Use the four-step plan to solve each problem.

1. Ryan’s living room is 10 feet wide, 12 feet long, and 10 feet high. If one gallon of paint covers 400 square feet of surface area, how many gallons of paint would Ryan need to paint all four walls and the ceiling?

2. Nolan is selling coupon books to raise money for a class trip. The cost of the trip is $400, and the profit from each coupon book is $15. How many coupon books does Nolan need to sell to earn enough money to go on the class trip?

3. Cangialosi’s Café made a $6,000 profit during January. Mr. Cangialosi expects profits to increase $500 per month. In what month can Mr. Cangialosi expect his profit to be $\frac{1}{3}$ greater than his January profit?

4. **TEST PRACTICE** A comic book store took in $2,700 in sales of first editions during November. December sales of first editions are expected to be double that amount. If the first editions are sold for $75 each, how many first editions are expected to be sold in December?

   A. 18  B. 36  C. 38  D. 72
ANSWERS
1. 2 gallons
2. May
3. 27 coupon books
4. D
VOCABULARY

- **Coordinate Plane** – A plane in which a horizontal number line and a vertical number line intersect at their zero points. Also called a coordinate grid.

- **Quadrants** – One of the four regions into which the two perpendicular number lines of the coordinate plane separate the plane.
VOCABULARY

- Ordered Pair – A pair of numbers used to locate a point in the coordinate plane. An ordered pair is written in the form. \((x\text{-coordinate, y-coordinate})\)

- X-coordinate – The first number of an ordered pair. It corresponds to a number on the x-axis.

- Y-coordinate – The second number of an ordered pair. It corresponds to a number on the y-axis.
VOCABULARY

- **Y-axis** – The vertical number line in a coordinate plane.

- **X-axis** – The horizontal number line in a coordinate plane.

- **Origin** – The point at which the x-axis and the y-axis intersect in a coordinate plane. The origin is at (0,0).
1. The slowest mammal on Earth is the tree sloth. It moves at a speed of 6 feet per minute. Determine whether the number of feet the sloth moves is proportional to the number of minutes it moves by graphing on the coordinate plane. Explain your reasoning.

**Step 1** Make a table to find the number of feet walked for 0, 1, 2, 3, and 4 minutes.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance (ft)</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
</tr>
</tbody>
</table>

**Step 2** Graph the ordered pairs (time, distance) on the coordinate plane. Then connect the ordered pairs.

The line passes through the origin and is a straight line. So, the number of feet traveled is proportional to the number of minutes.
2. The cost of renting video games from Games Inc. is shown in the table. Determine whether the cost is proportional to the number of games rented by graphing on the coordinate plane. Explain your reasoning.

<table>
<thead>
<tr>
<th>Number of Games</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

**Step 1** Write the two quantities as ordered pairs (number of games, cost).

1. The ordered pairs are (1, 3), (2, 5), (3, 7), and (4, 9).
3. **Step 2**
Graph the ordered pairs on the coordinate plane. Then connect the ordered pairs and extend the line to the $y$-axis.

4. The line does not pass through the origin. So, the cost of the video games is not proportional to the number of games rented.

5. **Check**
The ratios are not constant. $\frac{1}{3} \neq \frac{2}{5}$ ✓
PRACTICE PROBLEMS

1. A hot air balloon is at 140 feet and descends 20 feet per minute. Determine whether the height of the hot air balloon is proportional to the number of minutes. Explain your reasoning.

2. The table shows the number of seconds and the number of times a ride at an amusement park rotates. Determine whether the number of rotations is proportional to the number of seconds by graphing on the coordinate plane. Explain your reasoning.

<table>
<thead>
<tr>
<th>Number of Seconds</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Rotations</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>
1. The height of the hot air balloon is not proportional to the number of minutes because the graph does not pass through the origin.
2. The number of rotations is not proportional to the number of seconds because the graph is not a straight line.
3. Which batting cage represents a proportional relationship between the number of pitches thrown and the cost? Explain.

The graph for Softball Plus is a straight line, but it does not pass through the origin. So, the relationship is not proportional.

The graph for the Fun Center is a straight line through the origin. So, the relationship between the number of the pitches thrown and the cost is proportional.
Which person represents a proportional relationship between the time and the number of levels passed? Explain.
ANSWER TO PRACTICE PROBLEM

**Answer:** Morgan’s; The graph is a straight line through the origin.
Describe how you can tell whether a relationship between two quantities is proportional.
HOMEWORK

- Pages 49 – 52
- # 1 - 8 all and #13 - 19 all