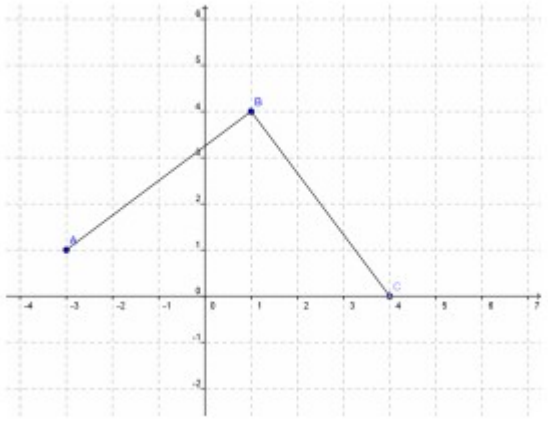
Lesson 3.3 Notes

For each graph, determine if the relationship represents a function, and if so, state the key features of the function (key features include intercepts, intervals where the function is increasing or decreasing, relative maximums and minimums, symmetries, domain and range, and end behavior).

1)



Is the relationship a function? Is a function

y-intercept: Point: $\left(0, 3\frac{1}{4}\right)$

x-intercept(s): Point: $(4, 0)$

Increasing: $(-3, 1)$

Decreasing: $(1, 4)$

Maximum: 4

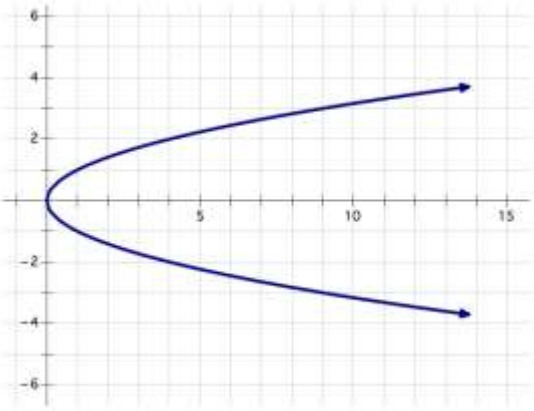
Minimum: 0

Domain: $[-3, 4]$

Range: $[10, 4]$

Circle One: Continuous Discontinuous Discrete

2)



Is the relationship a function? Not a function because it does not pass the vertical line test. So, we cannot determine the features since it is not a function.

y-intercept:

x-intercept(s):

Increasing:

Decreasing:

Maximum:

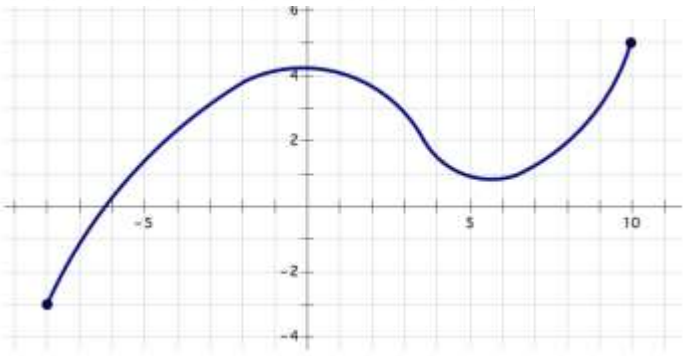
Minimum:

Domain:

Range:

Circle One: Continuous Discontinuous Discrete

3)



Is the relationship a function? Is a function

y-intercept: Point: $\left(0, 4\frac{1}{4}\right)$

x-intercept(s): Point: $\left(-6\frac{1}{4}, 0\right)$

Increasing: $(-8, 0) \cup \left(5\frac{1}{2}, 10\right)$

Decreasing: $\left(0, 5\frac{1}{2}\right)$

Maximum: 5

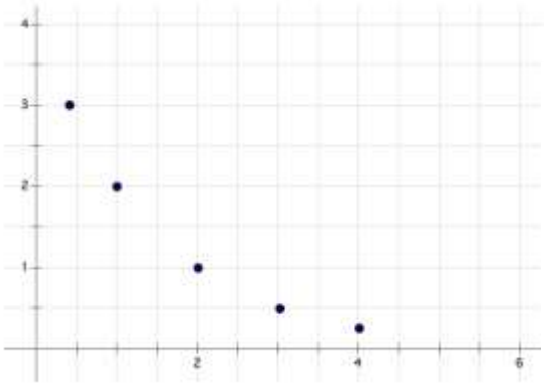
Minimum: -3

Domain: $[-8, 10]$

Range: $[-3, 5]$

Circle One: Continuous Discontinuous Discrete

4)



Is the relationship a function? Is a function

y-intercept: None

x-intercept(s): None

Increasing: None

Decreasing: $(0.4, 4)$

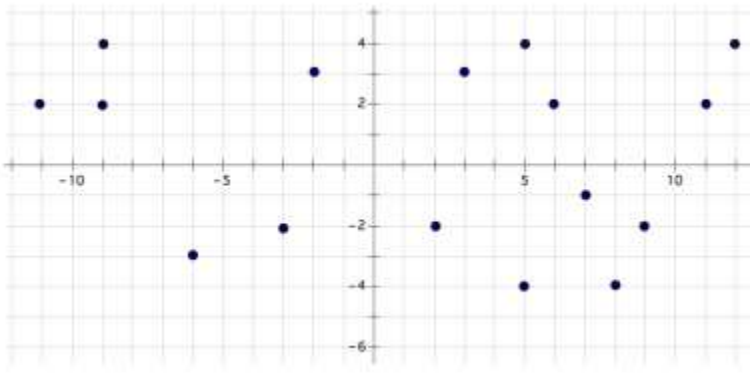
Maximum: 3

Minimum: $\frac{1}{4}$

Domain: $\{0.4, 1, 2, 3, 4\}$

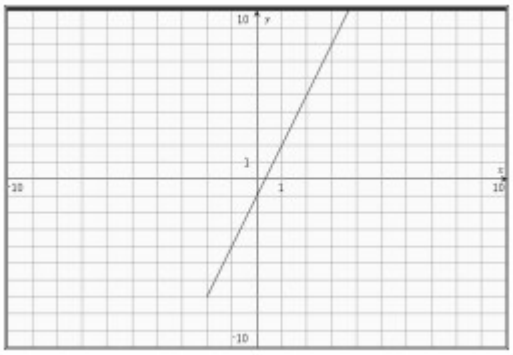
Range: $\left\{\frac{1}{4}, \frac{1}{2}, 1, 2, 3\right\}$

Circle One: Continuous Discontinuous Discrete

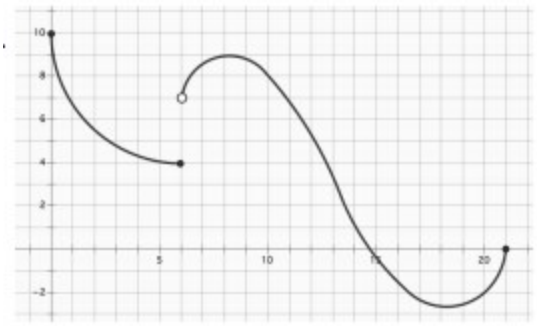
5) 

Is the relationship a function? Not a function.
y-intercept:
x-intercept(s):
Increasing:
Decreasing:
Maximum:
Minimum:
Domain:
Range:
When $x = -9$ there are two y-values. We cannot find the features if it is not a function.

Circle One: Continuous Discontinuous Discrete

6) 

Is the relationship a function? Is a function
y-intercept: Point:$(0, -1)$
x-intercept(s): Point:$\left(\frac{1}{3}, 0\right)$
Increasing: $(-2, \infty)$
Decreasing: None
Maximum: ∞
Minimum: -7
Domain: $[-2, \infty)$
Range: $[-7, \infty)$
Circle One: Continuous Discontinuous Discrete

7) 

Is the relationship a function? Is a function
y-intercept: Point:$(0, 10)$
x-intercept(s): Point:$(0, -1)$
Increasing: $(6, 8) \cup (18, 21)$
Decreasing: $(0, 6) \cup (8, 18)$
Maximum: 10
Minimum: $-2\frac{3}{4}$
Domain: $[0, 21]$
Range: $\left[-2\frac{3}{4}, 10\right]$
Circle One: Continuous Discontinuous Discrete

8) The table on the right represents a continuous function defined on the interval from [0, 6].

x	$f(x)$
0	2
1	-3
2	0
3	2
4	6
5	12
6	20

   a. Determine the domain, range, x and y intercepts.
      Domain: $(0, 6)$ Range: $(-3, 20)$ x-int: $(2, 0)$ y-int: $(0, 2)$
   b. Based on the table, identify the minimum value and where it is located.
      Minimum value is -3. It is located at $(1, -3)$.

9) The table represents a discrete function defined on the interval from [1,5].

x	$f(x)$
1	4
2	10
3	5
4	8
5	3

   a. Determine the domain, range, x and y intercepts.
      Domain: $\{1, 2, 3, 4, 5\}$ Range: $\{3, 4, 5, 8, 10\}$
      x-int: None y-int: None
   b. Based on the table, identify the minimum value and where it is located.
      Minimum value is 3. It is located at $(5, 3)$.

Other Important Notes:

Fill in the table of values for the linear function. Find the point of intersection of the two lines.

1) $f(x) = -x + 4$

x	$f(x)$
0	4
1	3
2	2
3	1
4	0

$g(x) = 6x - 3$

x	$g(x)$
0	-3
1	3
2	9
3	15
4	21

2) $f(x) = x + 3$

x	$f(x)$
-3	0
-2	1
-1	2
0	3
1	4

$g(x) = -2x - 3$

x	$g(x)$
-3	3
-2	1
-1	-1
0	-3
1	-5

3) $f(x) = \frac{1}{2}x + 3$

x	$f(x)$
0	3
1	3.5
2	4
3	4.5
4	5

$g(x) = \frac{3}{2}x + 1$

x	$g(x)$
0	1
1	2.5
2	4
3	5.5
4	7

Linear functions and arithmetic sequences are closely related. Linear functions are continuous. Arithmetic sequences are discrete. How does this affect domain? Range?

Domain and range of a linear function are intervals. Domain and range of an arithmetic sequence are a list of values in set notation.

Exponential functions and geometric sequences are closely related. Exponential functions are continuous. Geometric sequences are discrete. How does this affect domain? Range?

Domain and range of an exponential function are intervals. Domain and range of a geometric sequence are a list of values in set notation.

For each graph state the domain and range of the function using interval notation. Then determine if the graph is continuous, discrete or discontinuous.

1) Domain:

$[-4, 4)$

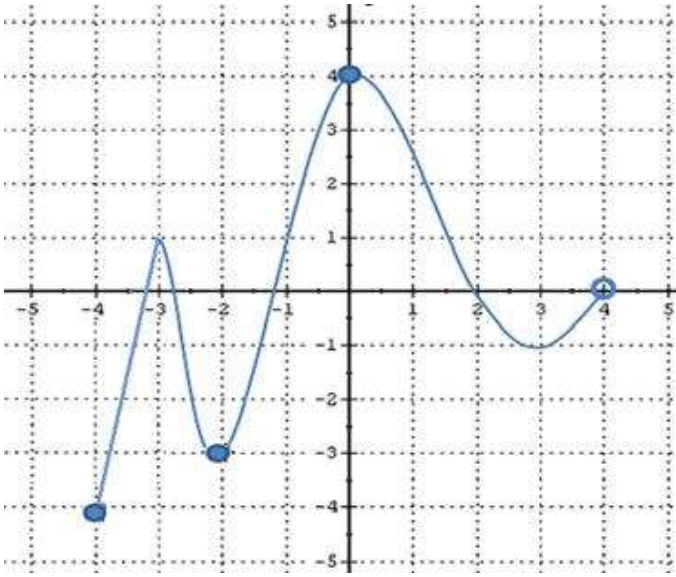
Range:

$[-4, 4]$

Circle One:

Continuous Discrete

Discontinuous



2) Domain:

$(-\infty, \infty)$

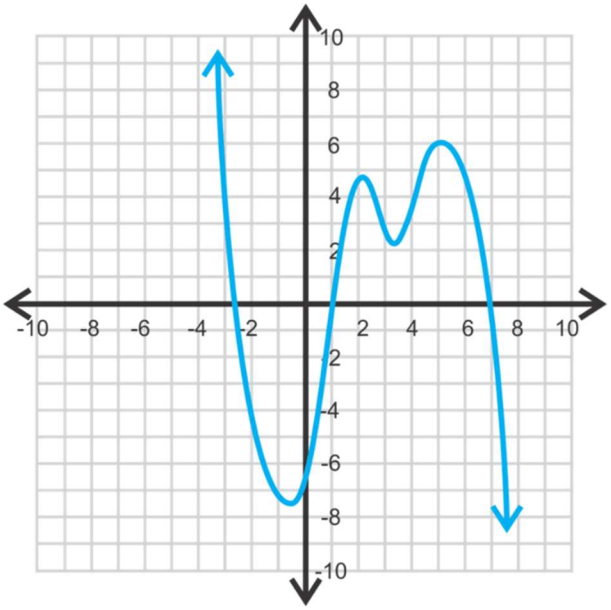
Range:

$(-\infty, \infty)$

Circle One:

(Continuous) Discrete

Discontinuous



3) Domain:

$[-4, \infty)$

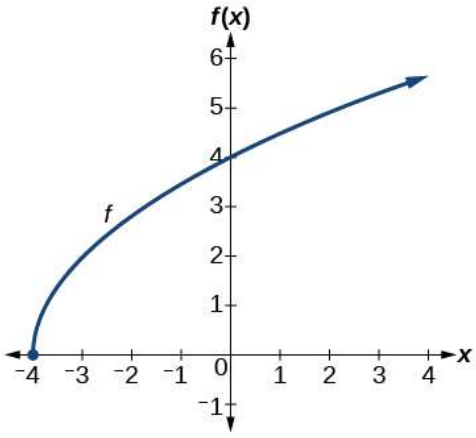
Range:

$[0, \infty)$

Circle One:

(Continuous) Discrete

Discontinuous



4) Domain:

$[-4, -1) \cup [0, 7)$

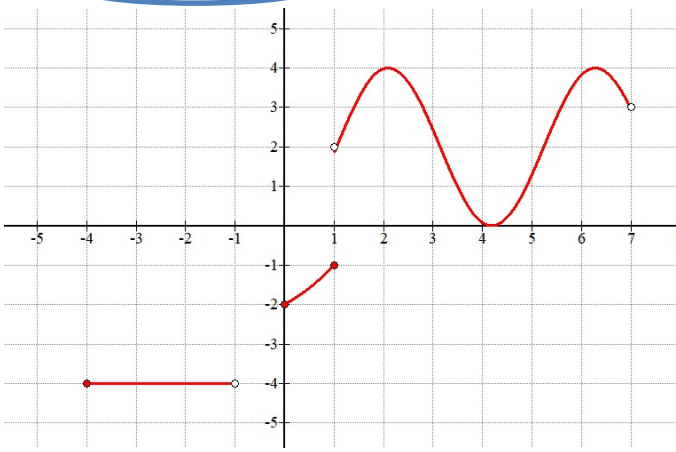
Range:

$\{-4\} \cup [-2, -1] \cup [0, 4]$

Circle One:

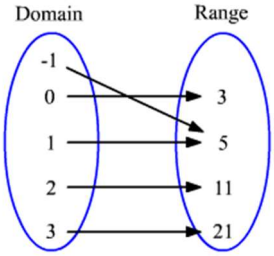
Continuous Discrete

(Discontinuous)



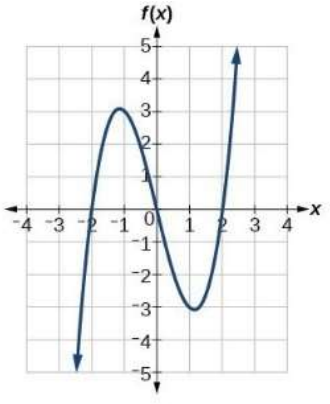
For each of the following relations, determine whether it is a function.

1.



Is a function because each domain value is paired with only one range value.

2.



(a)

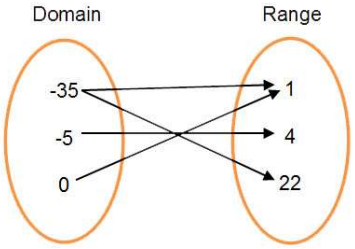
Is a function because each domain value is paired with only one range value. It passes the vertical line test.

3.

X	Y
2	-1
4	0
2	1
4	2

Is not a function because the same x-value is paired with more than one y-value.

4.



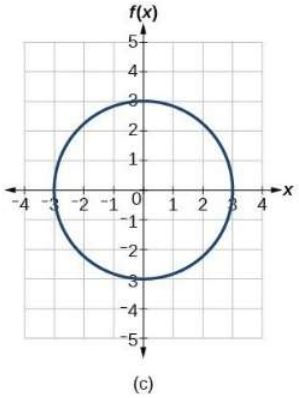
Is not a function because a domain value is paired with more than one range value.

5.

Input	Output
1	6
2	6
3	6
4	6
5	6

Is a function because each input value is paired with only one output value.

6.



(c)

Is not a function because each domain value is paired with more than one range value. It does not pass the vertical line test.