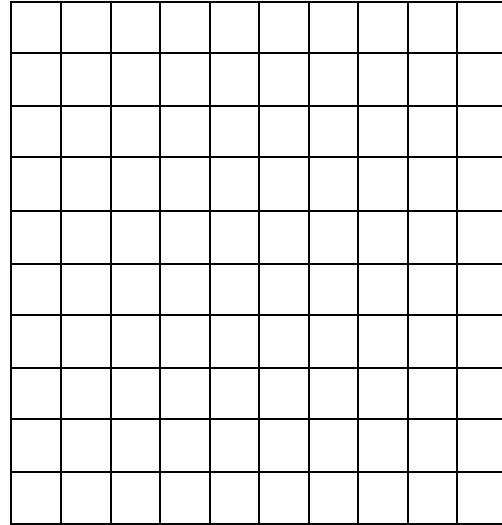
x	$y = 10x$	y	(x,y)
-5			
0			
5			

15)
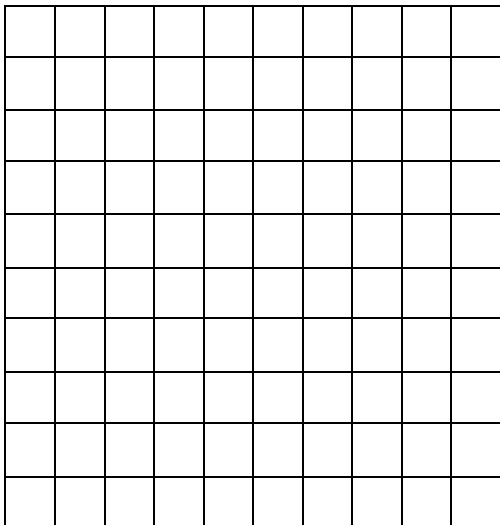
x	$y = 20x$	y	(x,y)
-2			
-1			
0			
1			
2			

16)

Synthesis
TBA

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