

Problem 1

At a factory, a machine fills jars with salsa. The manager of the factory is considering buying a new machine that will fill 78 jars of salsa every 3 minutes. To support his decision, he wants to compare the rate of the new machine to the rate of the old machine that is currently in the factory.

The graph to the right shows the number of jars of salsa filled over time with the old machine.

The manager is about to fill an order of 765 jars of salsa. How long would it take to fill this order on each machine? Should the manager consider replacing the old machine with the new one? Explain.



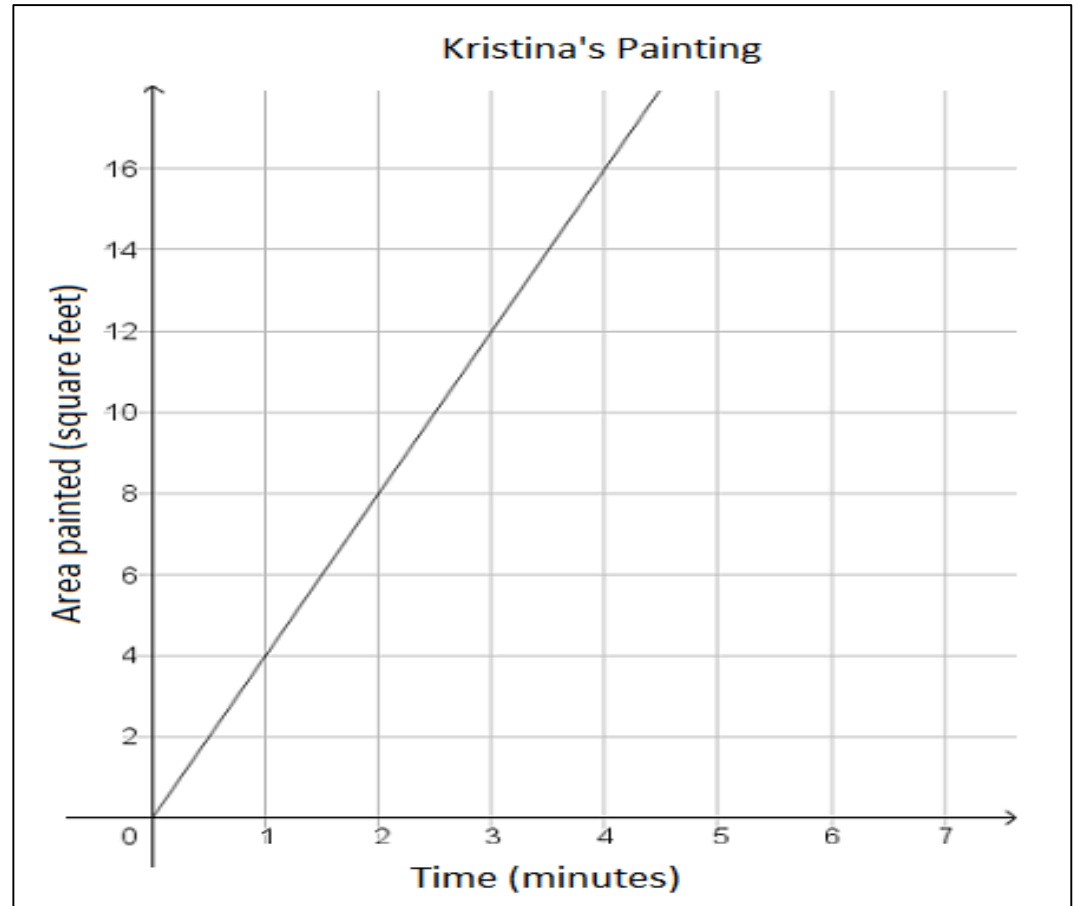
Guiding Questions

- For each machine, is the number of jars filled proportional to the amount of time?
- What is the unit rate for the new machine?
- What is the slope of the line that represents the old machine? What does that tell you about the unit rate?
- If you were to graph a line that represented the jars filled on the new machine over time, would it be steeper or less steep than the old machine?

Problem 2

Kristina and her sister, Tracee, are painting rooms in their house. The graph to the right represents the rate at which Kristina paints, and the table below shows how many square feet Tracee painted for given amounts of time. Both sisters paint at a constant pace. Who paints at the faster rate? Justify your answer.

Area painted (square feet)	Time (minutes)
18.75	5
30	8
45	12
75	20



Guiding Questions

- For each sister, is the square area painted proportional to the amount of time?
- What is the unit rate for each sister?
- What equation represents the square area painted by each sister over time?
- What is the slope of the line that represents Kristina's painting? What does that tell you about the unit rate?

Problem 3

The corner market sells rice by the pound using the equation $y=1.25x$, where y represents the total cost for x number of pounds.

The local grocery store also sells rice by the pound. The relationship between cost and weight at the grocery store is shown in the graph to the right.

Which store offers a better deal on rice?
Explain your answer.



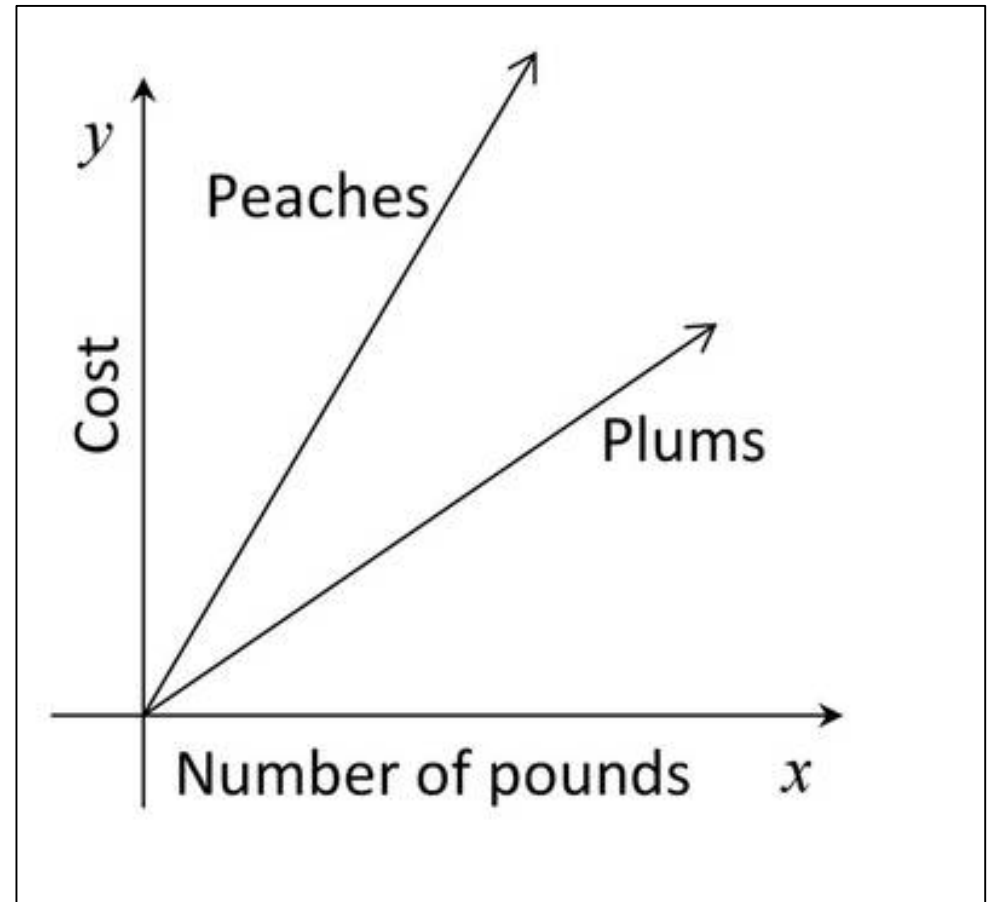
Guiding Questions

- Explain what the equation $y=1.25x$ tells you about rice at the corner market.
- If you were to graph the relationship of cost and weight of rice at the corner market, how would the graph compare to the graph at the grocery store? How would the slopes of the lines compare?
- What is the slope of the graph for the grocery store? What is the cost of rice per pound at the grocery store?

Problem 4

The graphs below show the cost y of buying x pounds of fruit. One graph shows the cost of buying x pounds of peaches, and the other shows the cost of buying x pounds of plums.

1. Which kind of fruit costs more per pound? Explain.
2. Bananas cost less per pound than peaches or plums. Draw a line alongside the other graphs that might represent the cost, y , of buying x pounds of bananas.



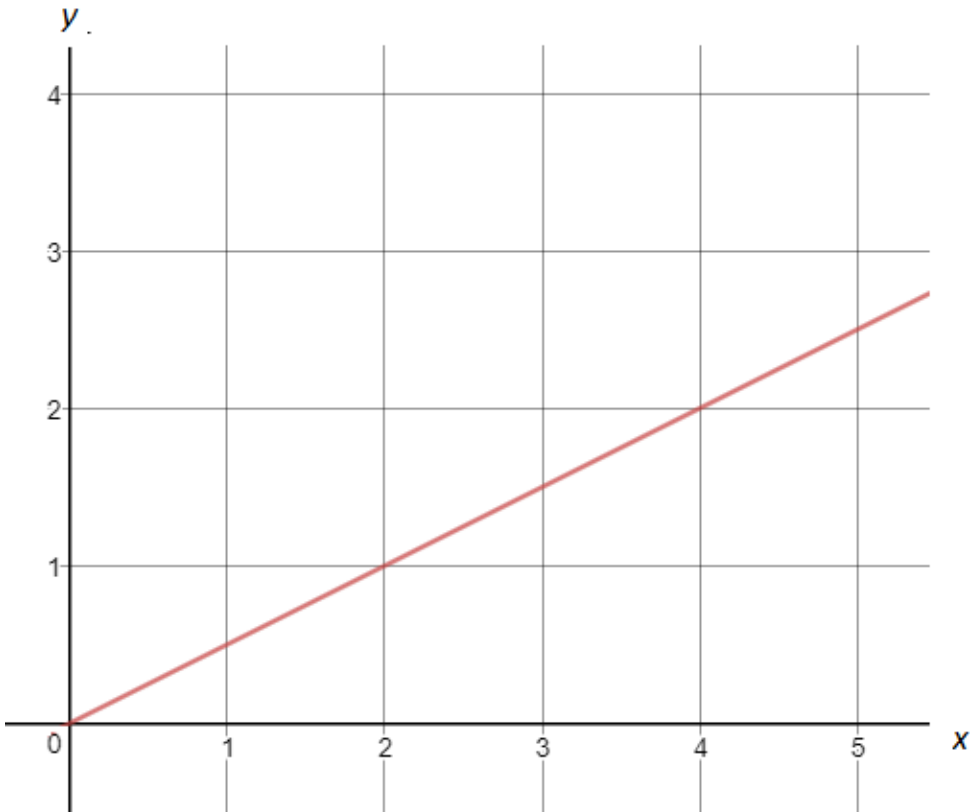
Guiding Questions

- What do you notice about the graph? What do you wonder?
- If you bought the same number of pounds of each fruit, which one would cost more?
- If you paid the same amount for each fruit, which fruit did you get more of?
- How does the slope of the line help you understand the cost per pound?
- Describe the cost per pound of a fruit whose line was drawn in between peaches and plums.

Problem 5

Four representations are shown below. Three of the four representations match. Which one does not belong? Explain your reasoning.

Graph:



Equation:

$$y=2x$$

Description:

A caterpillar moves at a constant speed of $\frac{1}{2}$ inch per second. Let x represent the time in seconds and y represent the distance traveled in inches.

Table:

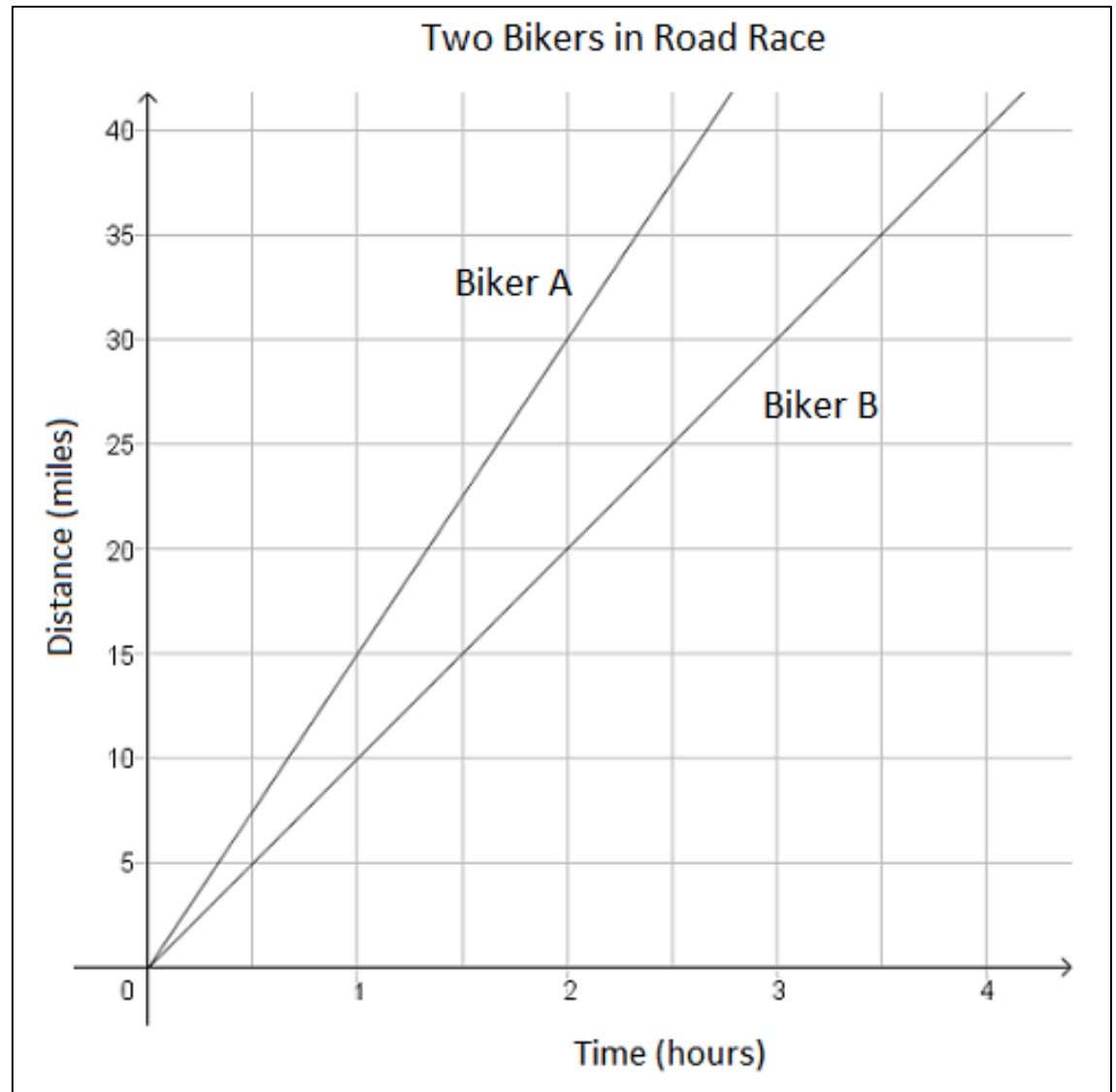
x	2	4	6	8
y	1	2	3	4

Problem 6

The graph below shows the relationship between the distance biked and the time spent biking for two different bikers in a road race.

Which of the following accurately compares the speed of the two bikers?

1. Biker A is going faster than Biker B by 5 miles per hour.
2. Biker A is going slower than Biker B by 5 miles per hour.
3. Biker A is going faster than Biker B by 10 miles per hour.
4. Biker A is going slower than Biker B by 10 miles per hour.

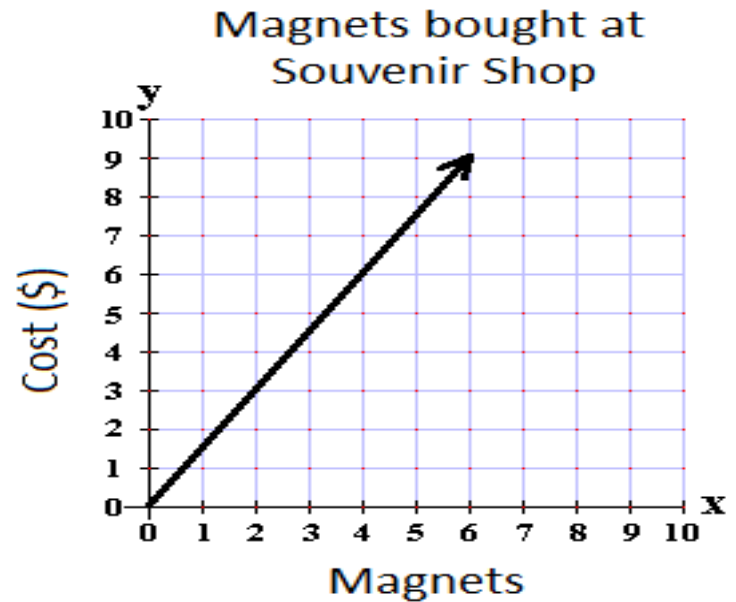


Guiding Questions

- What do you notice about the two lines in the graph? What do you wonder?
- How does the slope of each line help you understand the speed of each biker?
- Who is going faster? Why? How can you see this in the graph?

Problem 7

A souvenir shop sells magnets, 2 for \$3. The graph on the right shows the proportional relationship.

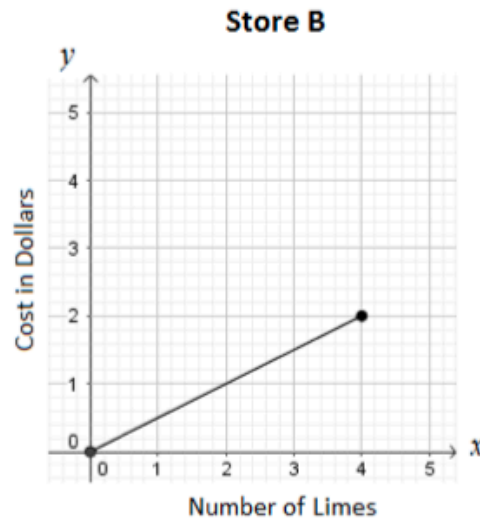
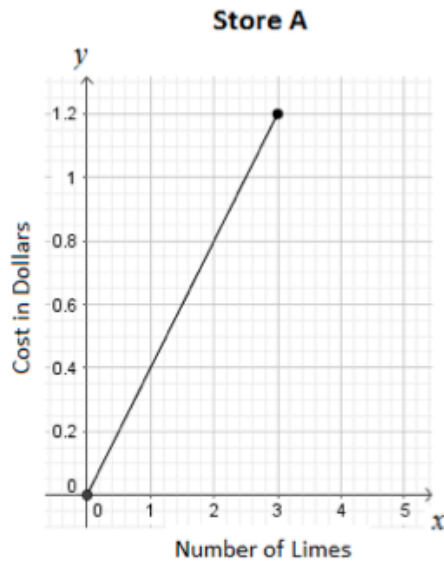


Which statements below are true? For each false statement, correct it so that the statement reads true.

- The point (6, 4) on the graph means that 6 magnets cost \$4.
- The point (1, 1.5) represents the unit rate or constant of proportionality for the graph.
- If a customer purchases 0 magnets, they will pay \$0, which is represented by the point (0, 0).
- The point (0.5, 1) means that each magnet costs \$0.50.
- The point (6, 9) means that it costs \$6 for 9 magnets.

Problem 8

The cost you pay for limes is proportional to the number of limes you buy. Four different stores sell limes for different amounts, as shown in the graphs, table, and equation below. Order the stores by their unit price for one lime, from most expensive to least expensive. Use the lines above each Store to rank them.



Store C

# of Limes	Cost (\$)
2	1.50
4	3
6	4.50
8	6

Store D

$$y = 0.65x$$

y represents the cost in dollars; x represents the number of limes

Guiding Questions

- What strategy will you use to determine the unit rate in each representation?
- If you were to graph all these relationships in the same graph, with the same scale, which store would have the steepest line? The least steepest line?