

MCR 3U– Grade 11 Functions

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Unit 1 – Ch. 1, 2, 3

1.1 – Relations & Functions

- OUR GOAL: To recognize functions in various representations

INVESTIGATE

- Using a ruler/tape measure, record the shoe size and height of every student in the class. Then plot the points – is there a relationship?



INVEST

- Jack recorded the heights and shoe sizes of students in his class.



Shoe Size	Height (cm)
10	158
11.5	175
10	173
9	164
9	167
10	170
11	172
8	160
8	174
11	175
8	166
7.5	153
10	171
11	181
11	171
10	170

Shoe Size	Height (cm)
8	156
7.5	161
12	179
11	178
10.5	173
8.5	177
8	165
12	182
13	177
13	192
7.5	157
8.5	163
12	183
10	168
11	180

INVESTIGATE CONT'D

- 5. What is the **domain** and **range** of the relationship between shoe size and height?
- 6. Explain why the **relation** plotted in 1. is *not a function*.
- 7. Is the relation in part 4. a function?

EXAMPLE #1



- The ages and soccer practice days of four students are shown in the table below.

Student	Age	Soccer Practice Day
Craig	15	Tuesday
Magda	16	Tuesday
Stefani	15	Thursday
Amit	17	Saturday

For each of the given relations, state the domain and range and then determine whether or not the relations are functions.

- Students and the day for soccer practice
- Ages and the day for soccer practice

a) **DOMAIN:** {Craig, Magda, Stefanie, Amit}

RANGE: {Tuesday, Thursday, Saturday}

a) Since one element of the domain corresponds with only one element in the range, the relation between students and the day for soccer practice is a function.

EXAMPLE #1 cont'd



- The ages and soccer practice days of four students are listed below.

Student	Age	Soccer Practice Day
Craig	15	Tuesday
Magda	16	Tuesday
Stefani	15	Thursday
Amit	17	Saturday

For each of the given relations, state the domain and range and then determine whether or not the relations are functions.

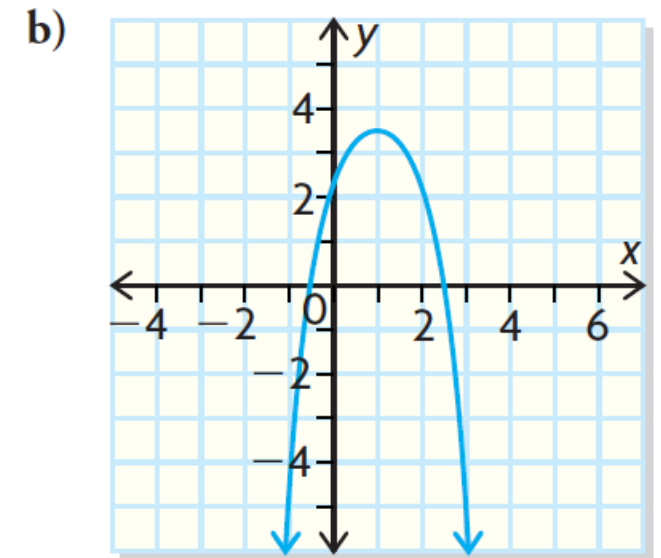
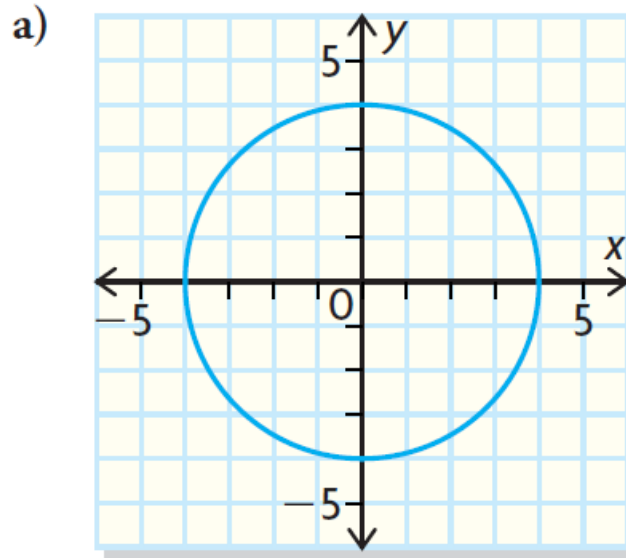
- Students and the day for soccer practice
- Ages and the day for soccer practice

b) DOMAIN: {15, 16, 17}

RANGE: {Tuesday, Thursday, Saturday}

b) 15 in the domain corresponds with two different days in the range, so this relation is not a function.

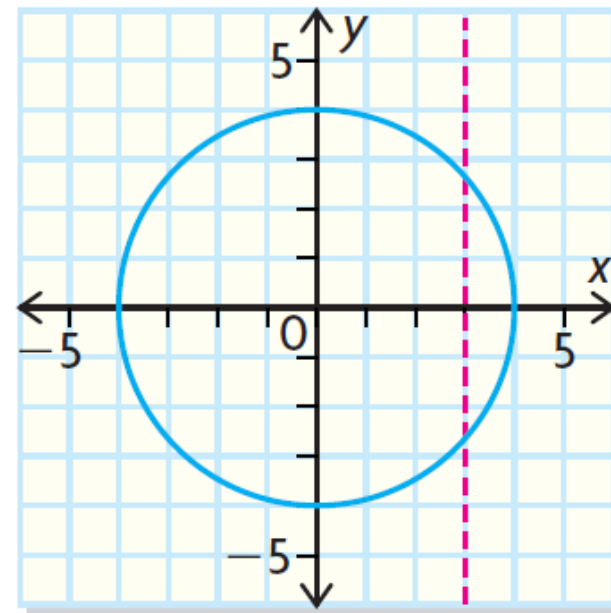
Determine which of the following graphs are functions.



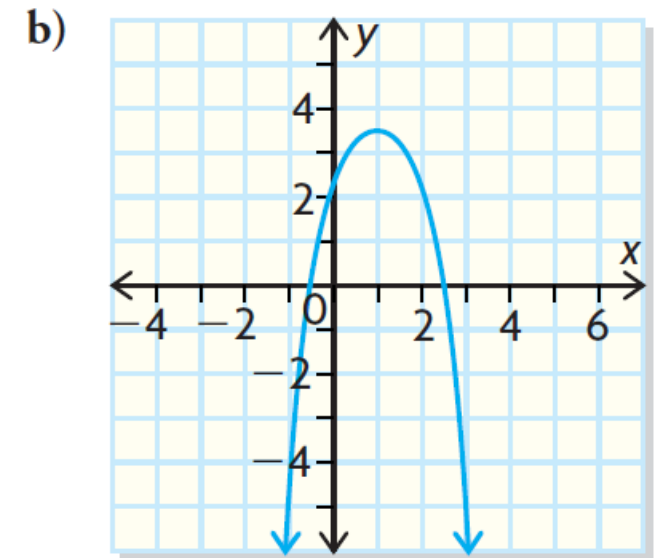
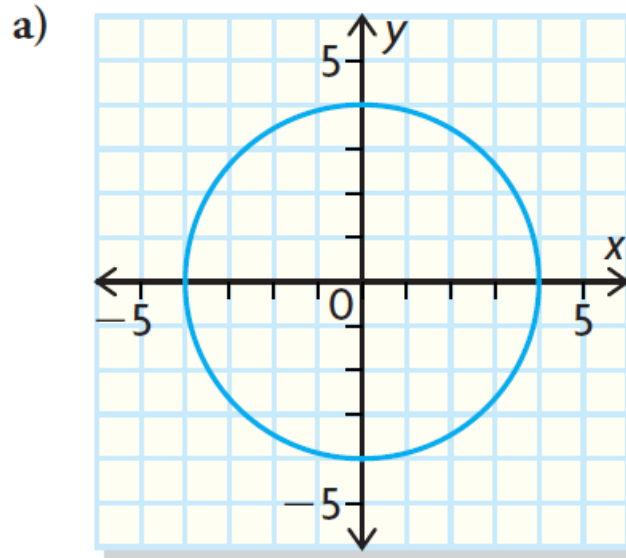
SOLUTION to (a)

Use the **vertical line test** to see how many points on the graph there are for each value of x .

The line crosses the graph in 2 places therefore this is not the graph of a function.



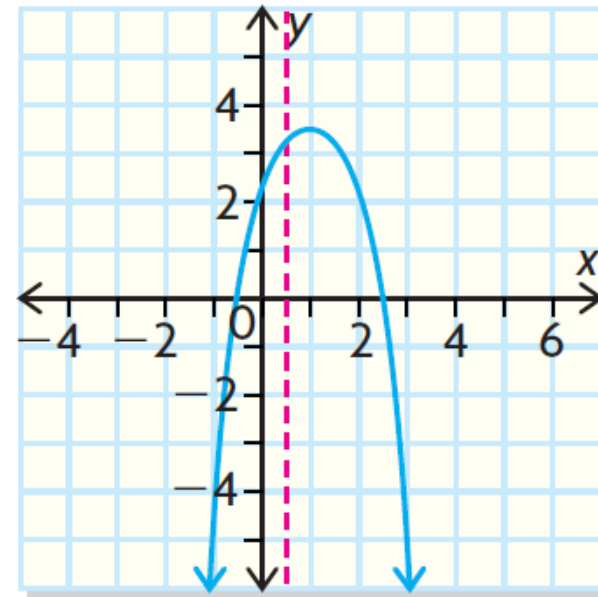
Determine which of the following graphs are functions.



SOLUTION to (b)

Use the **vertical line test** to see how many points on the graph there are for each value of x .

The line crosses the graph in 1 place therefore this is the graph of a function.



Example #3

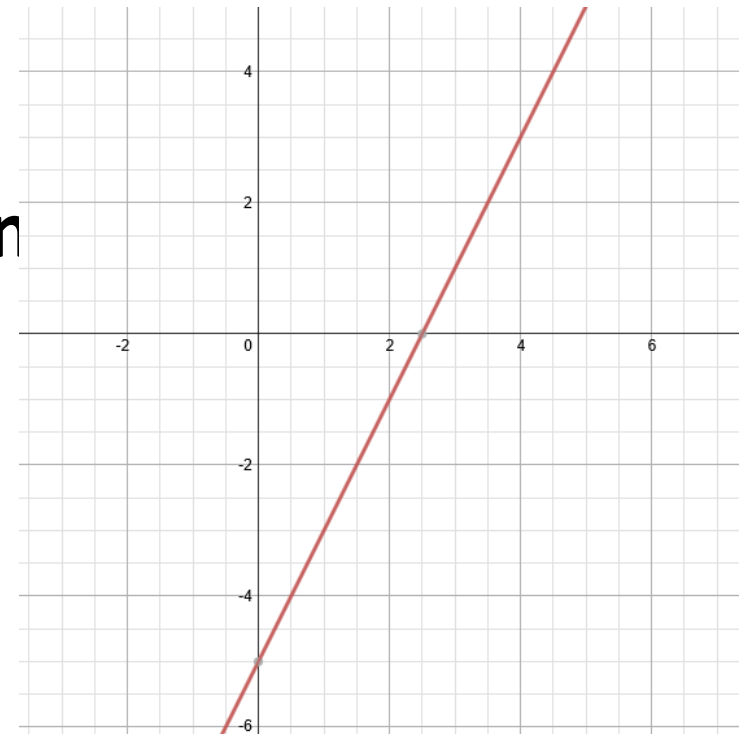
- Determine which equations represent functions.

- A) $y = 2x - 5$
 $- 3x + 1$

- B) $x^2 + y^2 = 9$

- C) $y = 2x^2$

- A) $y = 2x - 5$ is the graph of a **straight line**
positive slope of +2.



Example #3 cont'd

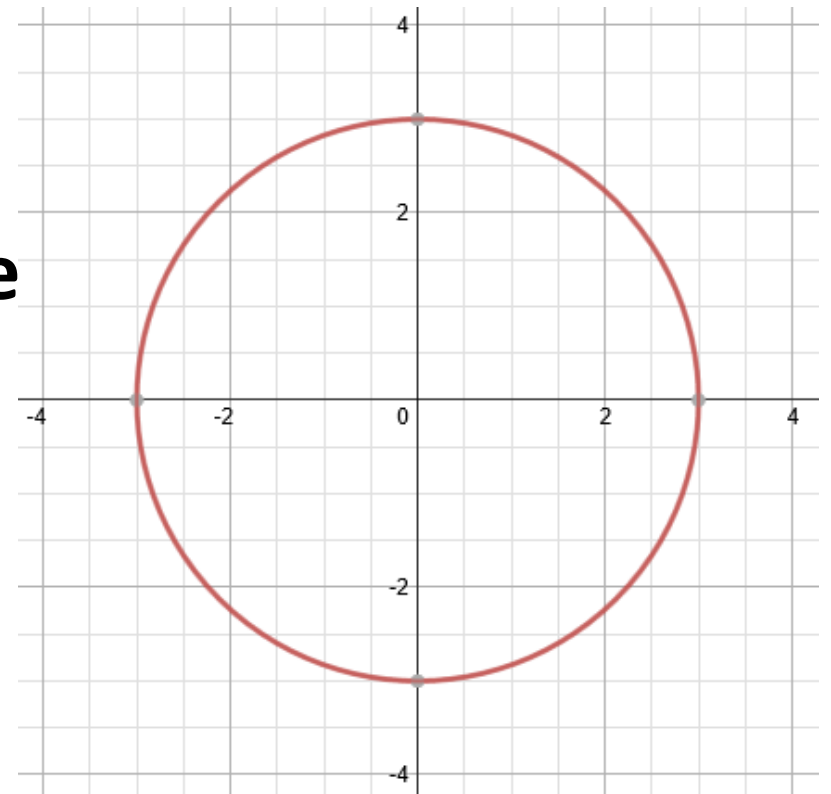
- Determine which equations represent functions.

- A) $y = 2x - 5$
 $- 3x + 1$

- B) $x^2 + y^2 = 9$

- C) $y = 2x^2$

- B) $x^2 + y^2 = 9$ is the graph of a **circle** **cente**
with a **radius of 3**.



Example #3

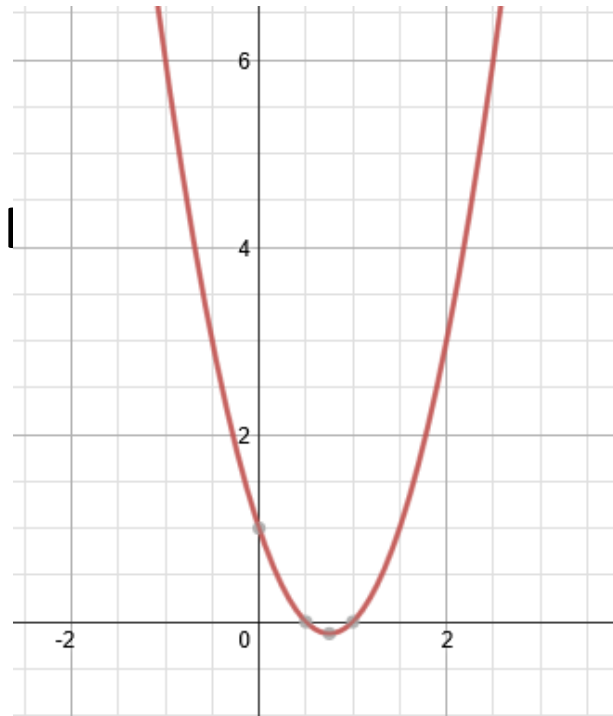
- Determine which equations represent functions.

- A) $y = 2x - 5$
 $- 3x + 1$

- B) $x^2 + y^2 = 9$

- C) $y = 2x^2$

- C) $y = 2x^2 - 3x + 1$ is the graph of a **quadr**



In Summary...

- A function is a relation in which each value of the independent variable corresponds with only one value of the dependent variable
- Functions can be represented in various ways: in words, a table of values, a set of ordered pairs, a graph or an equation.