Investigation 2

Analyzing Graphs and Tables

In this investigation you will continue to use tables, graphs, and descriptions to compare information and make decisions. Using tables, graphs, and words to represent relationships is an important part of algebra.

Sidney, Celia, Liz, Malcolm, and Theo continue making plans for Ocean Bike Tours. Many of these plans involve questions about money.

How much will it cost to operate the tours?

How much should customers pay?

Will the company make a profit?

The five tour operators decide to do some research.

Getting Ready for Problem 2.1

- With your classmates, make a list of things the tour operators must provide for their customers. Estimate the cost of each item per customer.
- Estimate how much customers would be willing to pay for the three-day tour.
- Based on your estimates, will the partners earn a profit?

2.1 Renting Bicycles

The tour operators decide to rent bicycles for their customers. They get information from two bike shops.

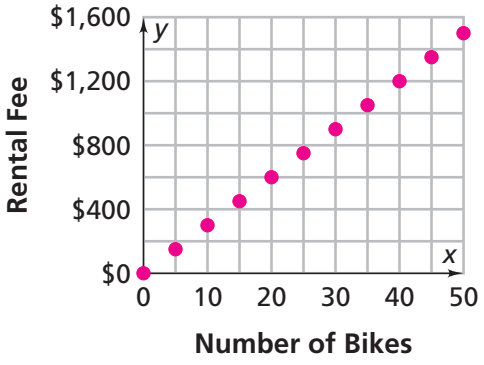
Rocky's Cycle Center sends a table of weekly rental fees for bikes.

Rocky's Weekly Rental Rates for Bikes

Number of Bikes	5	10	15	20	25	30	35	40	45	50
Rental Fee	$400	$535	$655	$770	$875	$975	$1,070	$1,140	$1,180	$1,200

Adrian's Bike Shop sends a graph of their weekly rental fees. Because the rental fee depends on the number of bikes, they put the number of bikes on the *x*-axis.

Adrian's Weekly Rental Rates for Bikes



Problem 2.1 Analyzing a Table and a Graph

A. Which bike shop should Ocean Bike Tours use? Explain.

B. Suppose you make a graph from the table for Rocky's Cycle Center. Would it make sense to connect the points? Explain.

C. How much do you think each company charges to rent 32 bikes?

D. 1. What patterns do you find in the table and in the graph?

2. Based on the patterns you found in part (1), how can you predict values that are not included in the table or graph?

E. 1. Describe a way to find the costs for renting any number of bikes from Adrian's Bike Shop.

2. Describe a way to find the costs for renting any number of bikes from Rocky's Cycle Center.

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2.2 Finding Customers

The tour operators plan a route and choose a bike shop. Now they must figure out what price to charge so they can attract customers and make a profit.

To help set a price, they conduct a survey. They ask 100 people who have taken other bicycle tours which of the following amounts they would pay for the Ocean Bike Tour: $150, $200, $250, $300, $350, $400, $450, $500, $550, or $600. The results are shown in the table below.

Problem 2.2 Making and Analyzing a Graph

A. To make a graph of these data, which variable would you put on the x-axis? Which variable would you put on the y-axis? Explain.

B. Make a coordinate graph of the data on grid paper.

C. Based on your graph, what price do you think the tour operators should charge? Explain.

D. **1.** The number of people who say they would take the tour depends on the price. How does the number of potential customers change as the price increases?

2. How is the change in the number of potential customers shown in the table? How is the change shown on the graph?

3. Describe a way to find the number of potential customers for a price between two prices in the table. For example, how can you predict the number of customers for a price of $425?

Price Customers Would Pay

Total Price	Number of Customers
$150	76
$200	74
$250	71
$300	65
$350	59
$400	49
$450	38
$500	26
$550	14
$600	0

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2.3 What's the Story?

It's important to be good at reading the "story" in a graph. Remember that the *y*-axis, or vertical axis, of a graph usually represents the *dependent variable*, and the *x*-axis, or horizontal axis, represents the *independent variable*. Here are some questions to ask when you look at a graph.

What are the variables represented by the graph?

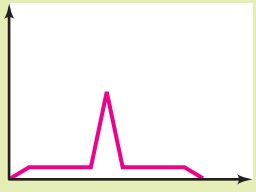
Do the values of one variable seem to depend on the values of the other? In other words, do changes in one variable seem to be the result of changes in the other?

What does the shape of the graph say about the relationship between the variables?

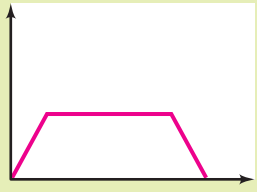
Getting Ready for Problem 2.3

The number of cars in a school parking lot changes as time passes during a school day. These graphs show two possibilities for the way the number of cars might change over time.

Graph 1



Graph 2



- Describe the "story" each graph tells about the school parking lot. Which graph shows the pattern you expect?
- How could you label the graph you chose so that someone else would know what it represents?

Problem 2.3 Interpreting Graphs

Questions A–G describe pairs of related variables. For each pair,

- Decide which variable is the dependent variable and which is the independent variable.
- Find a graph that tells a reasonable "story" about how the variables might be related. If no graph tells a reasonable story, sketch your own.
- Explain what the graph tells about the relationship of the variables.
- Give the graph a title.

A. The *number of students* who go on a school trip is related to the *price of the trip* for each student.

B. When a skateboard rider goes down one side of a half-pipe ramp and up the other side, her *speed* changes as *time* passes.

C. The *water level* changes over *time* when someone fills a tub, takes a bath, and empties the tub.

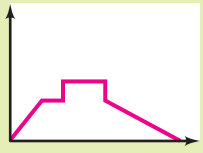
D. The *waiting time* for a popular ride at an amusement park is related to the *number of people in the park*.

E. The *number of hours of daylight* changes over *time* as the seasons change.

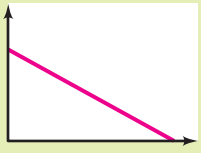
F. *Weekly attendance* at a popular movie changes as *time* passes from the date the movie first appears in theaters.

G. The *number of customers* at an amusement park with water slides is related to the *predicted high temperature* for the day.

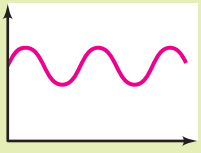
Graph 1



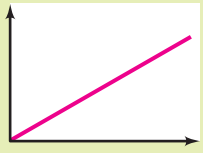
Graph 2



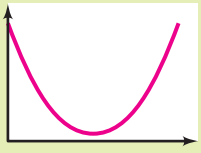
Graph 3



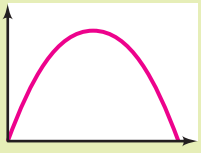
Graph 4



Graph 5



Graph 6



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