

Unit 7 Lesson 20: Representing Contexts with Equations

1 Don't Solve It (Warm up)

Student Task Statement

Is the solution positive or negative?

$$(-8.7)(1.4) = a$$

$$-8.7b = 1.4$$

$$-8.7 + c = -1.4$$

$$-8.7 - d = -1.4$$

2 Warmer or Colder than Before?

Student Task Statement

For each situation,

- Find *two* equations that could represent the situation from the bank of equations. (Some equations will not be used.)
- Explain what the variable v represents in the situation.
- Determine the value of the variable that makes the equation true, and explain your reasoning.

Bank of equations:

$$-3v = 9$$

$$v = -16 + 6$$

$$v = \frac{1}{3} \cdot (-6)$$

$$v + 12 = 4$$

$$-4 \cdot 3 = v$$

$$v = 4 + (-12)$$

$$v = -16 - (6)$$

$$v = 9 + 3$$

$$-4 \cdot -3 = v$$

$$-3v = -6$$

$$-6 + v = -16$$

$$-4 = \frac{1}{3}v$$

$$v = -\frac{1}{3} \cdot 9$$

$$v = -\frac{1}{3} \cdot (-6)$$

$$v = 4 + 12$$

$$4 = 3v$$

1. Between 6 a.m. and noon, the temperature rose 12 degrees Fahrenheit to 4 degrees Fahrenheit.
2. At midnight the temperature was -6 degrees. By 4 a.m. the temperature had fallen to -16 degrees.
3. The temperature is 0 degrees at midnight and dropping 3 degrees per hour. The temperature is -6 degrees at a certain time.

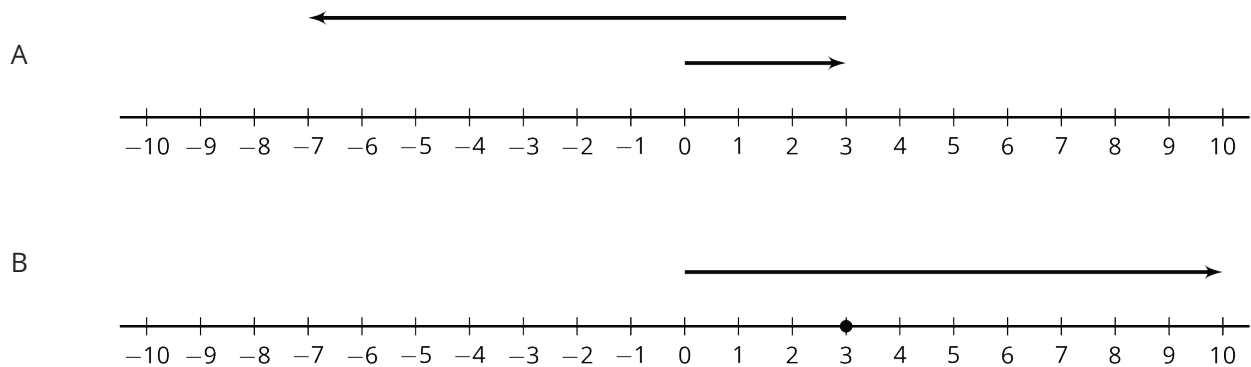
4. The temperature is 0 degrees at midnight and dropping 3 degrees per hour. The temperature is 9 degrees at a certain time.
5. The temperature at 9 p.m. is one third the temperature at midnight.

3 Animals Changing Altitudes (Optional)

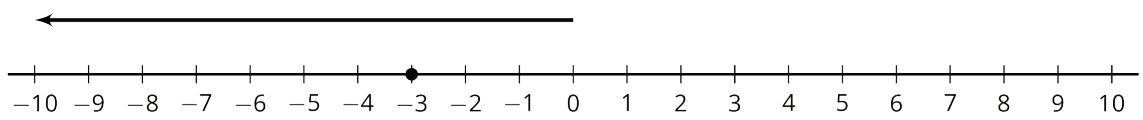
Student Task Statement

- Match each situation with a diagram.
 - A penguin is standing 3 feet above sea level and then dives down 10 feet. What is its depth?
 - A dolphin is swimming 3 feet below sea level and then jumps up 10 feet. What is its height at the top of the jump?
 - A sea turtle is swimming 3 feet below sea level and then dives down 10 feet. What is its depth?
 - An eagle is flying 10 feet above sea level and then dives down to 3 feet above sea level. What was its change in altitude?
 - A pelican is flying 10 feet above sea level and then dives down reaching 3 feet below sea level. What was its change in altitude?
 - A shark is swimming 10 feet below sea level and then swims up reaching 3 feet below sea level. What was its change in depth?
- Next, write an equation to represent each animal's situation and answer the question. Be prepared to explain your reasoning.

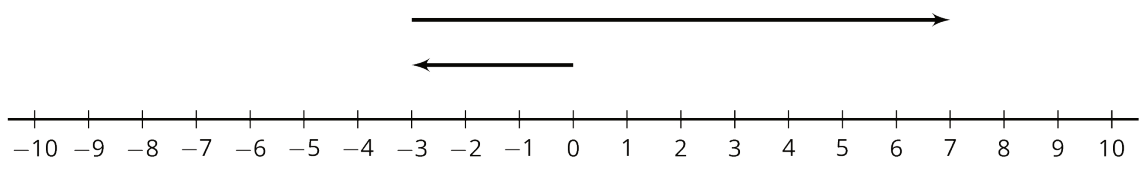
Diagrams



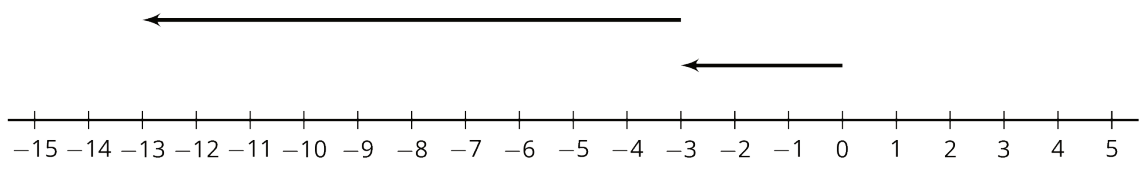
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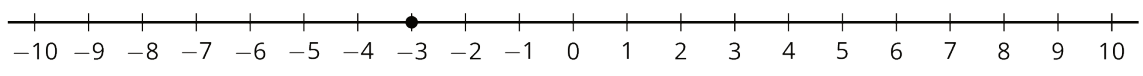
D



E



F



4 Equations Tell a Story

Student Task Statement

Your teacher will assign your group *one* of these situations. Create a visual display about your situation that includes:

- An equation that represents your situation
 - What your variable and each term in the equation represent
 - How the operations in the equation represent the relationships in the story
 - How you use inverses to solve for the unknown quantity
 - The solution to your equation
1. As a $7\frac{1}{4}$ inch candle burns down, its height decreases $\frac{3}{4}$ inch each hour. How many hours does it take for the candle to burn completely?
 2. On Monday $\frac{1}{9}$ of the enrolled students in a school were absent. There were 4,512 students present. How many students are enrolled at the school?
 3. A hiker begins at sea level and descends 25 feet every minute. How long will it take to get to an elevation of -750 feet?
 4. Jada practices the violin for the same amount of time every day. On Tuesday she practices for 35 minutes. How much does Jada practice in a week?
 5. The temperature has been dropping $2\frac{1}{2}$ degrees every hour and the current temperature is -15°F . How many hours ago was the temperature 0°F ?
 6. The population of a school increased by 12%, and now the population is 476. What was the population before the increase?
 7. During a 5% off sale, Diego pays \$74.10 for a new hockey stick. What was the original price?
 8. A store buys sweaters for \$8 and sells them for \$26. How many sweaters does the store need to sell to make a profit of \$990?