VOLUME 1

enVision® Mathematics

SAVVAS

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Lesson 1-1
Relate Integers and Their Opposites

Go Online

I can...
relate integers, their opposites, and their absolute values.

Solve & Discuss It!

ACTIVITY

When preparing for a rocket launch, the mission control center uses the phrase "T minus" before liftoff.

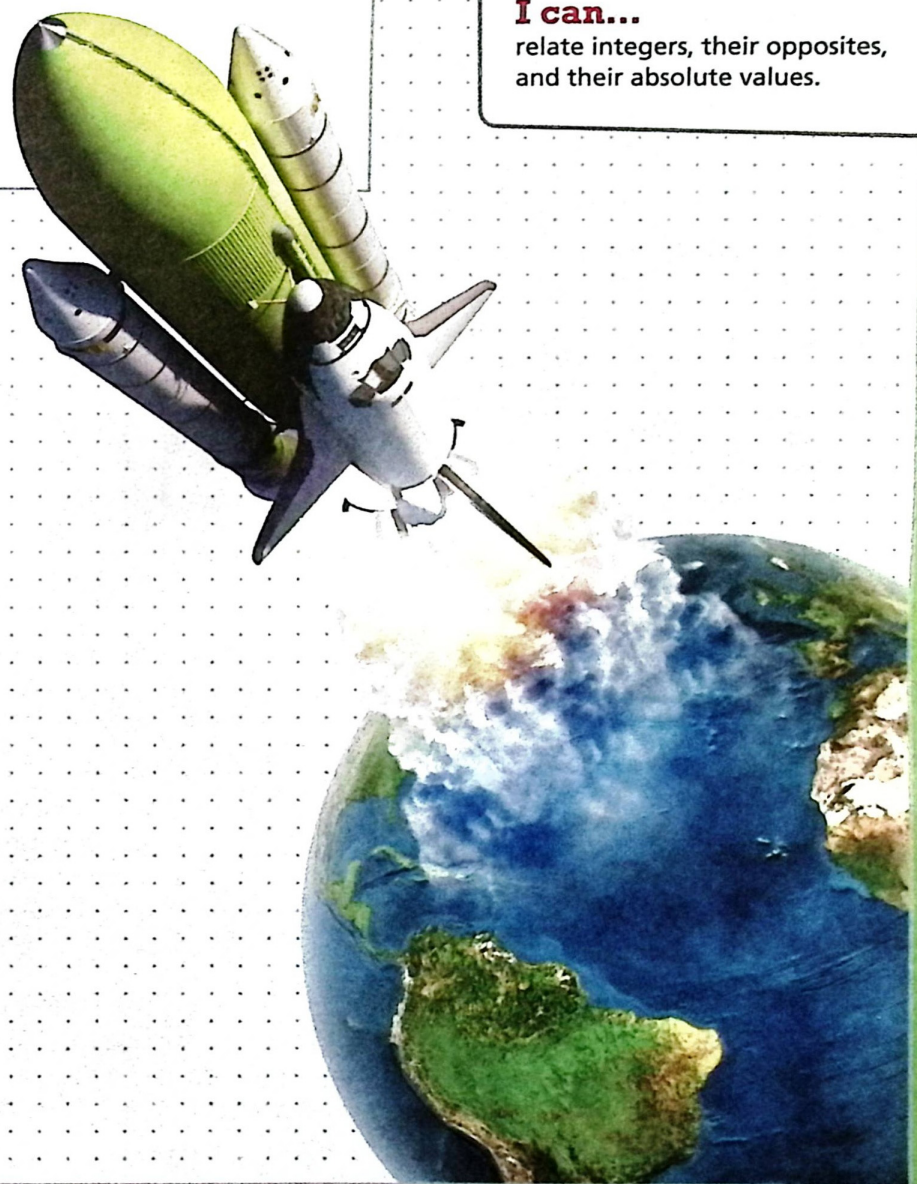
...T minus 3, T minus 2, T minus 1, ...

After the rocket has launched, "T plus" is used while the rocket is in flight.

...T plus 1, T plus 2, T plus 3, ...

When does the rocket launch? What could "T" represent?

Reasoning What integers can you use to represent this situation?



Focus on math practices

Reasoning How are "T minus 4" and "T plus 4" related?

Essential Question How are integers and their opposites related?

VISUAL LEARNING ASSESS

EXAMPLE 1 Combine Opposite Quantities to Make 0

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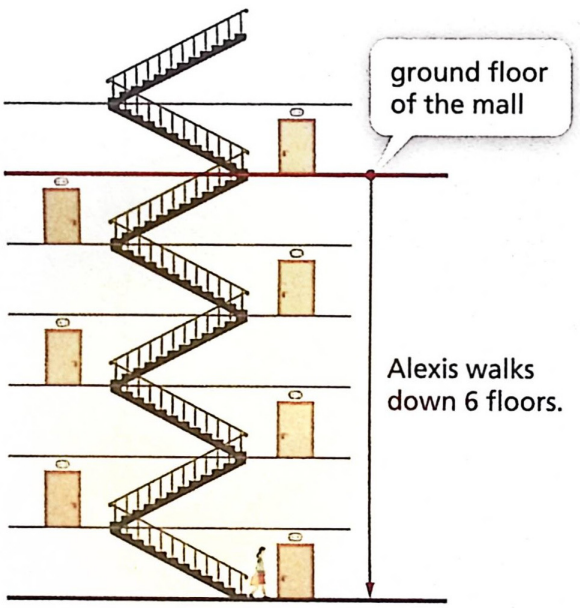
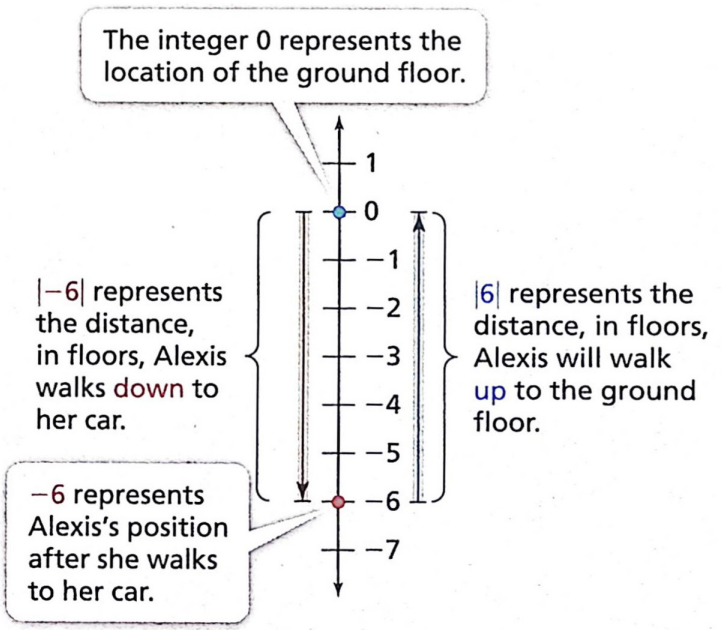
Alexis was shopping on the ground floor of the mall when she realized she had left her phone in her car. She walks down 6 floors to her car in the underground parking garage.

How far will Alexis walk to get back to the ground floor? Use integers to explain.



Use integers on a number line to represent the situation.



$|-6| = |6| = 6$

−6 and 6 are opposites. Opposite quantities combine to make 0.

Alexis will walk the same distance, 6 floors, in the opposite direction to get back to the ground floor.

Try It!

Xavier climbs 9 feet up into an apple tree. What integer represents the direction and how far he will climb to get back down to the ground? What does the integer 0 represent in this situation?

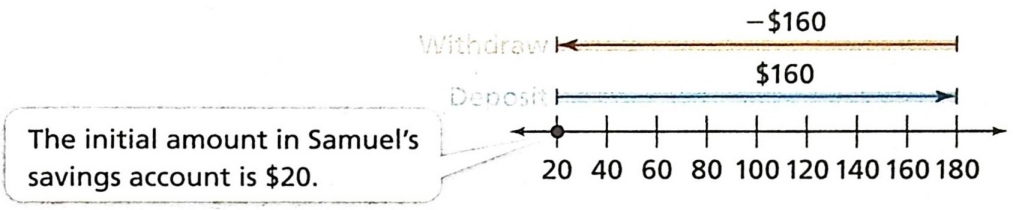
The integer ____ represents Xavier's climb down.

The integer 0 represents ____.

Convince Me! How are the absolute values of opposite integers related?

EXAMPLE 2 Combine Opposite Quantities

Samuel has $20 in his savings account before he makes a deposit of $160. After 2 weeks, he withdraws $160. How did Samuel's savings account balance change?



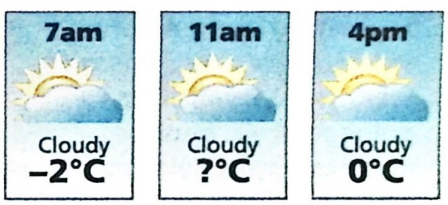
The amounts deposited and withdrawn are opposite quantities and combine to make 0. Samuel's account balance did not change because the amounts deposited and withdrawn combine to make 0.

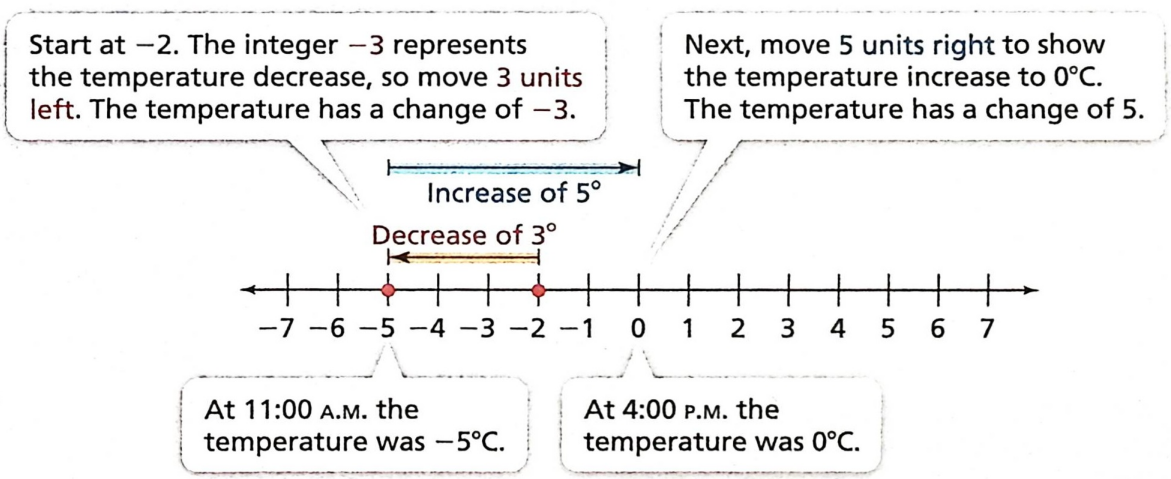
Try It!

The temperature was 75°. At noon, the temperature increased 7°. By evening, the temperature decreased by 7°. How did the temperature change?

EXAMPLE 3 Represent Change Using Integers

One winter morning, the temperature was −2°C. By 11:00 A.M., the temperature had decreased by 3°. At 4:00 P.M., the temperature reached 0°C. What integer represents the temperature change from 11:00 A.M. to 4:00 P.M.?





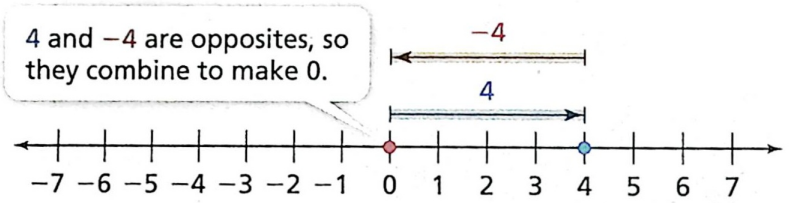
The integer 5 represents the temperature change from 11:00 A.M. to 4:00 P.M.

Try It!

Shaniqua has $45 in her wallet. She spends $4 on snacks and $8 on a movie ticket. What integer represents the change in the amount of money in Shaniqua's wallet? How much money does she have left?

KEY CONCEPT

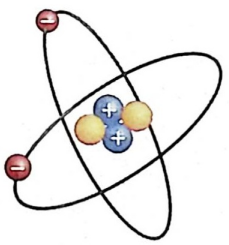
An integer, n, and its opposite, $-n$, combine to make 0.



Do You Understand?

1. **Essential Question** How are integers and their opposites related?

2. **Reasoning** In order for an atom to have a zero charge, every proton, which has a charge of +1, must be matched with an electron, which has a charge of −1. A helium atom has 2 protons and 2 electrons. Explain why a helium atom has a zero charge.



3. **Model with Math** Explain how to use a number line to show that opposite quantities combine to make 0.

Do You Know How?

4. Marcus dives from the surface of the ocean to a reef 18 meters below sea level. What integer represents Marcus's location relative to the surface? How far does Marcus have to go to return to the surface?

5. The temperature of the water in Emily's fish tank was 78°F on Sunday. The water temperature changed by −3° on Monday, and then by 3° on Tuesday. What integer represents the temperature change of the water from Sunday to Tuesday? What was the water temperature on Tuesday?

6. The scores of players on a golf team are shown in the table. The team's combined score was 0. What was Travis's score?

Golfer	Score
CELIA	−3
JANINE	3
SAMI	1
TED	4
TRAVIS	

Name: _____

Practice & Problem Solving

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Leveled Practice **In 7–9, write the integer that represents the situation.**

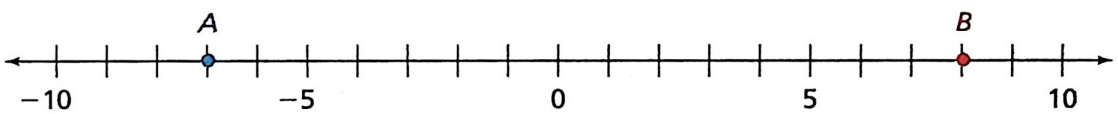
7. Max spent $53 and now has no money left. He had $ ____ before his purchase.

8. The temperature was 8°F. It dropped so that the temperature was 0°F. ____ °F represents the change in temperature.

9. An airplane descended 4,000 feet before landing. The integer that represents how many feet the airplane was above the ground before its descent is ____.

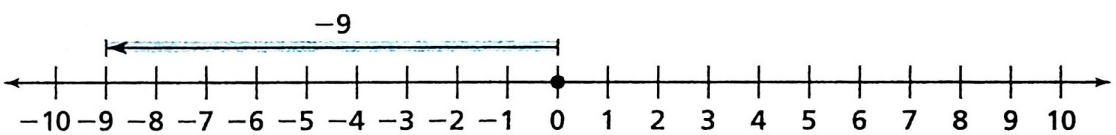
10. Carolyn says that point A and point B represent opposite integers.

a. What is the opposite of the integer represented by point A? By point B?



b. Construct Arguments Do you agree with Carolyn? Explain.

11. A football team lost 9 yards during a play. The team had a combined gain or loss of 0 yards after the next play. What integer represents the yards gained or lost on the next play? Show this on the number line.



12. A roller coaster car goes above and below ground. Use the number line to show its changes in height. What is the height of the car at the end of the ride?