

Unit 1 Notes

Linear Functions

A **Relation** is a pairing between 2 sets of numbers. All ordered pairs and graphs are relations.

Domain	
Range	

Finding Domain and Range from a Table or Set of Ordered Pairs

Find the domain and range of each of the following relations:

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

Domain:

Domain:

Range:

Range:

3.

x	2	-3	-6	-10
y	5	6	7	8

Domain:

Range:

4.

Distance (miles)	0.5	1.0	2	3
Time (min)	4	8	17	25

Domain:

Range:

(DOMAIN, RANGE)

(x , y)

Try These

5. $\{(2, -6), (5, -6), (6, 2), (7, 2)\}$

Domain:

Range:

6. $\{(-1, 4), (-5, -3), (-3, 7), (-1, -2)\}$

Domain:

Range:

7.

x	-8	0	7	12
y	-7	-4	-7	8

Domain:

Range:

Function	
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Examples

1. $\{(1, 4), (2, 5), (3, 6), (4, 7)\}$

Is this a function?

Why?

2. $\{(-4, 0), (-1, 1), (3, 0), (7, -1)\}$

Is this a function?

Why?

3. $\{(-10, 4), (-8, 5), (-6, 6), (-10, 7), (-4, 10)\}$

Is this a function?

Why?

4.

x	25	35	45
y	12	14	16

Is this a function?

Why?

5. Is this a function?

x	y
-12	18
-6	13
0	9
12	6
-6	1

Why?

Try These

6. $\{(2, -6), (5, -6), (6, 2), (7, 2)\}$

Is this a function?

Why?

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

Is this a function?

Why?

8.

x	-3	0	3	6
y	2	2	2	2

Is this a function?

Why?

9.

x	6	4	2	0	2
y	4	2	0	-2	-4

Is this a function?

Why?

Finding Domain and Range from a Graph

← **Domain** →

↑
Range
↓

Look at the x -axis
Where is the graph from left to right?

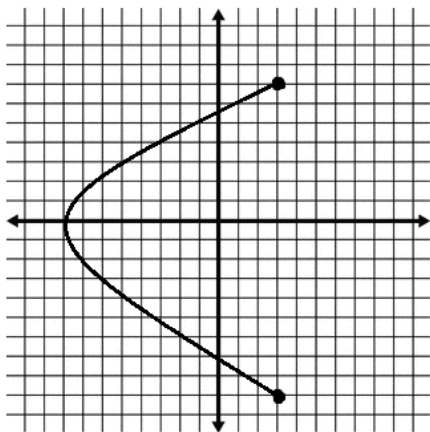
Look at the y -axis
Where is the graph up and down?

Interval Notation

- When the point is included in the domain or range (closed dot), use _____
- When the point is not included in the domain or range (open dot), or the graph goes on forever (infinity), use _____ Infinity symbol _____

Examples

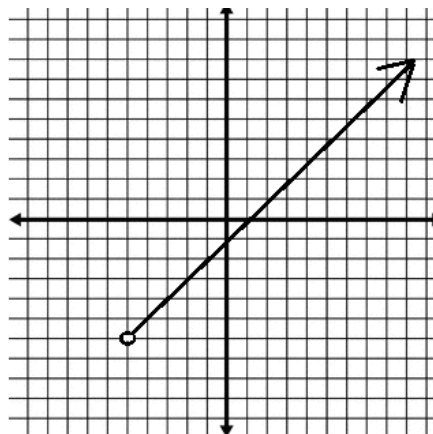
1.



Domain:

Range:

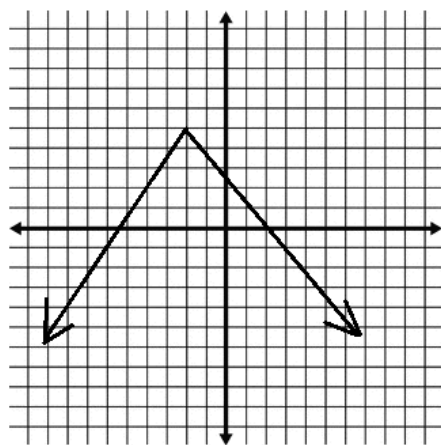
2.



Domain:

Range:

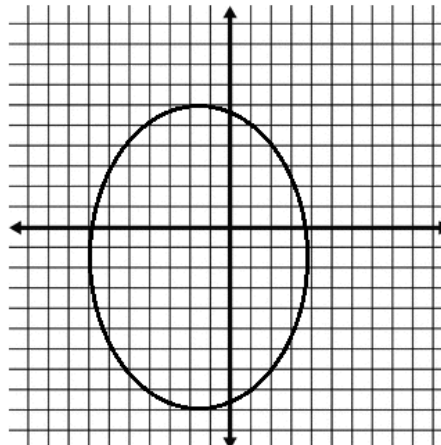
3.



Domain:

Range:

4.

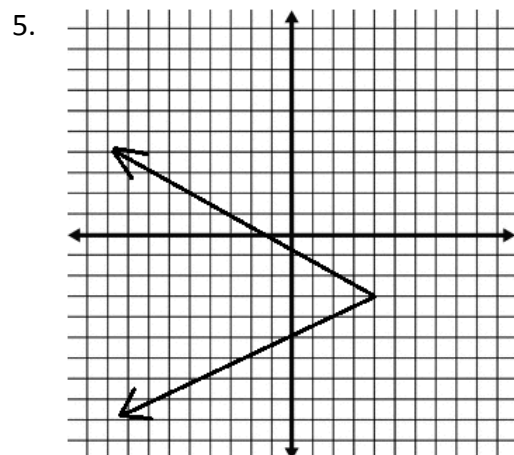


Domain:

Range:

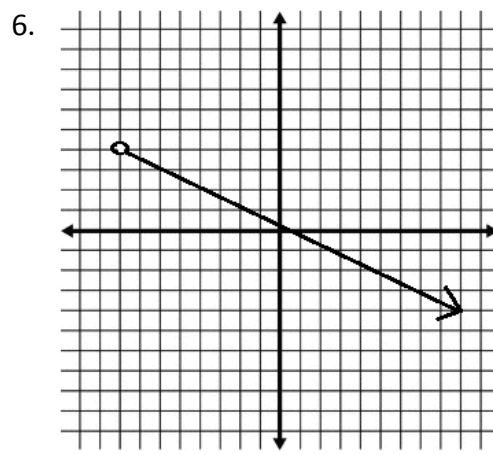
Try These

Determine the domain and range of each graph. Write your answer in interval notation.



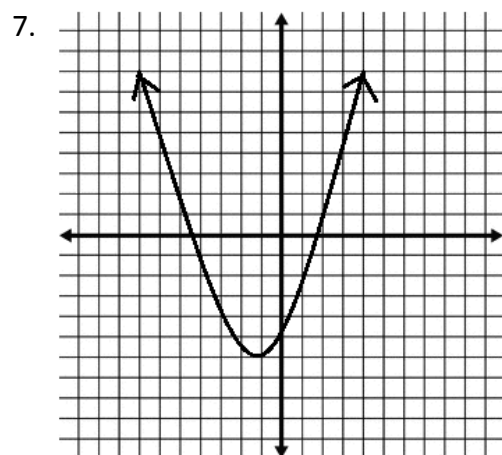
Domain:

Range:



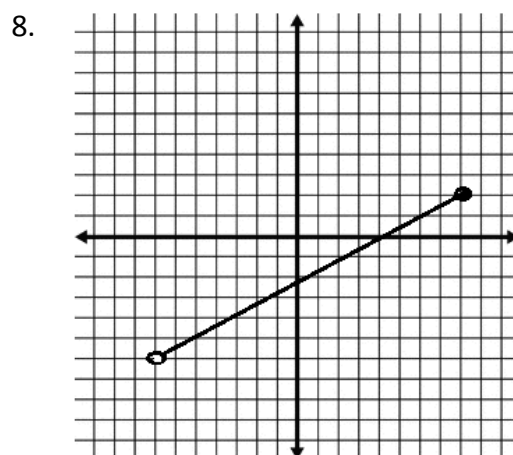
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Range:



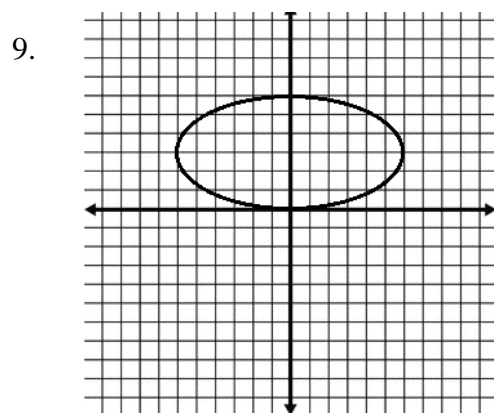
Domain:

Range:



Domain:

Range:

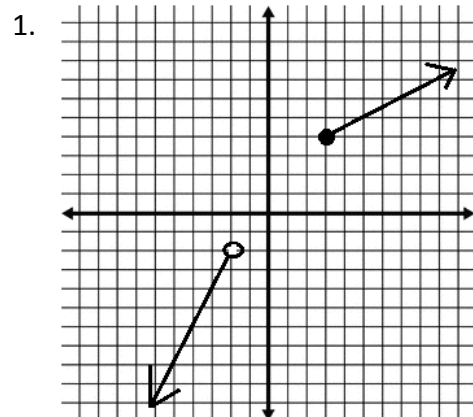


Domain:

Range:

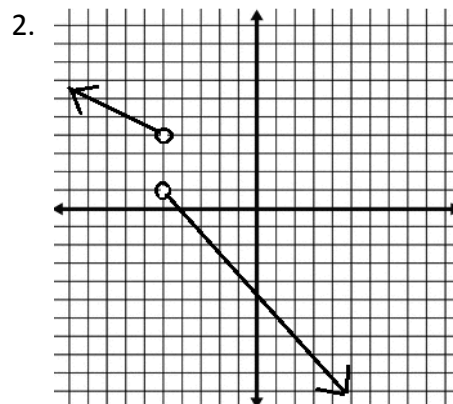
Additional Examples

Find the domain and range of each graph.



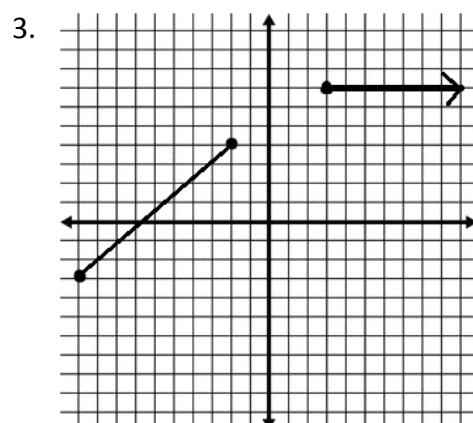
Domain:

Range:



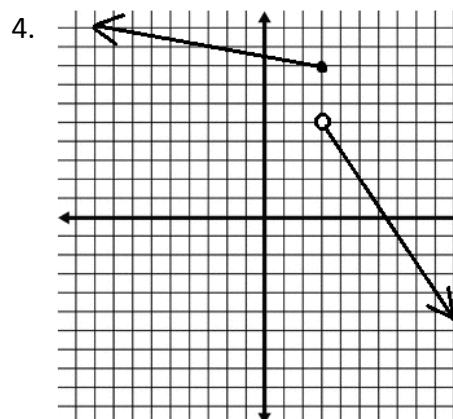
Domain:

Range:



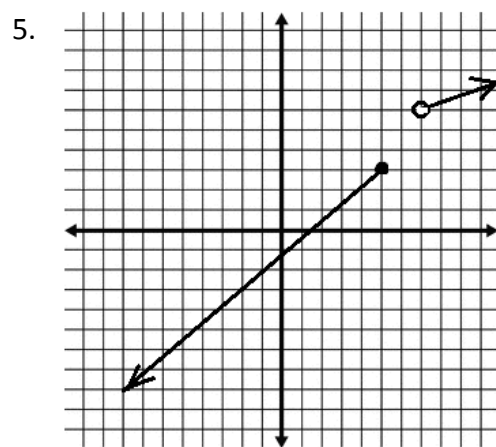
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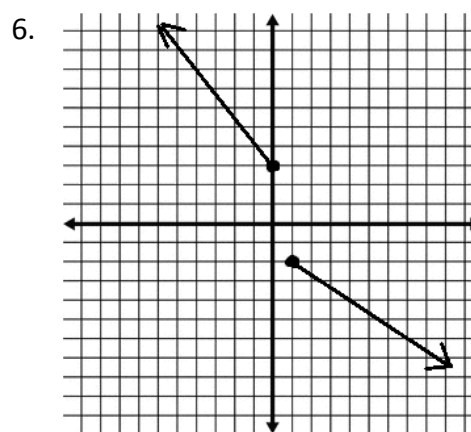
Domain:

Range:



Domain:

Range:



Domain:

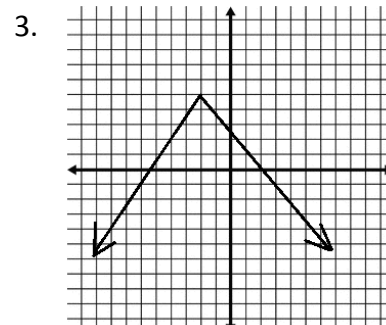
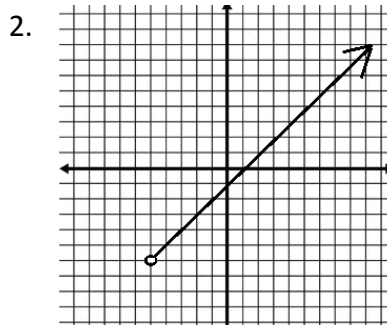
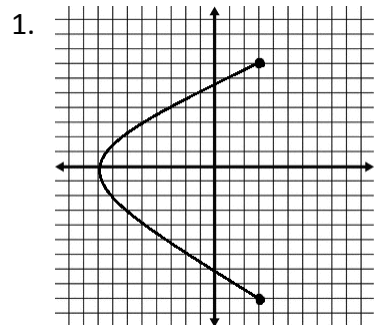
Range:

Determining if a Relation is a Function from a Graph

To determine whether a relation is a function from a graph we use the **Vertical Line Test**.

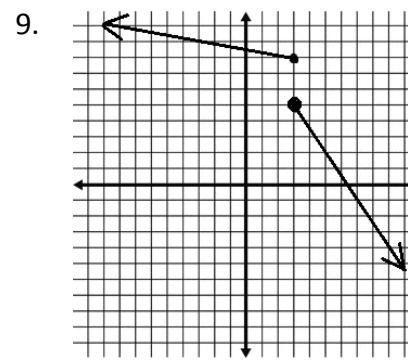
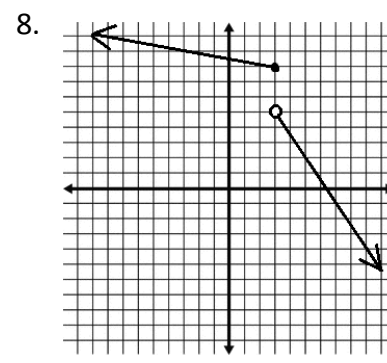
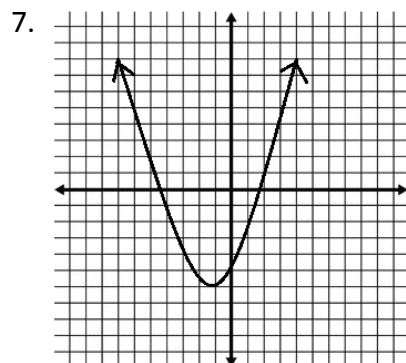
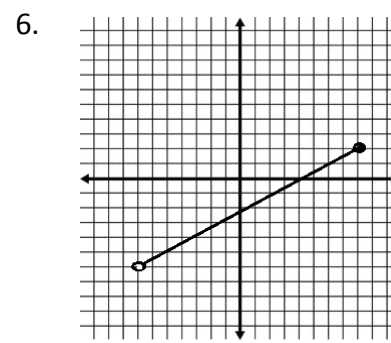
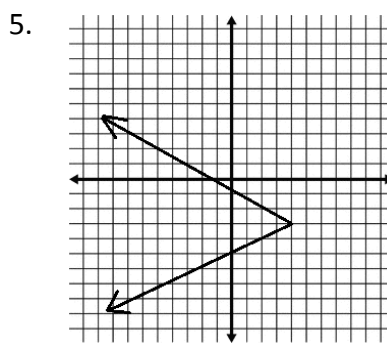
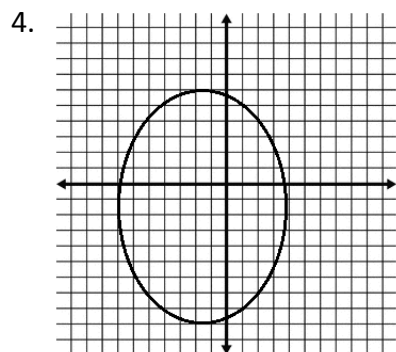
- Hold your pencil vertically (up and down) and drag it across the graph from left to right.
- If the pencil hits the graph in more than 1 place then it is _____

Examples



Try These

Determine if the relation is a function for each graph.



Identifying Patterns

Find the pattern of each sequence, then find the next 3 terms in each sequence.

1. 5, 13, 21, 29, 37, ...

2. 99, 87, 75, 63, 51, ...

Constant Difference =

Constant Difference =

3. -15, -8, -1, 6, 13, ...

4. -3, -9, -15, -21, ...

5. 1, 4, 9, 16, 25, ...

6. 3, 7, 14, 24, 37, ...

Try These

Find the next 3 terms of each sequence.

7. 1, 3, 5, 7, 9, ...

8. 87, 78, 69, 60, 51, ...

9. 10, 17, 26, 37, 50, ...

10. 3, 13, 21, 27, 31, ...

Complete the following tables by identifying the pattern.

11.

x	5	6	7	8	9	10	11
y	12	17	22	27			

12.

x	-2	-1	0	1	2	3	4
y	42	34	26	18			

13.

x	-4	-3	-2	-1	0	1	2
y	5.2	6.6	8.0	9.4			

14.

x	2	4	6	8	10	12	14
y	3	5	9	15			

15. The table below shows the data from the flight of a football after it is punted. The ball was in the air for just over 6 seconds when it hit the ground. Use the method of constant differences to find the maximum height during the football's flight.

Time in seconds	0	1	2	3	4	5	6
Height in feet	0	56	90	102			

16. Robin Hood shoots his arrow from his bow. Since he was hiding behind a log, he shot the arrow from the ground. How many seconds will it take for the arrow to hit the ground again (In other words, when will the height of the arrow be 0 again)? Use the table below and the method of constant differences.

Time in seconds	0	1	2	3	4	5	6	7
Height in feet	0	50	80	90				

Representing Patterns with Equations

Write an equation to represent the data.

x	-1	0	1	2	3
y	3	6	9	12	15

Form of the equation:

1.

Equation _____

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

2.

Equation _____

x	-4	-3	-2	-1	0
y	12	8	4	0	-4

3.

x	y
1	15
2	27
3	39
4	51
5	63

Equation _____

4.

x	y
-1	3.2
0	4.6
1	6.0
2	7.4
3	8.8

Equation _____

5.

x	y
-2	3
-1	5
0	8
1	12
2	17

Equation _____

6.

x	y
0	3
2	6
4	9
6	12
8	15

Equation _____

Try These

Represent the pattern in the table with an equation.

7.

x	3	6	9	12	15
y	12	18	24	30	36

Equation _____

8.

Distance	0.5	1.0	1.5	2.0	2.5
Time	2	4	6	8	10

Equation _____

9.

# Sold	10	20	30	40	50
Profit	15	40	65	90	115

Equation _____

10.

x	-8	-4	0	4	8
y	11	9	7	5	3

Equation _____

11.

x	y
2	-13
3	-18
4	-23
5	-28
6	-33

Equation _____

Patterns in the Real World

1. To get cable TV at home, it costs \$47 to get the cable box installed plus \$27 each month.
 - a. Complete the table to show the cost of having cable TV for the number of months described.
 - b. Write an *equation* for the total cost, c , of having cable TV for m months.

# Months	Cost (\$)
0	47
1	
2	
3	
4	

2. The cost to rent a set of jet skis is a \$20 fee plus \$50 per hour. Complete the table below to rent the jet skis anywhere from 1 to 4 hours. Then write an equation for the situation.

# Hours	Cost (\$)
0	20
1	
2	
3	
4	