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## Unit 2, Lesson 12: Using Graphs to Compare Relationships

Let's graph more than one relationship on the same grid.

### 12.1: Number Talk: Fraction Multiplication and Division

Find each product or quotient mentally.

$$\frac{2}{3} \cdot \frac{1}{2}$$

$$\frac{4}{3} \cdot \frac{1}{4}$$

$$4 \div \frac{1}{5}$$

$$\frac{9}{6} \div \frac{1}{2}$$

### 12.2: Race to the Bumper Cars

[m.openup.org/1/7-2-12-2](https://m.openup.org/1/7-2-12-2)

Diego, Lin, and Mai went from the ticket booth to the bumper cars.



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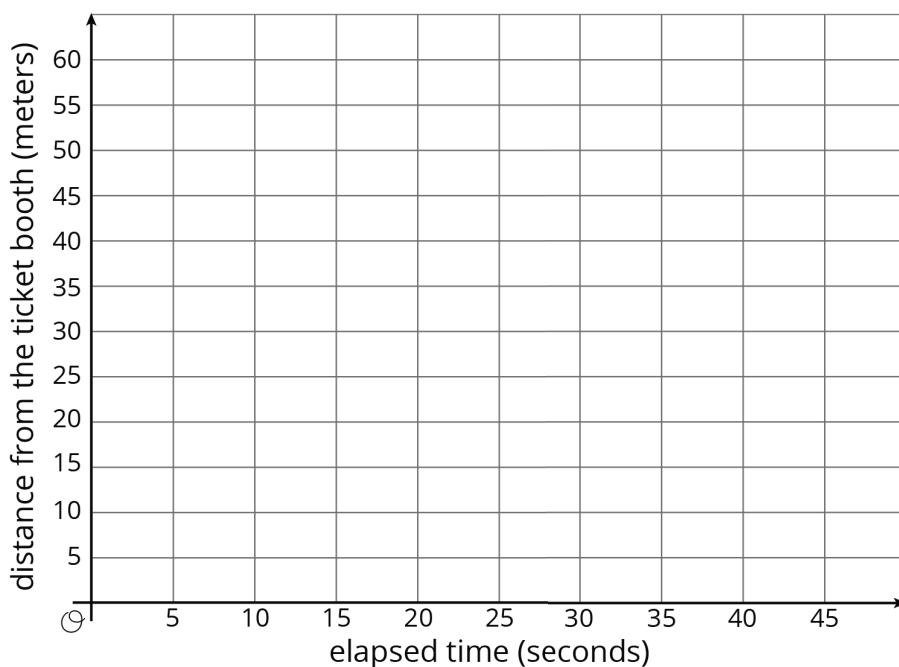
1. Use each description to complete the table representing that person's journey.
  - a. Diego left the ticket booth at the same time as Tyler. Diego jogged ahead at a steady pace and reached the bumper cars in 30 seconds.
  - b. Lin left the ticket booth at the same time as Tyler. She ran at a steady pace and arrived at the bumper cars in 20 seconds.
  - c. Mai left the booth 10 seconds later than Tyler. Her steady jog enabled her to catch up with Tyler just as he arrived at the bumper cars.

| Diego's time (seconds) | Diego's distance (meters) |
|------------------------|---------------------------|
| 0                      |                           |
| 15                     |                           |
| 30                     | 50                        |
| 1                      |                           |

| Lin's time (seconds) | Lin's distance (meters) |
|----------------------|-------------------------|
|                      | 0                       |
|                      | 25                      |
| 20                   | 50                      |
| 1                    |                         |

| Mai's time (seconds) | Mai's distance (meters) |
|----------------------|-------------------------|
|                      | 0                       |
|                      | 25                      |
| 40                   | 50                      |
| 1                    |                         |

2. Using a different color for each person, draw a graph of all four people's journeys (including Tyler's from the other day).



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3. Which person is moving the most quickly? How is that reflected in the graph?

### Are you ready for more?

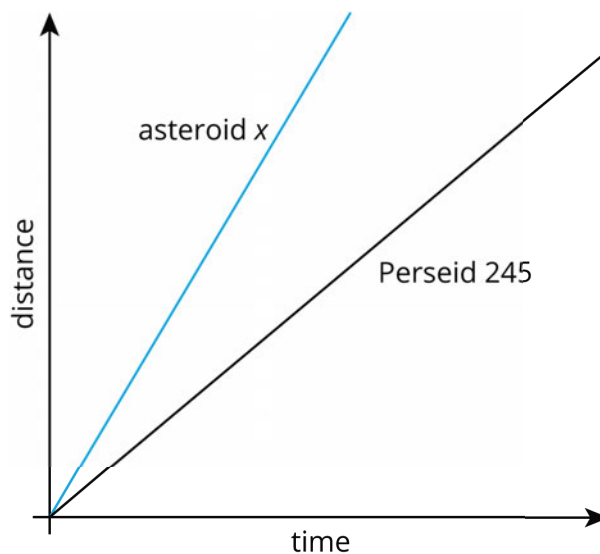
Write equations to represent each person's relationship between time and distance.

## 12.3: Space Rocks and the Price of Rope

[m.openup.org/1/7-2-12-3](https://m.openup.org/1/7-2-12-3)



1. Meteoroid Perseid 245 and Asteroid x travel through the solar system. The graph shows the distance each traveled after a given point in time.



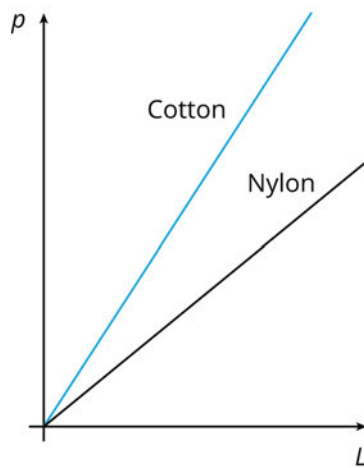
Is Asteroid x traveling faster or slower than Perseid 245? Explain how you know.

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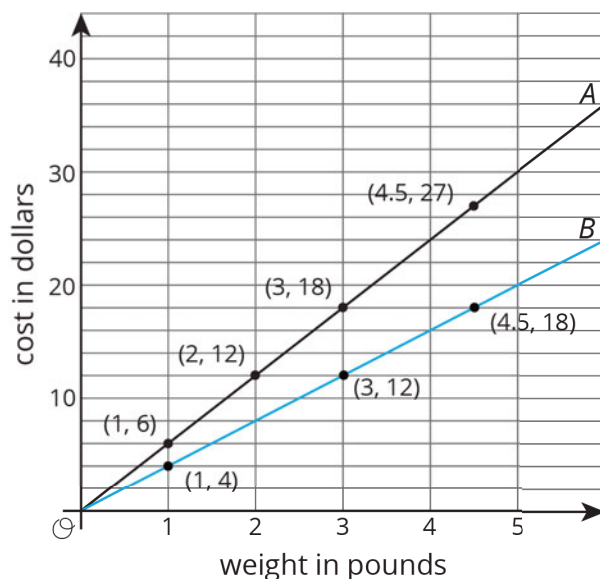
2. The graph shows the price,  $p$ , of different lengths,  $L$ , of two types of rope.



If you buy \$1.00 of each kind of rope, which one will be longer? Explain how you know.

### Lesson 12 Summary

Here is a graph that shows the price of blueberries at two different stores. Which store has a better price?



We can compare points that have the same  $x$  value or the same  $y$  value. For example, the points (2, 12) and (3, 12) tell us that at store B you can get more pounds of blueberries for the same price.

The points (3, 12) and (3, 18) tell us that at store A you have to pay more for the same quantity of blueberries. This means store B has the better price.

We can also use the graphs to compare the constants of proportionality. The line representing store B goes through the point (1, 4), so the constant of proportionality is 4. This tells us that at store B the blueberries cost \$4 per pound. This is cheaper than the \$6 per pound unit price at store A.

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# Unit 2, Lesson 12: Using Graphs to Compare Relationships

1. Match each equation to its graph.

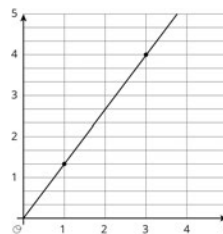
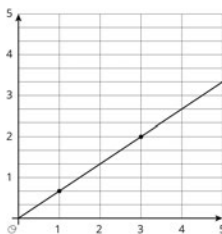
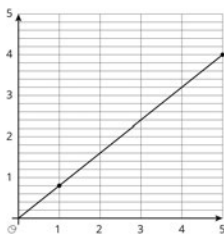
A.  $y = 2x$

1

2

3

B.  $y = \frac{4}{5}x$



C.  $y = \frac{1}{4}x$

D.  $y = \frac{2}{3}x$

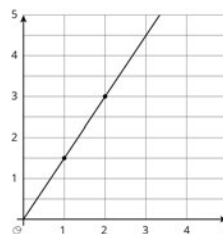
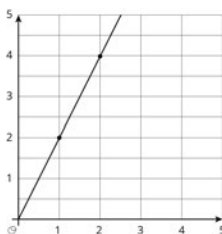
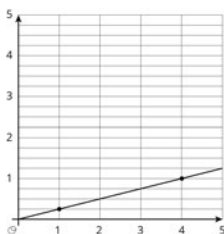
E.  $y = \frac{4}{3}x$

F.  $y = \frac{3}{2}x$

4

5

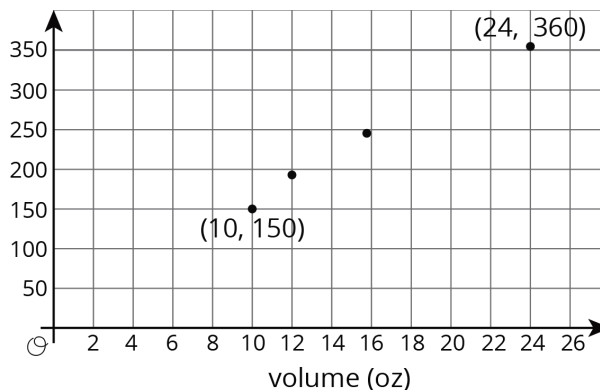
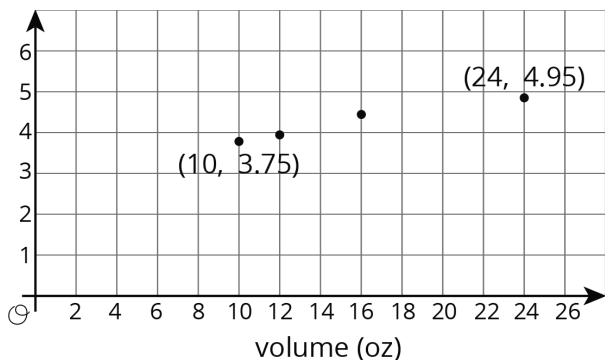
6



2. The graphs below show some data from a coffee shop menu. One of the graphs shows cost (in dollars) vs. drink volume (in ounces), and one of the graphs shows calories vs. drink volume (in ounces).

\_\_\_\_\_ vs volume

\_\_\_\_\_ vs volume



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- a. Which graph is which? Give them the correct titles.
  - b. Which quantities appear to be in a proportional relationship? Explain how you know.
  - c. For the proportional relationship, find the constant of proportionality. What does that number mean?
3. Lin and Andre biked home from school at a steady pace. Lin biked 1.5 km and it took her 5 minutes. Andre biked 2 km and it took him 8 minutes.
- a. Draw a graph with two lines that represent the bike rides of Lin and Andre.
  - b. For each line, highlight the point with coordinates  $(1, k)$  and find  $k$ .
  - c. Who was biking faster?