Lesson 4: Identifying Proportional & Non-Proportional Relationships and Comparing Relationships in Tables

Classwork

Example: Which Team Will Win the Race?

You have decided to run in a long distance race. There are two teams that you can join. Team A runs at a constant rate of 2.5 miles per hour. Team B runs 4 miles the first hour and then 2 miles per hour after that.

Task: Create a table for each team showing the distances that would be run for times of 1, 2, 3, 4, 5 and 6 hours.

<table>
<thead>
<tr>
<th>Team A</th>
<th>Team B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (hrs)</td>
<td>Distance (miles)</td>
</tr>
<tr>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

a. For which team is distance proportional to time? Explain your reasoning.

Team A’s distance is proportional to its time because the unit rate is a constant 2.5 mph.

b. Explain how you know distance for the other team is not proportional to time.

Team B’s distance is not proportional to its time—no constant unit rate.

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c. If the race were 2.5 miles long, which team would win? Explain.

Team B 4mph > 2.5mph  Team A 2
So, Team B takes less time.

If the race were 3.5 miles long, which team would win? Explain.

Team B - same reason 4mph > 2.5mph

If the race were 4.5 miles long, which team would win? Explain.

Team A 4 = 2.5x
4.5 = 2.5x
2.5

Team B again 1 hr = 4 miles
T.9sh + .5miles
1.25h = 4.5 miles

Any distance greater than 10 miles (4 hours).

d. For what length race would it be better to be on Team B than Team A? Explain

1.8 hours = x

Any distance greater than 10 miles (4 hours).

e. Using this relationship, if the members on the team ran for 10 hours, how far would each member run on each team?

Team A  y = 2.5x
y = 2.5(10)
22 miles
(by using chart)

Team B 2.2 miles

f. Will there always be a winning team, no matter what the length of the course? Why or why not?

Yes if the race is not 4 hours 10 miles long.

g. If the race is 12 miles long, which team should you choose to be on if you wish to win? Why would you choose this team?

Team A after 10 miles Team A is running faster than Team B.

h. How much sooner would you finish on that team compared to the other team?

4.8 < 5 hours Team B (on chart) 5 hours