2.1 Henri and Emile's Race

Finding the Point of Intersection

In Ms. Chang's class, Emile found out that his walking rate is 2.5 meters per second. That is, Emile walks 2.5 meters every 1 second. When he gets home from school, he times his little brother Henri as Henri walks 100 meters. He figures out that Henri's walking rate is 1 meter per second. Henri walks 1 meter every second.

Problem 2.1

Henri challenges Emile to a walking race. Because Emile's walking rate is faster, Emile gives Henri a 45-meter head start. Emile knows his brother would enjoy winning the race, but he does not want to make the race so short that it is obvious his brother will win.

A How long should the race be so that Henri will win in a close race?

B Describe your strategy for finding your answer to Question A. Give evidence to support your answer.

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2.2 Crossing the Line

Using Tables, Graphs, and Equations

Your class may have found some very interesting strategies for solving Problem 2.1, such as:

- Making a table showing time and distance data for both brothers
- Graphing time and distance data for both brothers on the same set of axes
- Writing an equation for each brother representing the relationship between time and distance

How can each of these strategies be used to solve the Problem?

Problem 2.2

A For each brother in Problem 2.1:

1. Make a table showing the distance from the starting line at several different times during the first 40 seconds. How can the table be used to find the length of the race?
2. Graph the time and the distance from the starting line on the same set of axes. How can the graph be used to find the length of the race?
3. Write an equation representing the relationship between time and distance. Explain what information each variable and number represents.
4. How does the walking rate of each brother show up in the graph, the table, and the equation?

B

1. How far does Emile walk in 20 seconds?
2. After 20 seconds, how far apart are the brothers? How is this distance represented in the table and on the graph?
3. Is the point (26, 70) on either graph?
4. When will Emile overtake Henri? Explain.

C How can you determine which of two lines will be steeper from

1. a table of the data?
2. an equation?

D

1. At what points do Emile's and Henri's graphs cross the y-axis?
2. What information do these points represent in terms of the race?
3. How can these points be found in a table? In an equation?

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