



El Capitan is a 3000-foot vertical rock formation in Yosemite National Park in California. The granite cliff is one of the most popular challenges for experienced rock climbers. On July 3, 2008, Hans Florine and Yuji Hirayama scaled El Capitan in a record time of 2 hours 43 minutes and 33 seconds.

1. On average, about how fast in feet per minute did the record holders climb?

Two new climbers want to attempt to break the record by climbing El Capitan in 2 hours and 30 minutes.

2. If these climbers are to reach their goal, on average, how fast in feet per minute will they have to climb?

You want to watch the climbers attempt to break the record for climbing El Capitan. On the morning of the climb, you arrive late at 11:30 A.M. When you arrive, the climbers are exactly halfway to the top.

3. How many feet high are the climbers?

4. Assuming they are climbing at the average rate needed, how many feet up the cliff will the climbers be:

a. in two more minutes?

b. in a quarter of an hour?

c. in one hour?

5. Consider the quantities in this scenario.

a. Which quantity depends on the other?

b. Identify and define the independent and dependent variables with their units of measure for this situation.

c. Write an equation for calculating the value of the dependent variable when the value of the independent variable is given.

6. Use your equation to determine how long after 11:30 A.M. it will take the climbers to reach the top at 3000 feet. What time would the climbers reach the top?

7. Use your equation to determine when the climbers are 1400 feet up the cliff. What does this answer mean in terms of the problem situation?

8. Use your equation to determine how high up the cliff the climbers were:

a. two minutes before 11:30 A.M.

b. a half hour before 11:30 A.M.

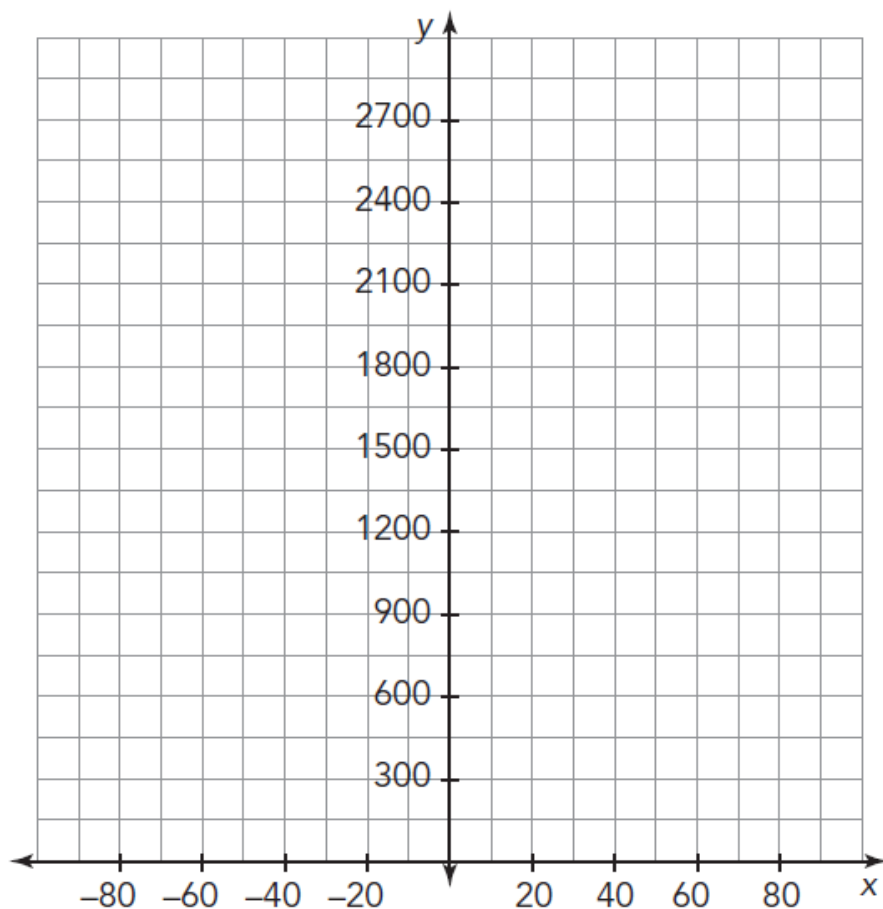
9. Use your equation to determine how many minutes before 11:30 A.M. the climbers started to climb. What time of day was that?

Now that you have represented the situation with an equation, represent it with a table and a graph.

10. Copy and complete the table for this situation.

11. Plot the points from the table on the coordinate plane shown. Label the axes, and draw the graph of your equation.

Quantities	Time	Height
Units of Measure		
Variables		
	0	
	2	
	15	
	60	



12. What should be the leftmost point on your graph? Explain your reasoning.

13. What should be the rightmost point on your graph?
Explain your reasoning.

14. Locate the point with an x-coordinate of -60 .

a. What is the height of the climbers at this point?

b. Write this point as an ordered pair and interpret the meaning in terms of the problem situation.

15. This analysis of the climbers' progress assumes that the climbers would climb at a steady rate of 20 feet per minute. In reality, would the climbers be able to do this during the whole climb? If not, how might the graph reflect this?

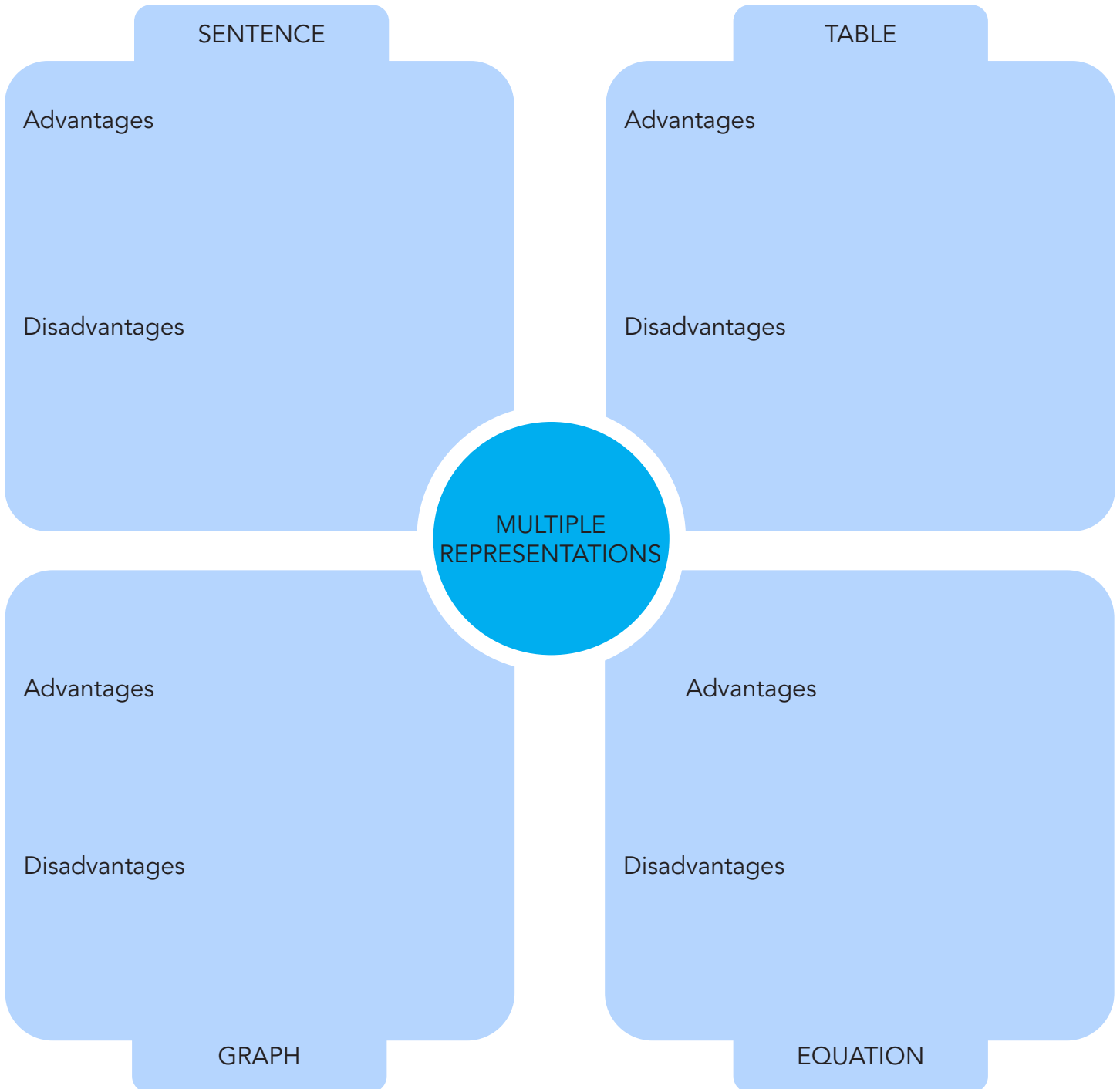
16. Explain what the negative values of time represent.

Show You KNOW

Take Advantage of the Situation

You have represented two situations in four different ways: as a sentence, as a table, as a graph, and as an equation.

1. Complete the graphic organizer to explain the advantages and disadvantages of each representation.





LESSON 9.1b

Put It on the Plane



Objective

Representing Equations with Tables and Graphs

Practice

2. Mr. Hong is a rare coin collector. He recently bought a coin valued at \$5400. It has been determined that the coin will increase in value by \$30 each month. Mr. Hong plans to sell the coin within 5 years.

a. Name the quantities that change in this problem situation and the quantities that remain constant. Determine which quantity is independent and which quantity is dependent.

b. Create a table of values that represents a variety of different number of months for which Mr. Hong could own the coin and the total value of the coin.

c. Create a graph of the data from the table. Carefully select the lower bound, upper bound, and intervals. Remember to label the axes and the intervals.

d. Describe the relationship between the two quantities.

e. Use the graph to determine the approximate worth of the coin if Mr. Hong owns it for 3 years.

f. Use the graph to determine approximately when will the coin be worth \$6600.

g. Write an algebraic equation to represent the situation. Define your variables.

h. After owning the coin for 3 years, Mr. Hong wants to sell the coin. He tells a potential buyer it is worth \$6480. The buyer disagrees and says it is worth \$5490. Who is correct? Explain your reasoning in terms of the equation.