



Identifying Domain and Range

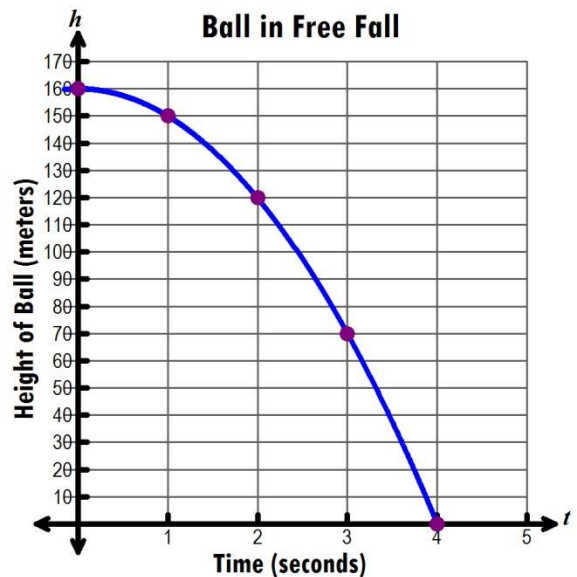
Explore – Answer Key

Height of a Ball in Free Fall

A ball is dropped from a 160-meter tall building. Its height after t seconds is modeled by the equation $h = 160 - 10t^2$.

- Use the function to complete the table below.
- Make a scatterplot of the height of the ball versus time. Connect the values using the function rule.

Time (seconds) (t)	Process	Height of Ball (meters) (h)
0	$160 - 10(0)^2$	160
1	$160 - 10(1)^2$	150
2	$160 - 10(2)^2$	120
3	$160 - 10(3)^2$	70
4	$160 - 10(4)^2$	0
t	$160 - 10t^2$	h



- Use the table and graph to complete the comparison chart below.

	Possible t -values	Possible h -values
Function	<i>All real numbers</i>	<i>Real numbers less than or equal to 160; $h \leq 160$</i>
Situation	<i>Real numbers between 0 and 4, including 0 and 4; $t \geq 0$ and $t \leq 4$</i>	<i>Real numbers between 0 and 160, including 0 and 160; $h \geq 0$ and $h \leq 160$</i>

Hint – Use words like:

- real numbers
- less than
- between
- equal to
- including



Debriefing Questions

The **domain** of a function is all possible values of the *independent variable* that make sense in a situation.

1. Use words to describe the **domain** of the function that models the height of the ball.

The domain of the function includes all real numbers.

2. Use words to describe the **domain** of the situation.

The domain of the situation is limited to real numbers between 0 and 4, including both 0 and 4.

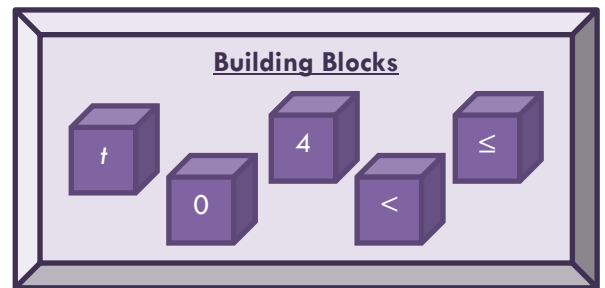
3. Are the domain of the function and the domain of the situation different? Explain.

Yes. The domain of the situation is a small part of the domain of the function, and the domain of the function includes all real numbers, but the domain of the situation only includes certain real numbers. This is because the context of the situation limits the domain to positive numbers (Quadrant I).

4. Write an inequality representing the domain of the portion of the graph represented by the situation. Use the building blocks to help you. You may not use all of the blocks, or you may use some blocks more than once.

$0 \leq t \text{ and } t \leq 4$

$0 \leq t \leq 4$



The **range** of a function is all possible values of the *dependent variable* that make sense in a situation.

5. Use words to describe the **range** of the function that models the height of the ball.

The range of the function includes all real numbers less than 160, including 160.

6. Use words to describe the **range** of the situation.

The range of the situation is limited to real numbers between 0 and 160, including both 0 and 160.

7. Are the range of the function and the range of the situation different? Explain.

Yes. The range of the situation is a small part of the range of the function, and the range of the function includes all real numbers less than or equal to 160, but the range of the situation only includes certain real numbers less than or equal to 160. This is because the context of the situation limits the range to positive numbers (Quadrant I).

8. Write an inequality representing the range of the portion of the graph represented by the situation. Use the building blocks to help you. You may not use all of the blocks, or you may use some blocks more than once.

$0 \leq h \text{ and } h \leq 160$

$0 \leq h \leq 160$

