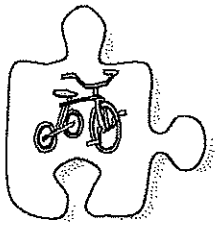
2.2.2 What can rate of change represent?



Rate of Change

Today you will focus on the meaning of "rate of change" in various situations. What does a rate of change represent? How can you use it? As you graph the results of a competitive tricycle race today, think about how the participants' rates of change compare to each other.

2-53. THE BIG RACE – HEAT 1

Before a big race, participants often compete in heats, which are preliminary races that determine who competes in the final race. Later in this chapter, your class will compete in a tricycle race against the winners of these preliminary heats.

In the first heat, Leslie, Kristin, and Evie rode tricycles toward the finish line. Leslie began at the starting line and rode at a constant rate of 2 meters every second. Kristin got an 8-meter head start and rode 2 meters every 5 seconds. Evie rode 5 meters every 4 seconds and got a 6-meter head start.

a. On neatly scaled axes, graph and then write an equation in terms of x and y for the distance Leslie travels. Let x represent time in seconds and y represent distance in meters. Then do the same for Kristin and Evie using the same set of axes.

b. After how many seconds did Leslie catch up to Evie? How far were they from the starting line when Leslie caught up to Evie? Confirm your answer algebraically and explain how to use your graph to justify your answer.

c. The winner of this heat will race in the final Big Race. If the race is 20 meters long, who won? Use both the graph and the equations to justify your answer.

d. How long did it take each participant to finish the race?

e. The school newspaper wants to report Kristin's speed. How fast was Kristin riding? Write your answer as a unit rate.

2-54. THE BIG RACE – HEAT 2

In the second heat, Elizabeth, Kaye, and Hannah raced down the track. They knew the winner would compete against the other heat winners in the final race.

a. When the line representing Kaye's race is graphed, the equation is $f(x)=\frac{2}{3}x+1$. What was her speed (in meters per second)? Did she get a head start?

b. Elizabeth's race is given by the equation $f(x)=\frac{12}{16}x+4$. Who is riding faster, Elizabeth or Kaye? How do you know?

c. Just as she started pedaling, Hannah's shoelace came untied! Being careful not to get her shoelace tangled in the pedal, she rode slowly. Hannah's race is represented by the table to the right. At what unit rate was she riding? Write your answer as a unit rate.

Hannah's Race	
Time (sec)	Distance (meters)
14	10
28	14
42	18

d. To entertain the crowd, a clown rode a tricycle in the race described by the equation $f(x)=20-x$. Without graphing or making a table, fully describe the clown's ride.