### **desmos** Unit 6.7, Family Resource

## Unit 7 Summary

<ul> <li>Prior Learning</li> <li>Grades 3–5</li> <li>Inequalities with numbers</li> <li>Comparing fractions and decimals</li> <li>Graphing points with positive coordinates</li> <li>Math 6</li> <li>Intro to polygons (Unit 1)</li> <li>Equations with variables (Unit 6)</li> </ul>	<ul> <li>Math 6, Unit 7</li> <li>Negative numbers and absolute value</li> <li>Inequalities with variables</li> <li>The coordinate plane (with positive and negative coordinates)</li> </ul>	<ul> <li>Future Learning</li> <li>Math 7, Units 5 and 6</li> <li>Operations with negative numbers</li> <li>Solving inequalities</li> <li>Math 8</li> <li>Transformations in the plane</li> <li>Pythagorean theorem and distance</li> </ul>
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#### **Negative Numbers and Absolute Value**

We can use *positive* and *negative* numbers to describe locations on the number line.

The tree is at + 4 because it is 4 units to the right of 0.

The sand dollar is at -4 because it is 4 units to the left of 0.

4 and -4 are *opposites* because they are the same distance from 0 on different sides of the number line.

|x| is pronounced the *absolute value* of x and describes a number's distance from 0.

|-4| = 4 and |4| = 4 because both numbers are 4 units away from 0.



We often compare positive and negative numbers when talking about temperatures or elevations.

The crab has a higher elevation than the octopus, so 4 > -5.

The crab is closer to the surface than the octopus, so |4| < |-5|.



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#### Inequalities

We can compare numbers using the words and symbols *less than* (<) and *greater than* (>). We can also write inequalities with variables to show any number greater than or less than a value.

The inequality h < 400 and the graph represent **all** vehicle heights less than 400 centimeters tall.

There is an open circle on the graph because 400 centimeters is not included.

Any value that makes an inequality true is a *solution to the inequality*.

There are infinite solutions to h < 400, including 300, 1, 200.5, and 399.9.



#### The Coordinate Plane

In previous grades, students learned to plot points with positive coordinates. In this unit, students learn to plot points that have both positive and negative coordinates.



The leftmost point is located at (-4, 2) because it is 4 to the left of the vertical axis and 2 above the horizontal axis.

The side connecting (-4, 2) and (3, 2) is 7 units long. Because the side is horizontal, we only need to compare the *x*-coordinates. It takes 4 units to get from -4 to 0 and another 3 units to get from 0 to 3.

# Try This at Home

#### **Negative Numbers and Absolute Value**

1.1 Complete each statement below.

The opposite of 3 is \_\_\_\_\_.

The opposite of  $\frac{4}{5}$  is \_\_\_\_\_.

The opposite of -2.5 is \_\_\_\_\_.

The opposite of 0 is \_\_\_\_\_.

1.2 Plot and label each number from the statements above **and** its opposite on the number line.



- 2.1 A duck is sitting at the surface of the ocean. What is the duck's elevation?
- 2.2 The duck dives 15 feet into the water looking for food. What is the duck's elevation now?
- 2.3 The duck comes back up 5 feet and catches a fish. How far away is the duck from the surface of the ocean? Write this in words and using the symbols | |.

#### Inequalities

A sign at the fair says, "You must be taller than 32 inches to ride."

- 3.1 List three possible heights of someone who can ride.
- 3.2 Write an inequality to show heights, h, for people who can ride the Ferris wheel.
- 3.3 Make a graph of all the possible heights you could be in order to ride the Ferris wheel.





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#### The Coordinate Plane

Did you know that in the southern hemisphere, it is winter in July? Here is a graph of temperatures in the Andes in Peru for one day in July.

- 4.1 What was the temperature at noon?
- 4.2 What was the temperature at 10 a.m.?
- 4.3 When was it colder than freezing (0°C)?
- 4.4 Tell a story about the temperature that day.

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#### Solutions:



1.2



2.1 0 feet



- 2.3 The duck's elevation is -10 feet. This means the duck is 10 feet away from the surface, or |-10| = 10.
- 3.1 *Responses vary*. 33 inches, 40 inches, 80 inches.
- 3.2 h > 32



- 4.3 It was colder than freezing at 7, 8, and 9 a.m.
- 4.4 Stories vary. At 7 a.m., it was so cold at -5°C. It got warmer throughout the morning. At 10 a.m., temperatures went from below freezing to above freezing. By the afternoon, the temperature was up to 12°C. After 3 p.m., the temperature started to go slightly down again.