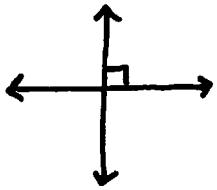
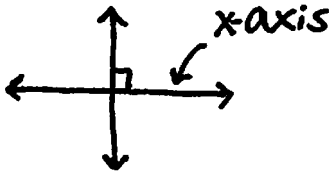
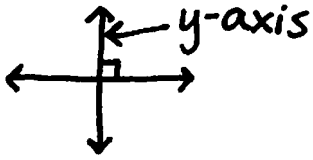
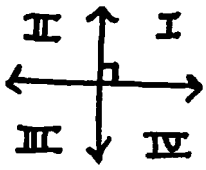
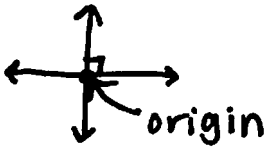
FUNCTIONS & LINEAR RELATIONSHIPS DICTIONARY

GRAPHING BASICS	DEFINITION	EXAMPLE OR VISUAL
COORDINATE PLANE	Formed by the intersection of two number lines, the horizontal axis and the vertical axis.	
X-AXIS	The horizontal axis on the coordinate plane.	
Y-AXIS	The vertical axis on the coordinate plane.	
QUADRANTS	The four regions into which the x and y-axis separate the coordinate plane.	
ORIGIN	The point at which the x and y-axis intersect on the coordinate plane. (0,0)	
ORDERED PAIR	The set of numbers, or coordinates, written in the form (x, y).	(-1, 5) x y
X-COORDINATE	The x-value of an ordered pair, represents the horizontal placement of the point.	(12, 7) x-coordinate
Y-COORDINATE	The y-value of an ordered pair, represents the vertical placement of the point.	(0, 6) y-coordinate

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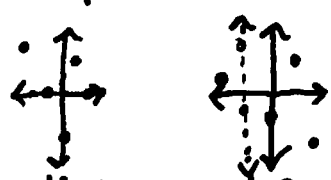
FUNCTIONS	DEFINITION	EXAMPLE OR VISUAL
RELATION	A set of ordered pairs.	$\{(5,-1),(-6,2),(4,0)\}$
DOMAIN	The set of x-values within the ordered pairs of a relation.	$\{(5,-1),(-6,2),(4,0)\}$ D: $\{-6,4,5\}$
RANGE	The set of y-values within the ordered pairs of a relation.	$\{(5,-1),(-6,2),(4,0)\}$ R: $\{-1,0,2\}$
FUNCTION	A relation in which each element of the domain is paired with exactly one element of the range.	$\{(5,-1),(-6,2),(4,0)\}$ x's do not repeat
INDEPENDENT VARIABLE	The x-value within a function.	$y = mx+b$ independent
DEPENDENT VARIABLE	The y-value within a function.	$y = mx+b$ dependent
VERTICAL LINE TEST	If any vertical line passes through the graph of a relation no more than once, then it is a function.	 function not a function

LINEAR EQUATIONS	DEFINITION	EXAMPLE OR VISUAL
RATE OF CHANGE	A ratio that shows how one variable changes with respect to another.	\$7.50/hr 23 mi/gal 31 ft/sec

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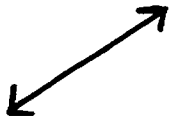
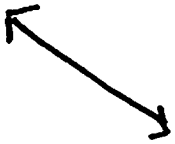
SLOPE	A ratio that compares the vertical to horizontal change between points.	$m = \frac{rise}{run}$
POSITIVE SLOPE	A line that is increasing from left to right.	
NEGATIVE SLOPE	A line that is decreasing from left to right.	
ZERO SLOPE	A horizontal line	
UNDEFINED SLOPE	A vertical line	
SLOPE FORMULA	A formula used to find the slope between 2 points.	$m = \frac{y_2 - y_1}{x_2 - x_1}$
SLOPE-INTERCEPT FORM	The form of a line, used to graph the line.	$y = mx + b$ (m: slope, b: y-intercept)
STANDARD FORM	Another form of a line	$Ax + By = C$
VERTICAL LINE	A line with an undefined slope; $x = a$	

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HORIZONTAL LINE	A line with zero slope; $y=a$	
LINEAR FUNCTION	A function represented by a line; rate of change is constant	
NONLINEAR FUNCTION	A function that cannot be represented by a line, but often is a curve; rate of change is <u>not</u> constant	

DIRECT VARIATION	DEFINITION	EXAMPLE OR VISUAL
PROPORTIONAL RELATIONSHIP	If the ratios of quantities are equal, then they are proportional.	5 candies = \$.50 7 candies = \$.70
NONPROPORTIONAL RELATIONSHIP	If the ratios of quantities are not equal, then they are not proportional.	12 candies = \$1 30 candies = \$2
CONSTANT OF VARIATION	The ratio between all ordered pairs	$k=\frac{y}{x}$
DIRECT VARIATION	A specific relationship in which there is a constant ratio between all ordered pairs.	$y=k\cdot x$

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COORDINATE PLANE

Formed by the intersection of two number lines, the horizontal axis and the vertical axis.

parts of the plane

x-axis
The horizontal axis

y-axis
The vertical axis

ORIGIN:
The point at which the x-axis and y-axis intersect; (0,0).

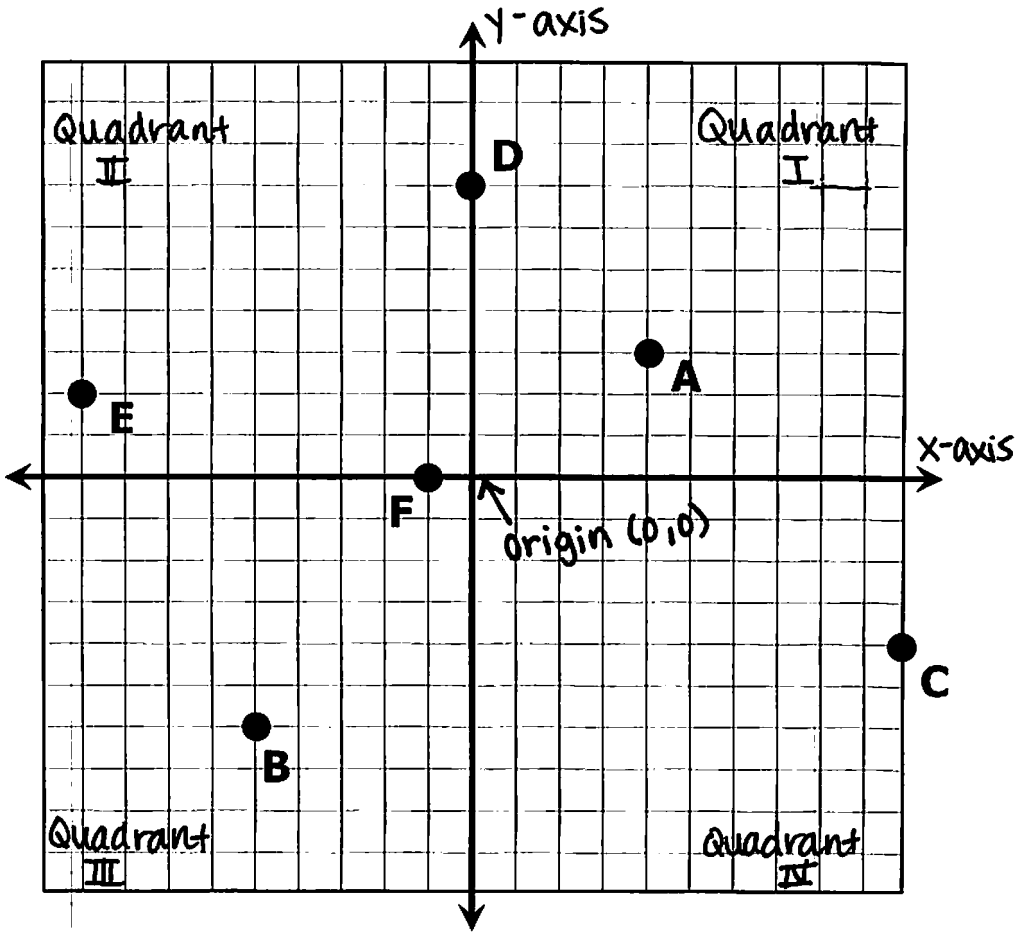
QUADRANTS:
The four regions into which the x and y-axis separate the coordinate plane.

ORDERED PAIR:
A pair of numbers used to locate any point on the plane.

(x, y)

x-coordinate

y-coordinate



LOCATING POINTS: Identify the ordered pair and quadrant (or axis) for each point.

POINT	ORDERED PAIR	QUADRANT
A	(4,3)	I
B	(-5,-6)	III
C	(10,-4)	IV
D	(0,7)	y-axis
E	(-9,2)	II
F	(-1,0)	x-axis

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Name:	Date:
Topic:	Class:

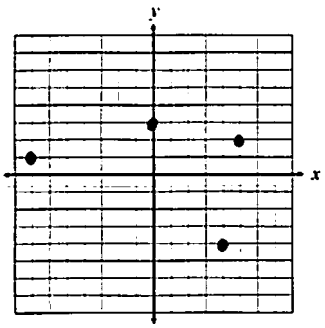
Main Ideas/Questions	Notes/Examples
RELATION	A set of ordered pairs.
	Example: {(-6,2), (5,-1), (0,6), (-4,1)}
	Can be shown as: ordered pairs, tables, graphs
DOMAIN	The set of x-values within a relation.
RANGE	The set of y-values within a relation.

examples

1

ORDERED PAIRS	TABLE	GRAPH
{(5, 2), (-7, 1), (0, 3), (4, -4)}		

x	y
5	2
-7	1
0	3
4	-4

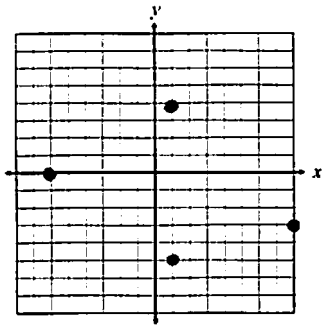


Domain: {-7, 0, 4, 5} Range: {-4, 1, 2, 3}

2

{(-6, 0), (1, 4), (8, -3), (1, -5)}

x	y
-6	0
1	4
8	-3
1	-5



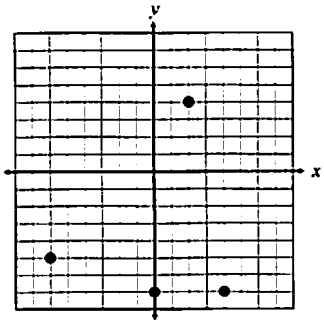
Domain: {-6, 1, 8} Range: {-5, -3, 0, 4}

3

For questions 3 and 4, use the points plotted on the graph.

{(-6,-5), (0,-7), (2,4), (4,-7)}

x	y
-6	-5
0	-7
2	4
4	-7



Domain: {-6, 0, 2, 4} Range: {-7, -5, 4}

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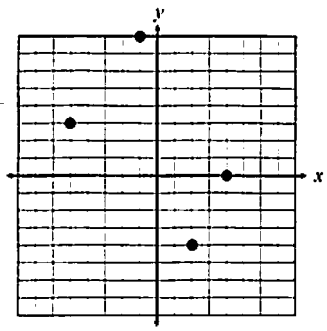
4

{(-5,3), (-1,8), (2,-4), (4,0)}

x	y
-5	3
-1	8
2	-4
4	0



Domain: {-5, -1, 2, 4}

Range: {-4, 0, 3, 8}

FUNCTION

A relation is a function if each x-value is paired with one + only one y-value.

examples

Directions: Determine whether each relation is a function.

5 {(6, -2), (-4, -1), (2, 0), (-7, 4)}

yes

6 {(1, 5), (-5, -3), (-8, -1), (1, -7)}

no

7 {(1, 4), (2, 4), (3, 4), (4, 4)}

yes

8 {(-7, 4), (-4, 1), (-4, -9), (0, -6)}

no

9

x	y
-2	4
-1	1
0	0
1	1
2	4

yes

10

x	y
-7	0
-4	1
-1	2
5	3
8	4

yes

11

x	y
-3	-2
-3	-1
-3	0
-3	5
-3	9

no

VERTICAL LINE TEST

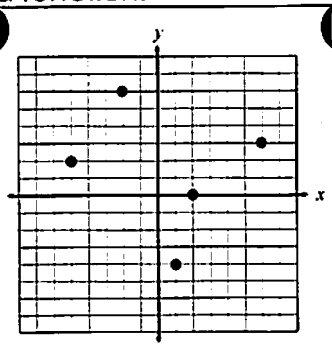
When given the **graph** of a relation, the vertical line test can be used to determine whether the relation is a function.

Vertical Line Test: If any vertical line passes through the graph of a relation no more than once, then its a function.

examples

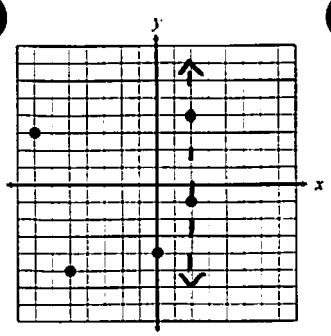
Directions: Use the vertical line test to determine whether each relation is a function.

12



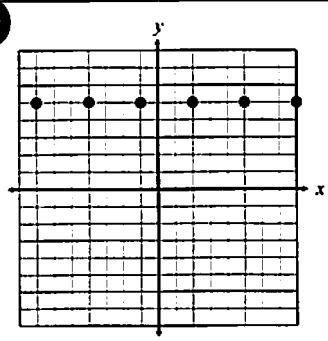
yes

13



no

14



yes

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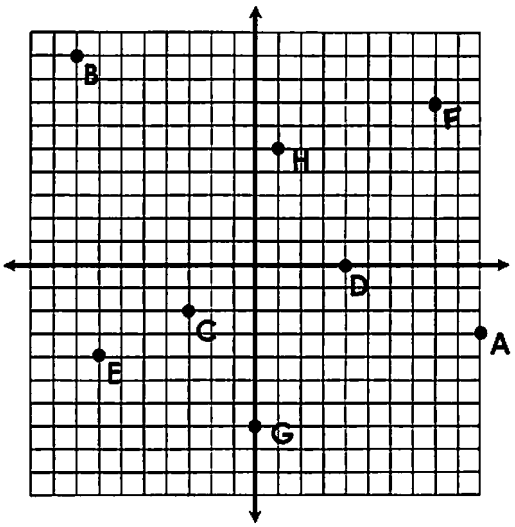
Name: _____ **Unit 5:** Functions & Linear Relationships

Date: _____ **Per:** _____ **Homework 1:** Coordinate Plane, Relations, & Functions

**** This is a 2-page document! ****

1. Identify the ordered pair and quadrant (or axis) for each point on the graph.

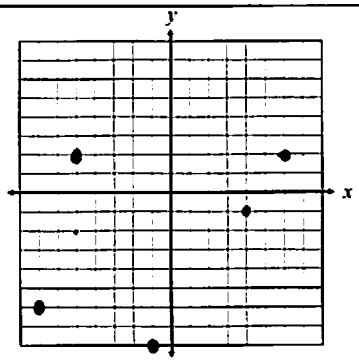


Point	Ordered Pair	Quadrant
A	(10, -3)	IV
B	(-8, 9)	II
C	(-3, -2)	III
D	(4, 0)	x-axis
E	(7, -4)	III
F	(8, 7)	I
G	(0, -7)	y-axis
H	(1, 5)	I

Directions: For questions 2 and 3, complete the table and graph for each relation. Then give the domain and range. For questions 4 and 5, give the ordered pairs and complete the table for the relation shown on the graph. Then give the domain and range.

ORDERED PAIRS	TABLE	GRAPH
2. {(4, -1), (6, 2), (-7, -6), (-5, 2), (-1, -8)}		

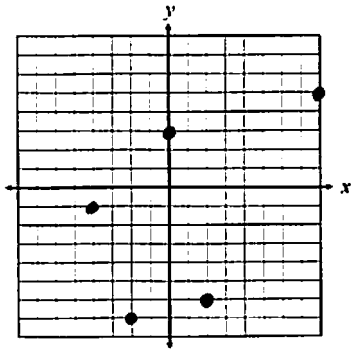
x	y
4	-1
6	2
-7	-6
-5	2
-1	-8



Domain: {-7, -5, -1, 4, 6} **Range:** {-8, -6, -1, 2}

3. {(-4, -1), (0, 3), (-2, -7), (8, 5), (2, -6)}

x	y
-4	-1
0	3
-2	7
8	5
2	-6



Domain: {-4, -2, 0, 2, 8} **Range:** {-6, -1, 3, 5, 7}

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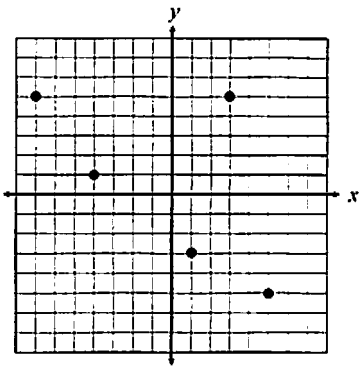
4.

{(-7,5), (-4,1), (1,-3), (3,5), (5,-5)}

x	y
-7	5
-4	1
1	-3
3	5
5	-5



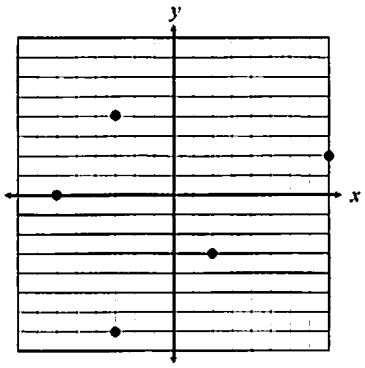
Domain: {-7, -4, 1, 3, 5}

Range: {-5, -3, 1, 5}

5.

{(-6,0), (-3,4), (-3,-7), (2,-3), (8,2)}

x	y
-6	0
-3	4
-3	-7
2	-3
8	2



Domain: {-6, -3, 2, 8}

Range: {-7, -3, 0, 2, 4}

Directions: Determine whether each relation is a function.

6. {(5, 12), (-4, 9), (-2, -7), (-4, 0), (3, 2)}

no

7. {(-1, 1), (-2, 3), (-3, 5), (-4, 7), (-5, 9)}

yes

8.

x	-8	-4	0	4	8
y	5	1	-2	1	5

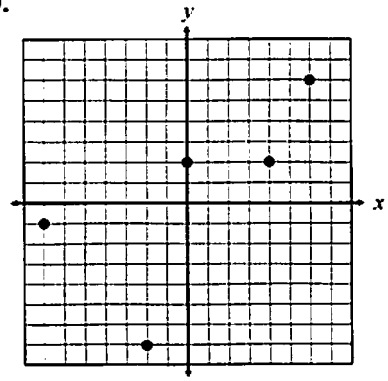
yes

9.

x	7	7	7	7	7
y	0	-5	-8	4	3

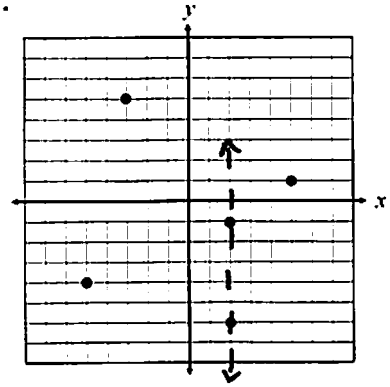
no

10.



yes

11.



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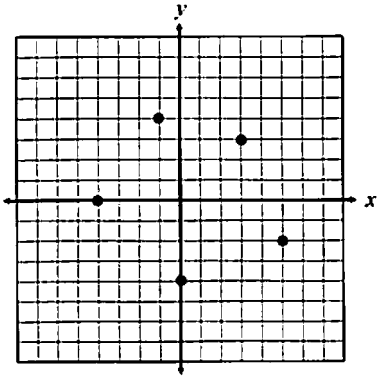
12.



yes

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