1.2 Walking Rates and Linear Relationships

Tables, Graphs, and Equations

Think about the effect a walking rate has on the relationship between time walked and distance walked. This will provide some important clues about how to identify linear relationships from tables, graphs, and equations.

Problem 1.2

Here are the walking rates that Gilberto, Alana, and Leanne found in their experiment.

Name	Walking Rate
Alana	1 meter per second
Gilberto	2 meters per second
Leanne	2.5 meters per second

A

1. Make a table showing the distance walked by each student for the first ten seconds. How does the walking rate appear as a pattern in the table?
2. Graph the times and distances for the three students on the same coordinate axes. Use a different color for each student's data. How does the walking rate affect the graph?
3. Write an equation that gives the relationship between the time t and the distance d walked for each student. How is the walking rate represented in the equations?
4. How can you predict that the graph will be a straight line from the patterns in the table? In the equation? Explain.
5. Are any of these proportional relationships? If so, what is the constant of proportionality?

B For each student:

1. If time t increases by 1 second, by how much does the distance d change? How is this change represented in a table? In a graph?
2. If t increases by 5 seconds, by how much does d change? How is this change represented in a table? In a graph?
3. What is the walking rate per minute? The walking rate per hour?

Problem 1.2 continued

C Four other friends who are part of the walkathon made the following representations of their data. Could any of these relationships be linear relationships? Explain.

George's Walking Rate

Time (seconds)	Distance (meters)
0	0
1	2
2	9
3	11
4	20
5	25

Elizabeth's Walking Rate

Time (seconds)	Distance (meters)
0	0
2	3
4	6
6	9
8	12
10	15

Billie's Walking Rate

$D = 2.25t$

D represents distance
t represents time

Bob's Walking Rate

$t = \frac{100}{r}$

t represents time
r represents walking rate

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1.3 Raising Money
Using Linear Relationships

In *Variables and Patterns*, you looked at situations that involved *dependent* and *independent* variables. In Problem 1.2, the distance walked depended on the time. This tells you that distance is the **dependent variable** and time is the **independent variable**. In this Problem, you will look at relationships between two other variables in a walkathon.

Each participant in the walkathon must find sponsors to pledge a certain amount of money for each kilometer the participant walks.