Assignment

Write

Explain how the following terms are related: linear relationship, proportional relationship, equivalent ratios, and direct variation.

Remember

For a graph to represent a proportional relationship, the points of the graph must form a straight line and pass through the origin of the graph.

For a table of values to represent a proportional relationship, all the ratios of corresponding *x*- and *y*-values must be constant.

Practice

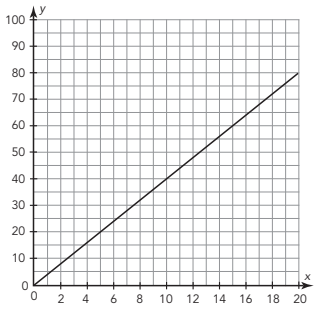
1. Analyze each table shown. Determine if the relationship is proportional. If the relationship is proportional, state the constant ratio for the relationship.
   a. Of the 75 boys in the 7th grade class, 25 participate in at least one sport. Of the 120 girls in the 7th grade class, 30 participate in at least one sport.
   b. Of the 210 boys in the 8th grade, 190 have a cell phone. Of the 168 girls in the 8th grade, 152 have a cell phone.

7th Grade Class	Plays Sports	Total
Boys	25	75
Girls	30	120

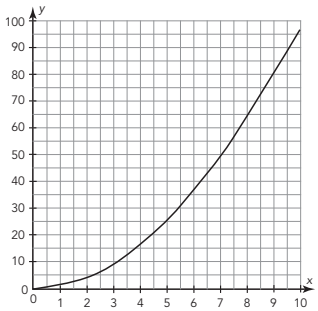
8th Grade Class	Cell Phones	Total
Boys	190	210
Girls	152	168

2. Match each graph with its scenario. Then state if the scenario represents a linear relationship. If it represents a linear relationship, state if it represents a proportional relationship.
   a. Vanessa and Michelle must decide how to divide 16 marbles among themselves.
   b. The perimeter of a square is 4 times the length of one side of the square.
   c. The area of a square is calculated by squaring the length of one side of the square.
   d. When Tara, a nurse, works on Saturdays, she is paid a $30 bonus plus $40 per hour worked.

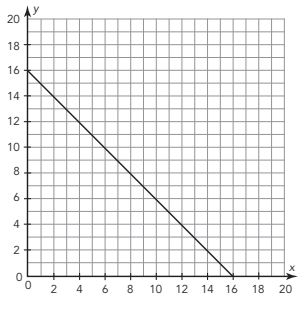
Graph A



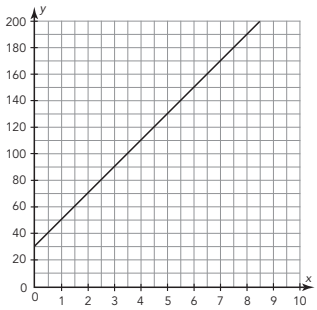
Graph B



Graph C



Graph D



3. In 2010, Chevrolet produced 12,194 Corvettes. That means they made about 34 Corvettes per day.
   a. Create a table to show the number of Corvettes made in at least 5 different numbers of days.
   b. Use the table to determine if this situation represents a proportional relationship.
   c. Use the data in the table to create a graph of the total number of Corvettes produced over time.
   d. Does the number of Corvettes vary directly with the number of days? Explain using the graph.

Stretch

Another way to classify varying quantities is as an inverse variation, or inversely proportional. The tables shown represent inverse variations. Study the tables of values and make a conjecture about the relationship between the quantities that illustrate inverse variation.

Number of Hours	Number of People
2	6
3	4
$\frac{1}{12}$	144

Width of Rectangle	Length of Rectangle
2	18
12	3
0.5	72

Review

Use proportions to solve each.

1. In the town of Clover, 3 out of 5 citizens who are eligible to vote did so in the fall election.
   a. Determine the number of citizens that voted in the fall election if 400 citizens were eligible.
   b. Determine the number of citizens that were eligible to vote in the fall election if 180 actually voted.
2. The student council at Camp Creek Middle School determines that 3 out of 4 students prefer that all school assemblies be held on Friday afternoon.
   a. If 200 students are surveyed, how many will prefer that school assemblies be held on Friday afternoon?
   b. If 747 students prefer the school assemblies be held on Friday afternoon, how many students were surveyed?

Write a unit rate to represent the relationship between the given quantities. Round to the nearest hundredth, if necessary.

3. 2.5 liters $\approx$ 0.66 gallon
4. 430.6 centimeters $\approx$ 169.5 inches

Determine each quotient.

5. $67.36 \div 3.2$
6. $3401.74 \div 7.9$