

Introduction to Proportional and Nonproportional Relationships

Lesson 5 - pages 45 - 48

Vocabulary Start-Up



Maps have grids to locate cities. The **coordinate plane** is a type of grid that is formed when two number lines intersect at their zero points. The number lines separate the coordinate plane into four regions called **quadrants**.

An **ordered pair** is a pair of numbers, such as $(1, 2)$, used to locate or graph points on the coordinate plane.

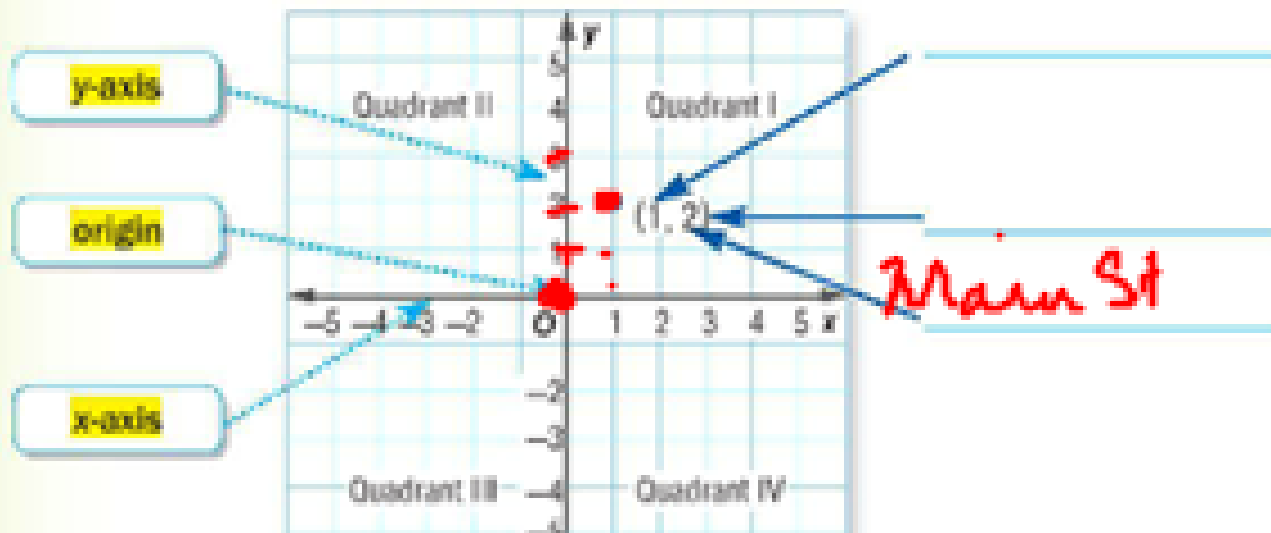
The **x-coordinate** corresponds to a number on the x-axis.

$(1, 2)$

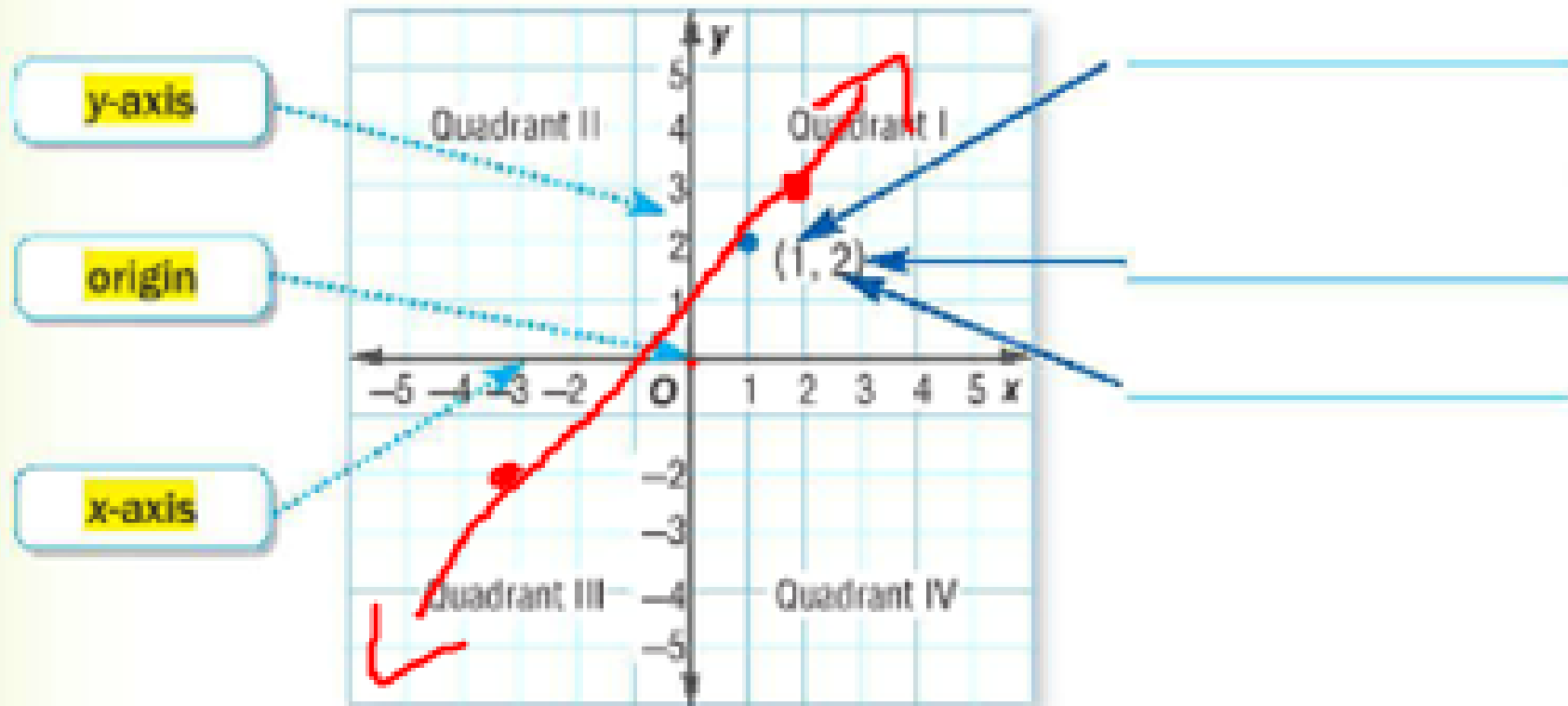
The **y-coordinate** corresponds to a number on the y-axis.

Label the coordinate plane with the terms **ordered pair**, **x-coordinate**, and **y-coordinate**.

Center



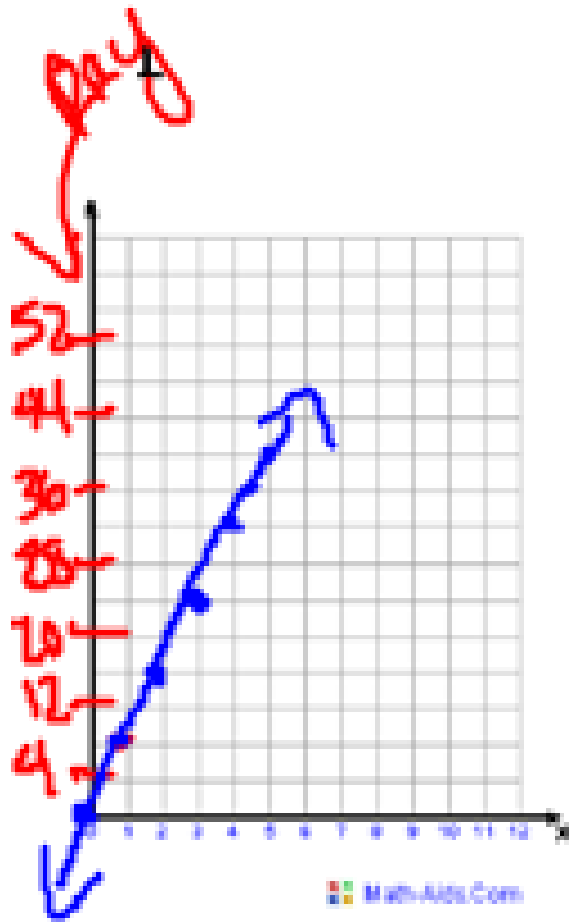
Page 45



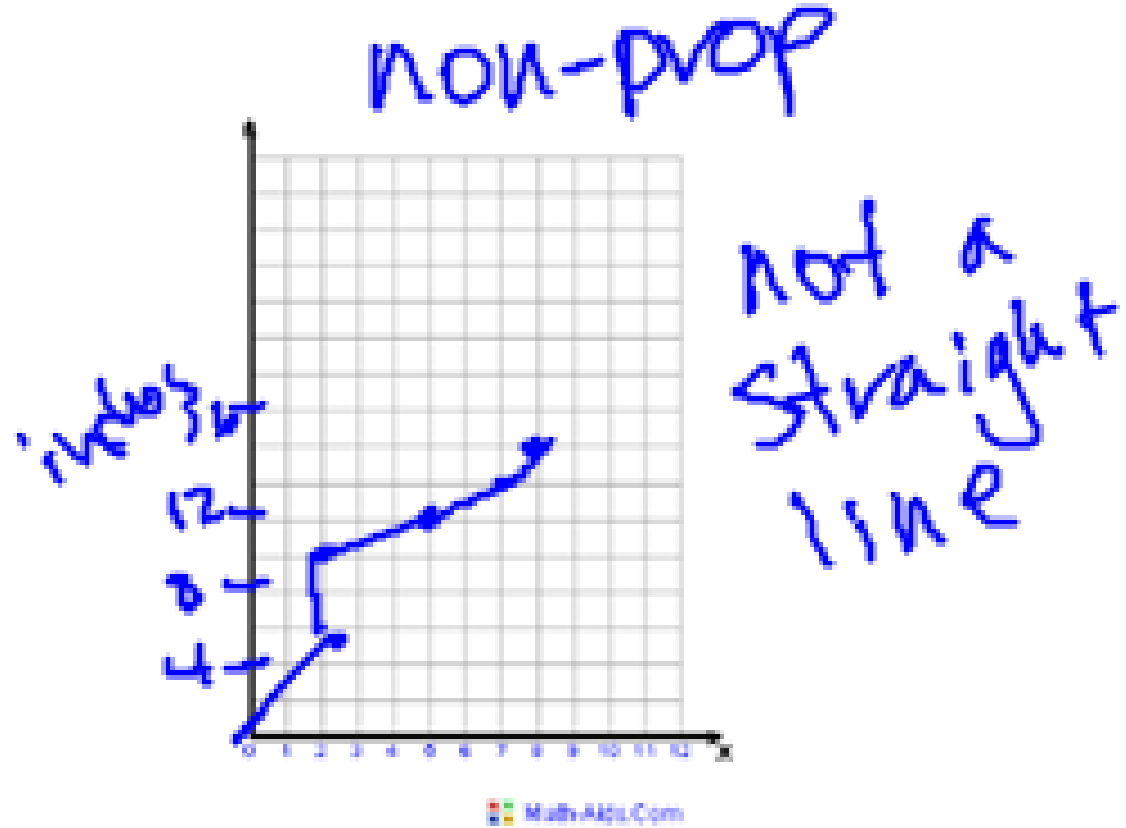
Graph points $(2, 3)$ and $(-3, -2)$ above. Connect the three points on the coordinate plane. Describe the graph.

On the graphs below, plot the values from the five tables on the Identifying Proportional and Nonproportional Relationships worksheet. Make sure to label the x-axis and the y-axis. Write appropriate numbers for the scale on the y - axes.

2.



hrs



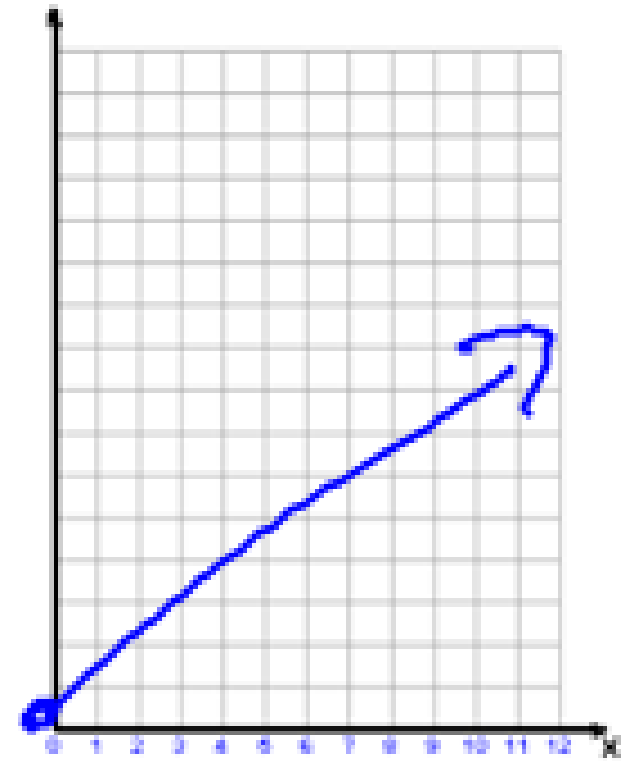
time
~~can~~
 hrs

3.



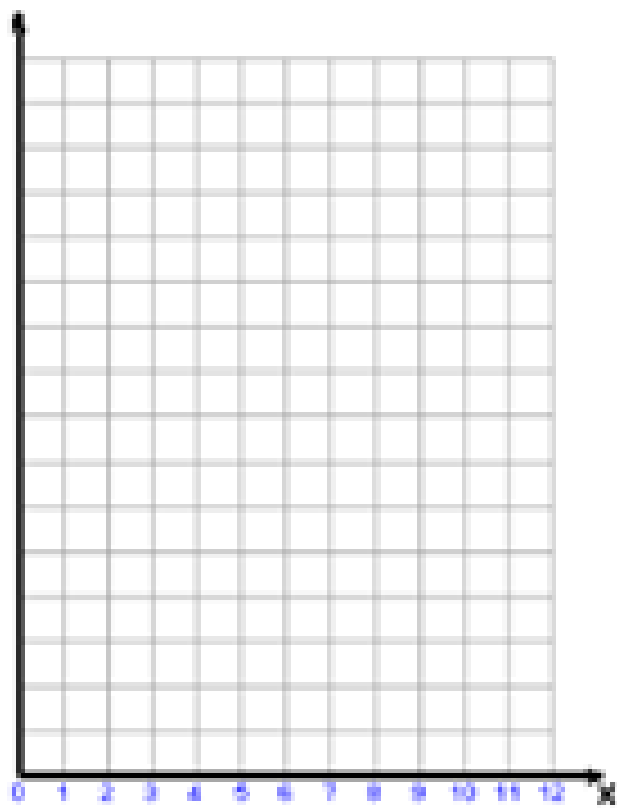
gallons
Straight - goes
thru $(0,0)$

4a)



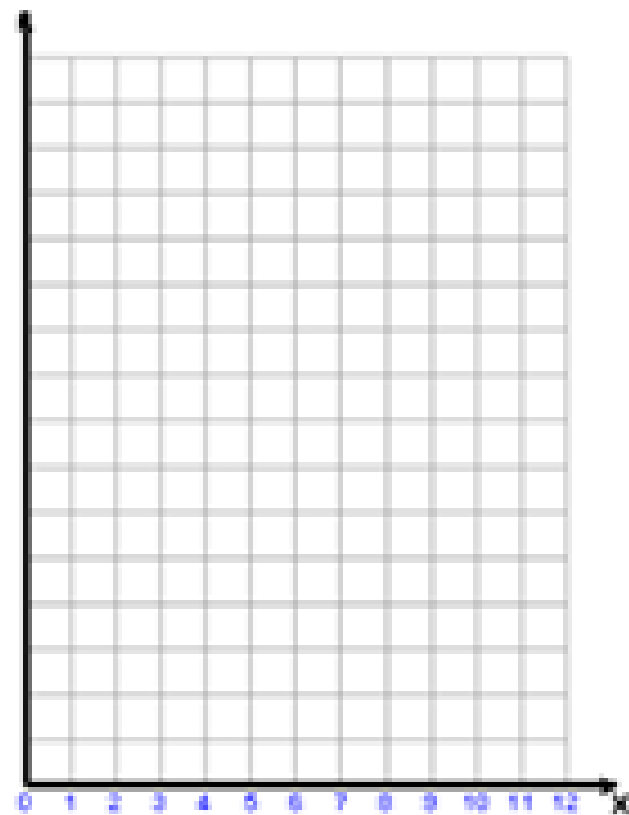
prop.

4b)



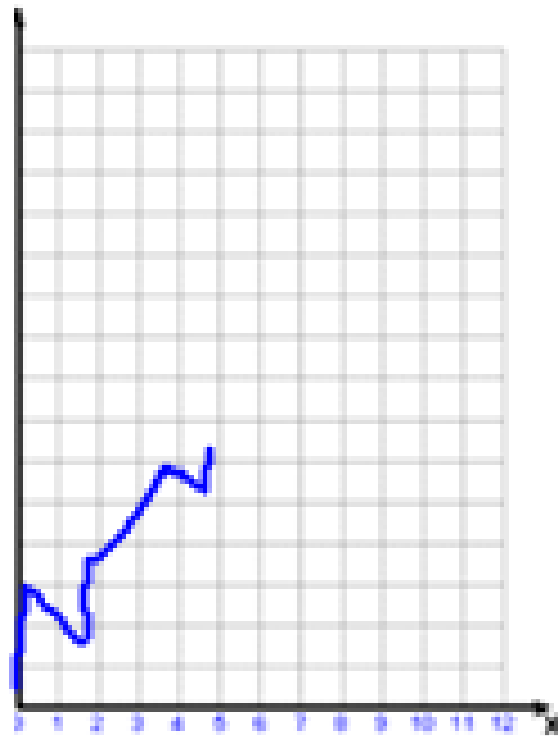
 Math-Aids.Com

4c)



 Math-Aids.Com

5.



Math-Aids.Com

Now that you have graphed all of the tables from the worksheet, answer the following questions. Compare the look of each graph to all of the other graphs.

Do you see any similarities in the graphs? What do you see that's different in the graphs?

The graphs that go through $(0,0)$ are proportional
if they are lines



Example



- 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.

| Video Game Rental Rates | |
|-------------------------|-----------|
| Number of Games | Cost (\$) |
| 1 | 3 |
| 2 | 5 |
| 3 | 7 |
| 4 | 9 |

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

The ordered pairs are (1, 3), (2, 5), (3, 7), and (4, 9).

$$\frac{3}{1} = 3$$

$$\frac{5}{2} = 2.5$$

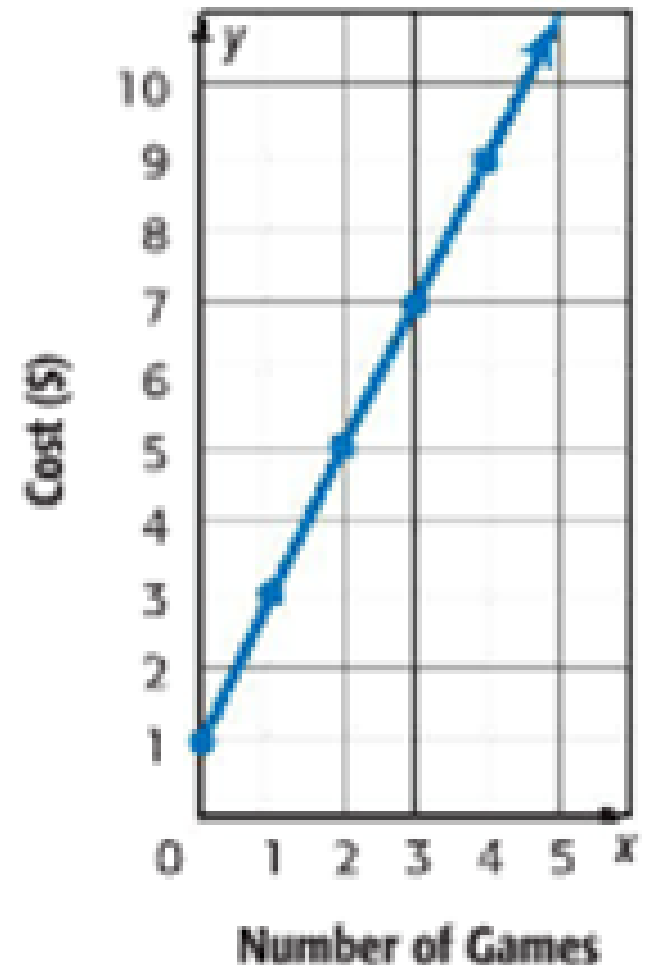
so, not proportional

Page 47

Step 2 Graph the ordered pairs on the coordinate plane. Then connect the ordered pairs and extend the line to the y -axis.

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

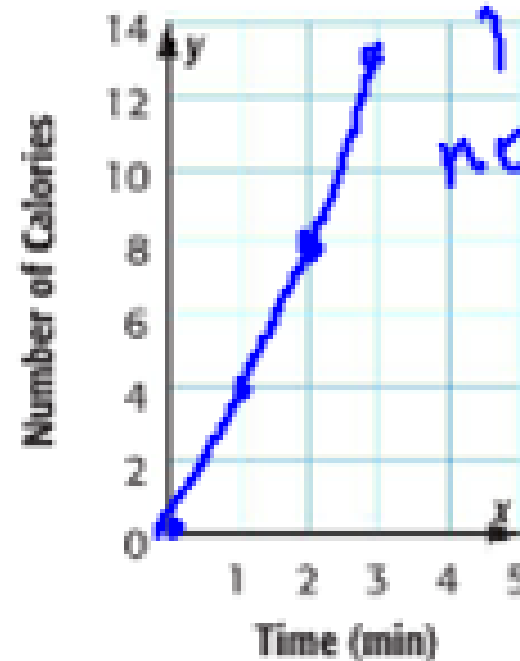
Check The ratios are not constant. $\frac{1}{3} \neq \frac{2}{5}$ ✓



Got It? Do this problem to find out.

- b. The table shows the number of Calories an athlete burned per minute of exercise. Determine whether the number of Calories burned is proportional to the number of minutes by graphing on the coordinate plane. Explain your reasoning in the Work Zone.

| Calories Burned | |
|-------------------|--------------------|
| Number of Minutes | Number of Calories |
| 0 | 0 |
| 1 | 4 |
| 2 | 8 |
| 3 | 13 |



not a straight line, so non-prop





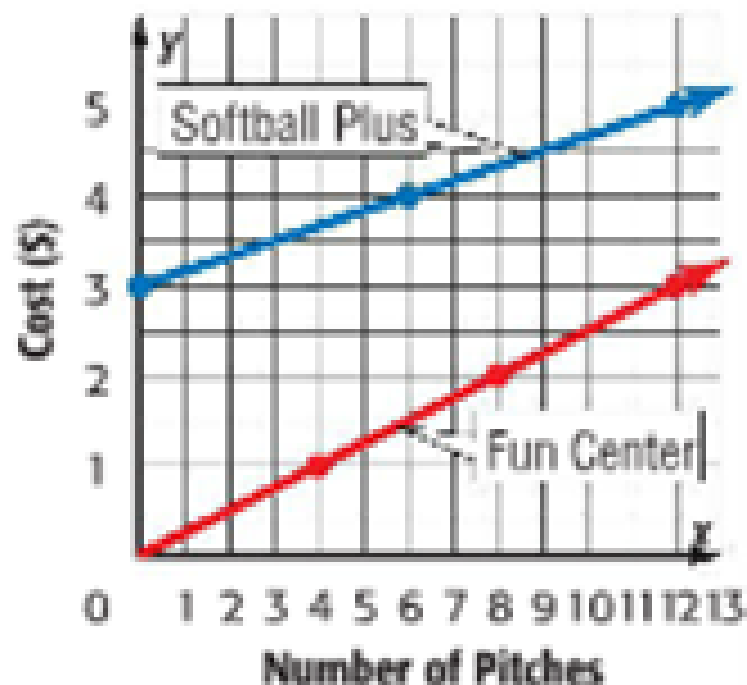
Example



- 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.

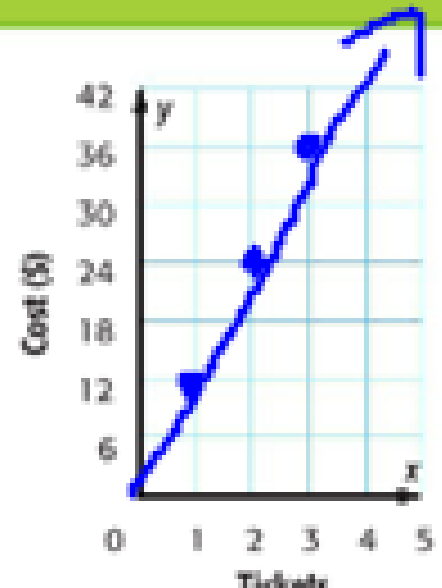


Guided Practice

1. The cost of 3-D movie tickets is \$12 for 1 ticket, \$24 for 2 tickets, and \$36 for 3 tickets. Determine whether the cost is proportional to the number of tickets by graphing on the coordinate plane. Explain your reasoning. (Examples 1 and 2)

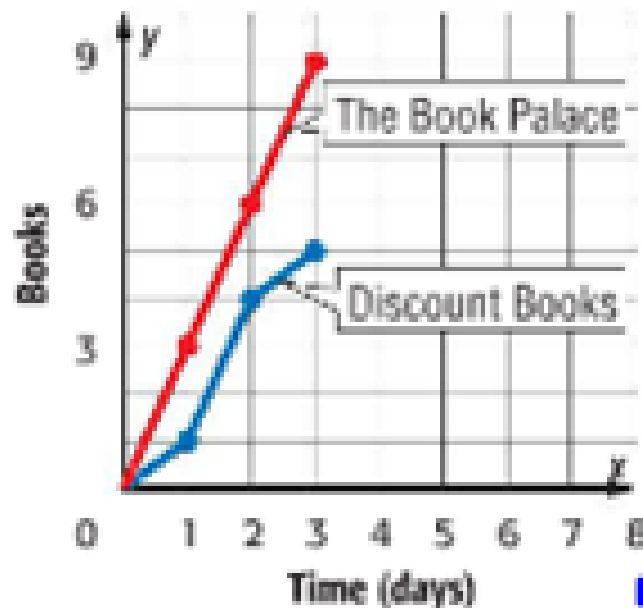
yes, it's proportional
\$12/ticket, \$0 for 0 tickets

2. The number of books two stores sell after 1, 2, and 3 days




Page 48

2. The number of books two stores sell after 1, 2, and 3 days is shown. Which book sale represents a proportional relationship between time and books? Explain. (Example 3)



Book Palace - yes
straight line
through $(0,0)$
Discount Books
no - time isn't
straight, even though
it goes through $(0,0)$

3.  **Building on the Essential Question** How does graphing relationships help you determine whether the relationship is proportional or not?

you can see if it's a line that goes through $(0,0)$