



Teacher Guide

Sample Items

Mathematics

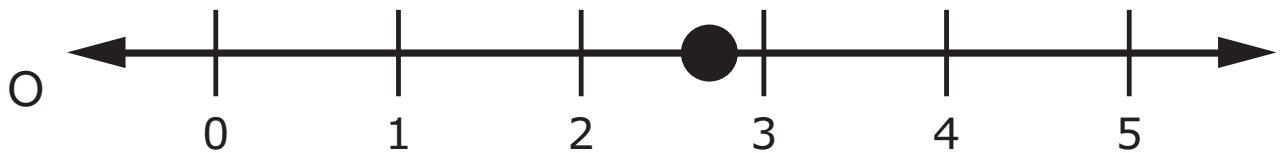
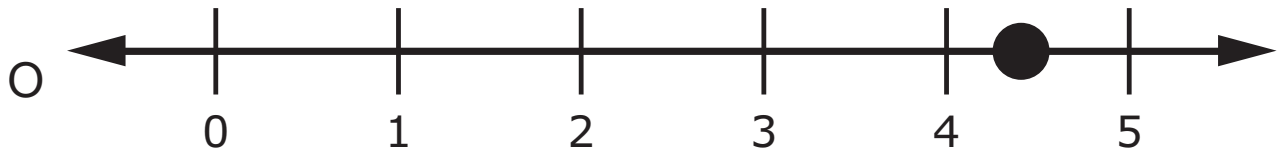
Grades 8 & High School

Mathematics Grade 8

Item 1

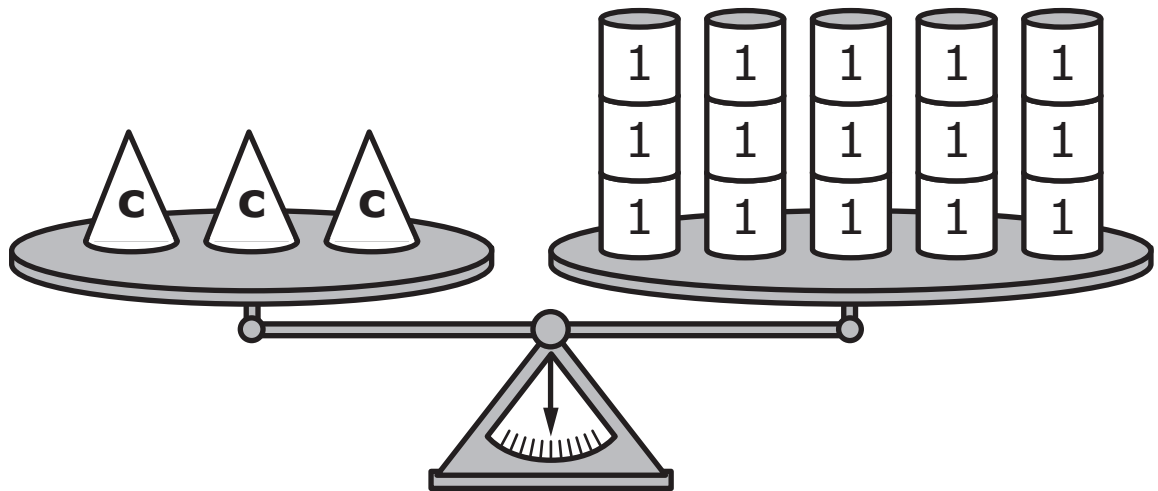
The number 2.7 is an example of a number that is between two whole numbers.

Which number line has a point marked at 2.7?



Item 2

This is a picture of a balance scale.



The total mass of the cones on the left side is equal to the total mass of the cylinders on the right side.

Use this equation to find the mass of one cone. In this equation, the variable **c** stands for the mass of one cone.

$$\begin{array}{c} \triangle c \quad \triangle c \quad \triangle c \\ \\ 3 \, c \end{array} = \begin{array}{c} \begin{array}{ccccc} \begin{array}{c} 1 \\ 1 \\ 1 \end{array} & \begin{array}{c} 1 \\ 1 \\ 1 \end{array} & \begin{array}{c} 1 \\ 1 \\ 1 \end{array} & \begin{array}{c} 1 \\ 1 \\ 1 \end{array} & \begin{array}{c} 1 \\ 1 \\ 1 \end{array} \end{array} \\ \\ 15 \text{ cylinders} \end{array}$$

Divide each side of the equation by 3 to find the mass of one cone, **c**.

$$3\mathbf{c} = 15$$

$$\frac{3\mathbf{c}}{3} = \frac{15}{3}$$

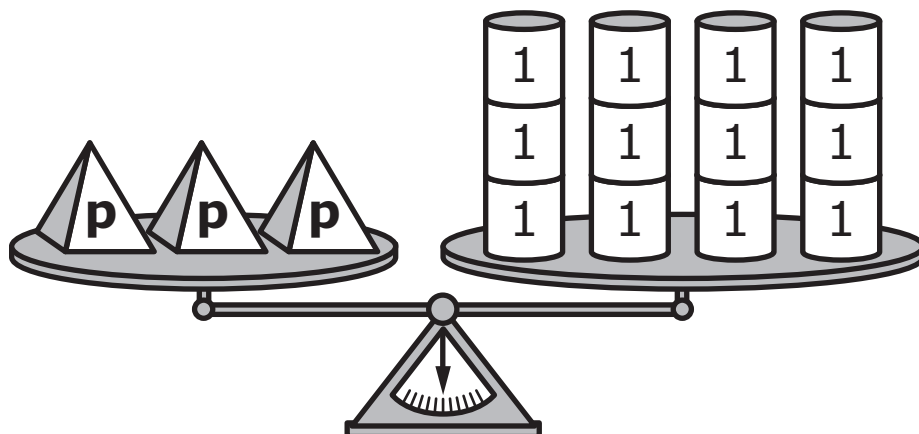
$$\mathbf{c} = 5$$

One cone has the same mass as 5 cylinders.



c = 5 cylinders

This is a picture of a different balance scale. The total mass of the pyramids on the left side is equal to the total mass of the cylinders on the right side.



Use this equation to answer the question.

In this equation, the variable **p** stands for the mass of one pyramid.

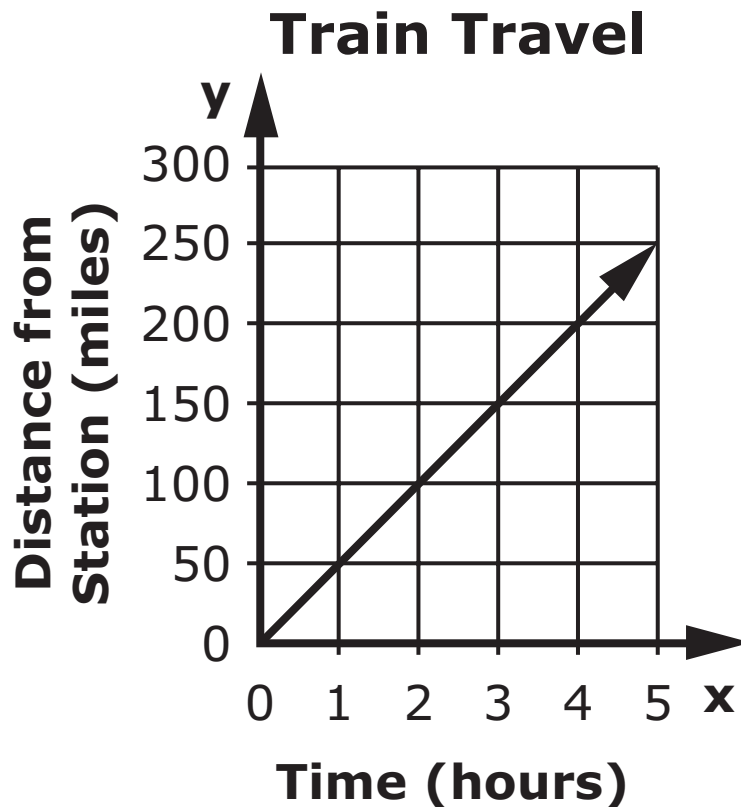
$$3\mathbf{p} = 12 \text{ cylinders}$$

How many cylinders have the same mass as one pyramid?

- ☐ 3 cylinders
- ☐ 4 cylinders
- ☐ 10 cylinders

Item 3

This graph shows the relationship between the distance a train was from the station and time.



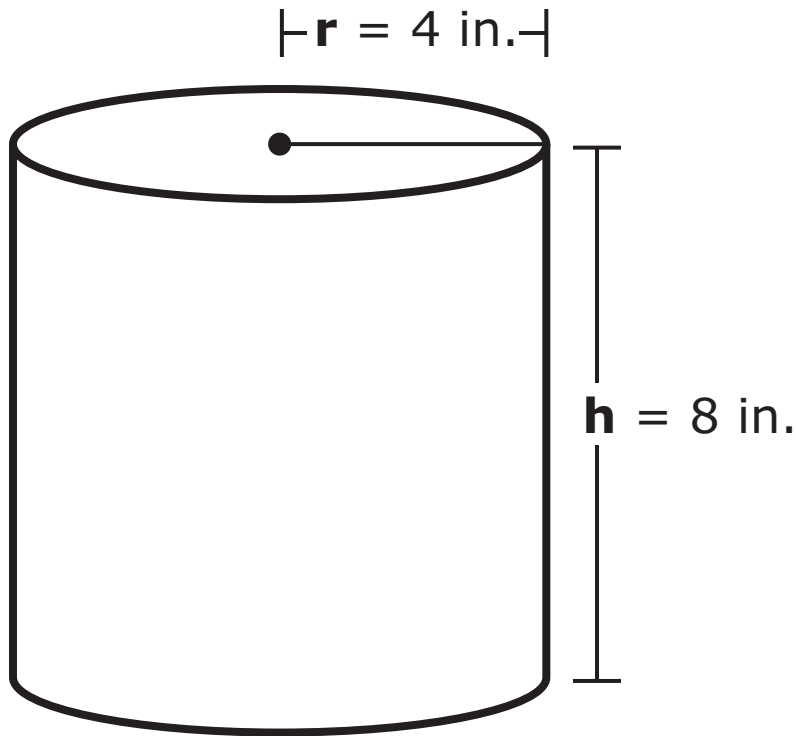
Which sentence describes the relationship between time and the distance the train was from the station?

- ☐ As the time **increased**, the distance the train was from the station **increased**.
- ☐ As the time **increased**, the distance the train was from the station **decreased**.
- ☐ As the time **decreased**, the distance the train was from the station **increased**.

Item 4

The volume of a cylinder is the amount of space inside it.

This is a picture of a cylinder.



This is the formula to find the volume of a cylinder.

$$\text{Volume} = \pi \times r \times r \times h$$

The radius, r , of the cylinder is 4 inches.

The height, h , of the cylinder is 8 inches.

Use the formula to find the volume of the cylinder.

$$\text{Volume} = \pi \times r \times r \times h$$

What is the volume of the cylinder in cubic inches?

- 16π cubic inches
- 128π cubic inches
- 448π cubic inches

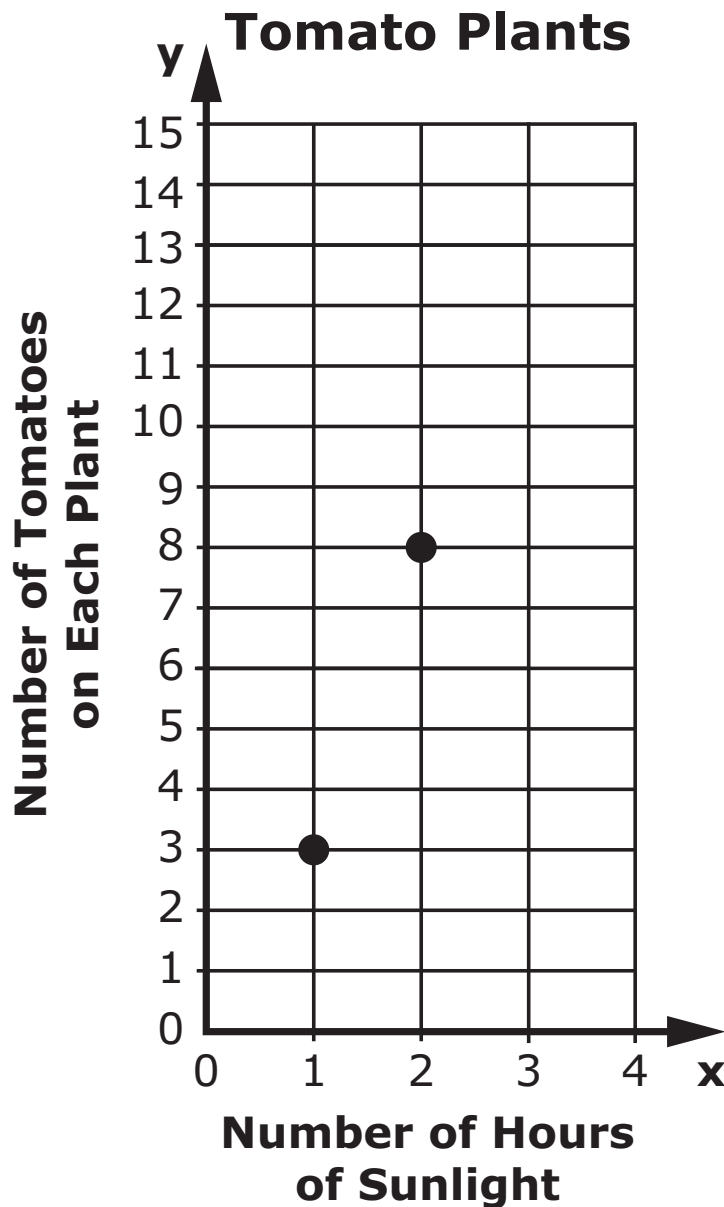
Item 5

This data table shows the number of tomatoes on four tomato plants exposed to different amounts of sunlight each day.

Tomato Plants

Number of hours of sunlight	Number of tomatoes on each plant
1	3
2	8
3	11
4	13

This incomplete scatter plot can be used to show the same information as the data table.



The data table shows that the tomato plant with 1 hour of sunlight each day had 3 tomatoes.

The scatter plot also shows that the tomato plant with 1 hour of sunlight each day had 3 tomatoes because there is a point located at (1, 3).

The data table shows that the tomato plant with 2 hours of sunlight each day had 8 tomatoes.

The scatter plot also shows that the tomato plant with 2 hours of sunlight each day had 8 tomatoes because there is a point located at (2, 8).

The third row of the data table shows that the tomato plant with 3 hours of sunlight each day had 11 tomatoes, so the third data point is (3, 11). This information still needs to be plotted on the scatter plot.

This is a small object.

Use this small object to plot the point for the tomato plant that had 4 hours of sunlight each day.

☐ The student provided the correct answer.

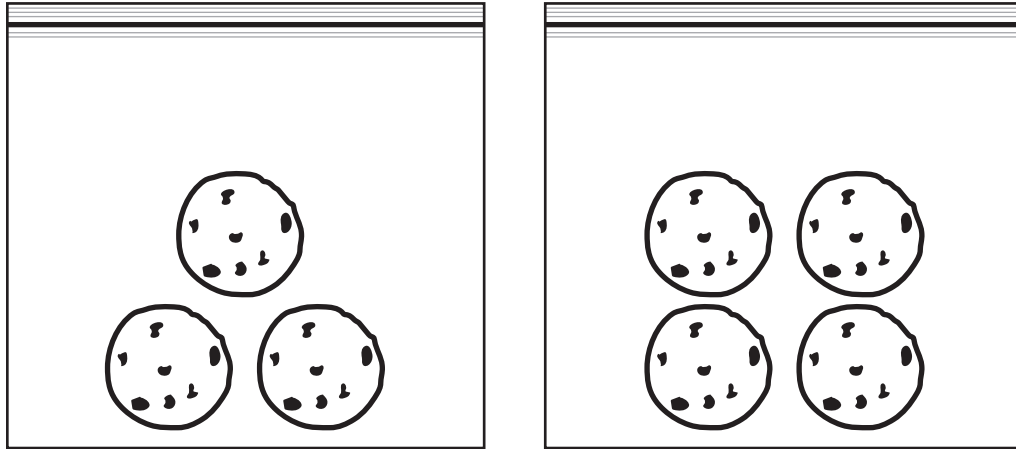
☐ The student did not provide the correct answer.

Mathematics High School

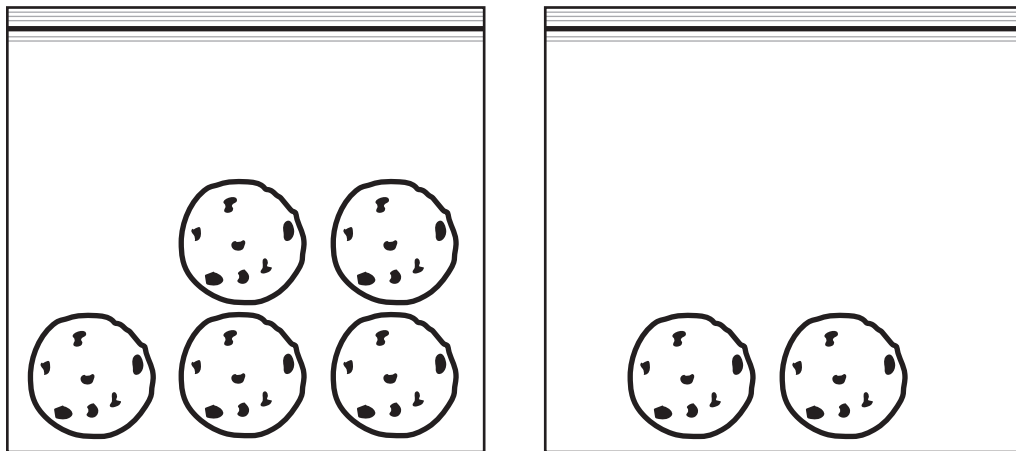
Item 1

Henry had 7 cookies and 2 bags.

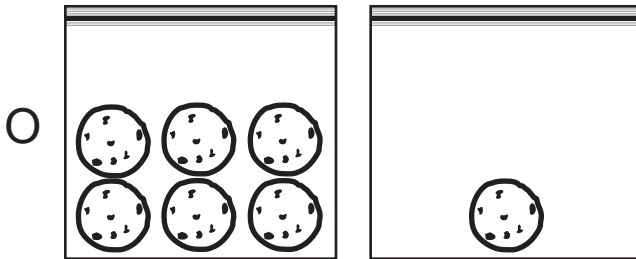
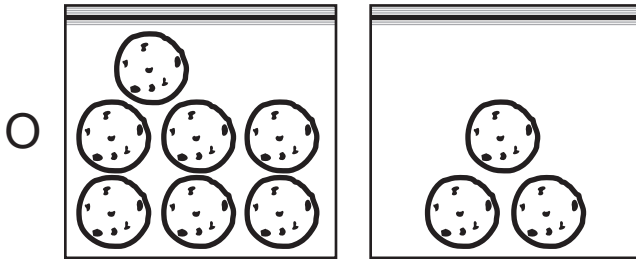
First, Henry put 3 cookies into one bag and 4 cookies into another bag.



Then, Henry decided to divide the 7 cookies differently. He put 5 cookies into one bag and 2 cookies into another bag.



Which picture shows another way Henry could divide the 7 cookies into 2 bags?



Item 2

An exponent tells how many times the base number will appear in a multiplication expression.

This is an expression with an exponent.

$$2^3$$

The exponent 3 indicates that the base number 2 will appear three times in the multiplication expression that is used to find the value of 2^3 .

$$2^3 = 2 \times 2 \times 2$$

The value of 2^3 is 8.

$$2^3 = 8$$

This is another expression with an exponent.

$$5^3$$

This equation is used to find the value of 5^3 .

$$5^3 = \underline{\quad} \times \underline{\quad} \times \underline{\quad}$$

What is the value of 5^3 ?

☐ 15

☐ 53

☐ 125

Item 3

An art teacher had 15 paintbrushes. Then she bought some boxes of paintbrushes. Each box had 8 paintbrushes in it. Now the art teacher has 71 paintbrushes.

Which equation can be used to find **b**, the number of boxes of paintbrushes the art teacher bought?

☐ $8b + 71 = 15$

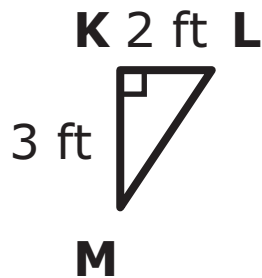
☐ $15 + 8b = 71$

☐ $15b + 8 = 71$

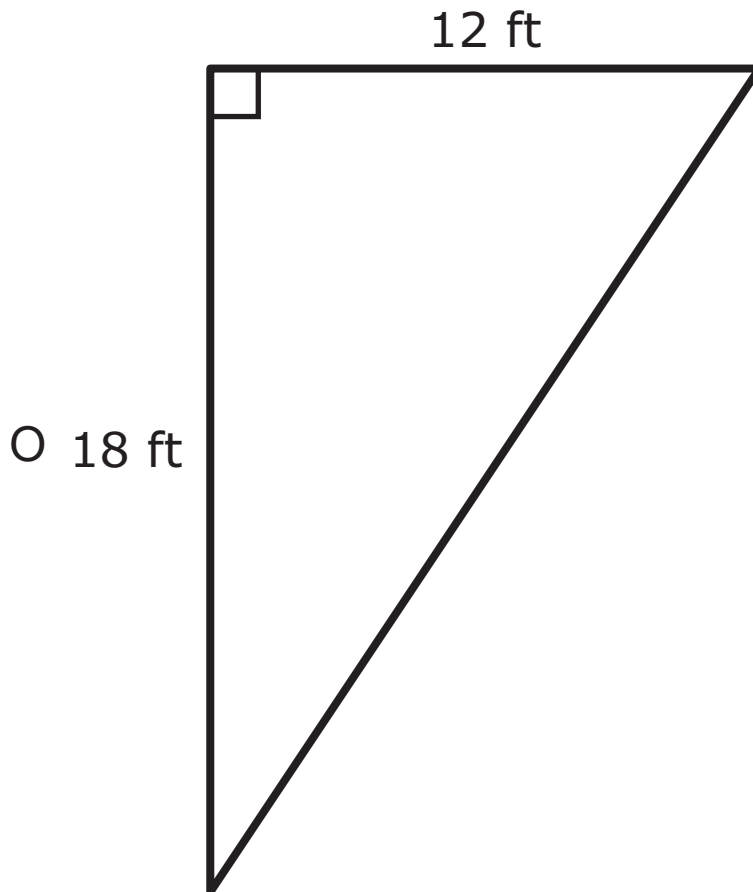
Item 4

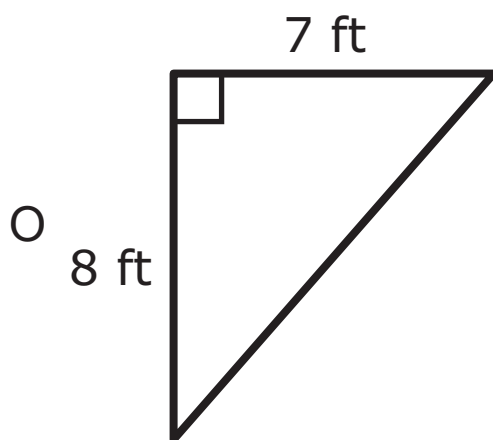
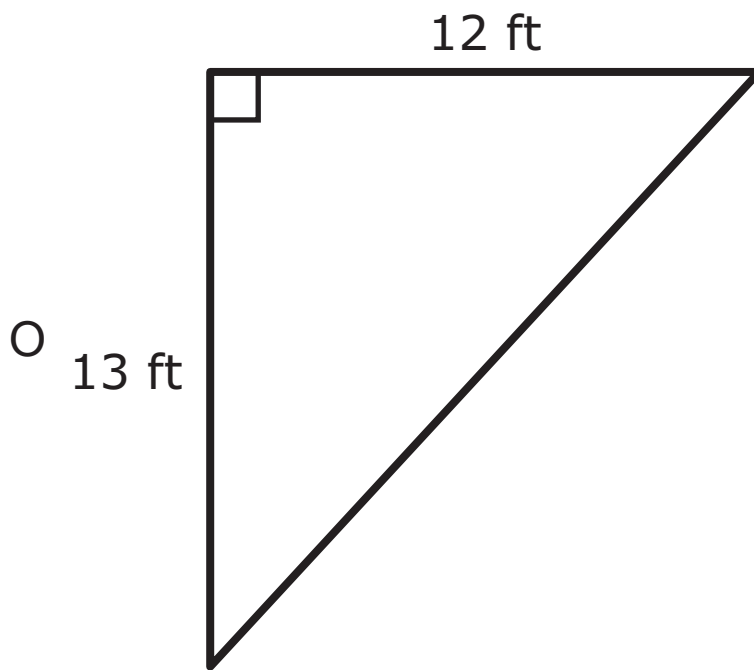
Triangles are similar when the ratios of the lengths of their corresponding sides are equal.

This is triangle **KLM**.



Which triangle is similar to triangle **KLM**?





Item 5

A histogram is a graph that uses bars to display data.

This list of data values shows the heights of the flowers in Paul's garden.

**Heights of Paul's Flowers
(inches)**

2, 4, 5, 6, 7, 7, 8, 8

To make a histogram, divide the data into equal-sized ranges.

The data values are from 2 to 8 inches. The data can be divided into these equal-sized ranges:

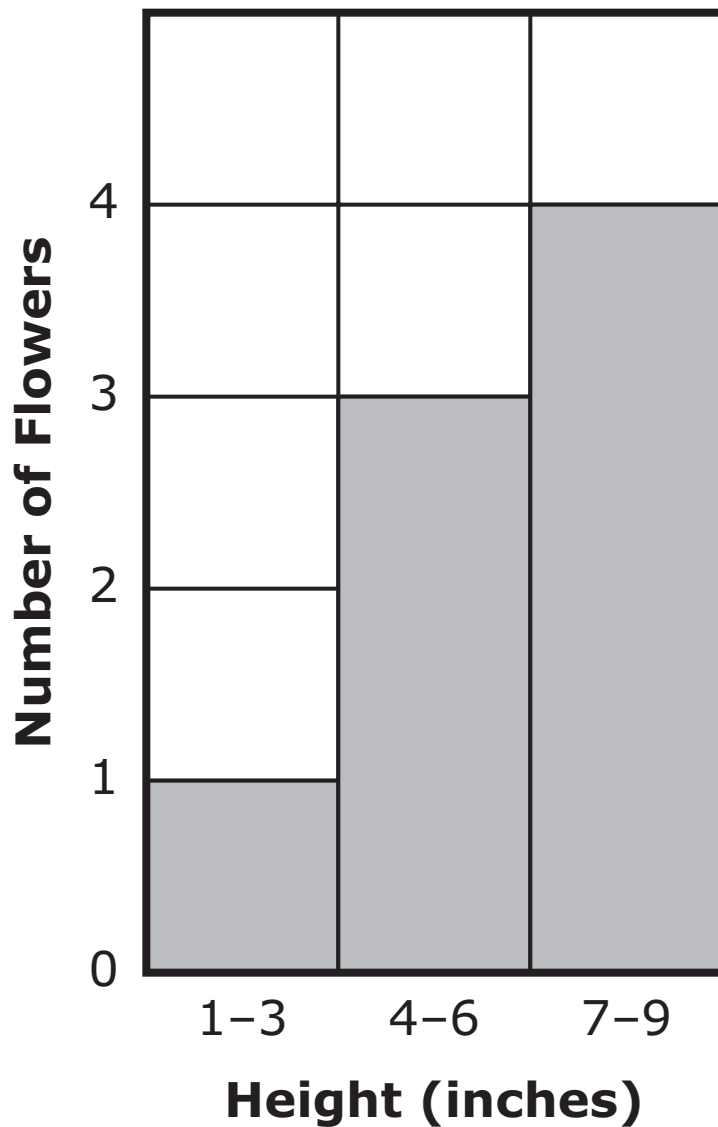
1 to 3 inches

4 to 6 inches

7 to 9 inches

This histogram shows the same information as the list of data. The height of each bar shows the number of flowers in each range.

Heights of Paul's Flowers



In this histogram, the first bar shows there is one flower in the range of 1 to 3 inches.

The second bar shows there are three flowers in the 4-to-6-inch range.

The third bar shows there are four flowers in the 7-to-9-inch range.

This is a different problem.

This list of data values shows the heights of the flowers in Lisa's garden.

Heights of Lisa's Flowers (inches)

1, 3, 4, 6, 6, 7, 8, 9

The data values are from 1 to 9 inches. The data can be divided into these equal-sized ranges:

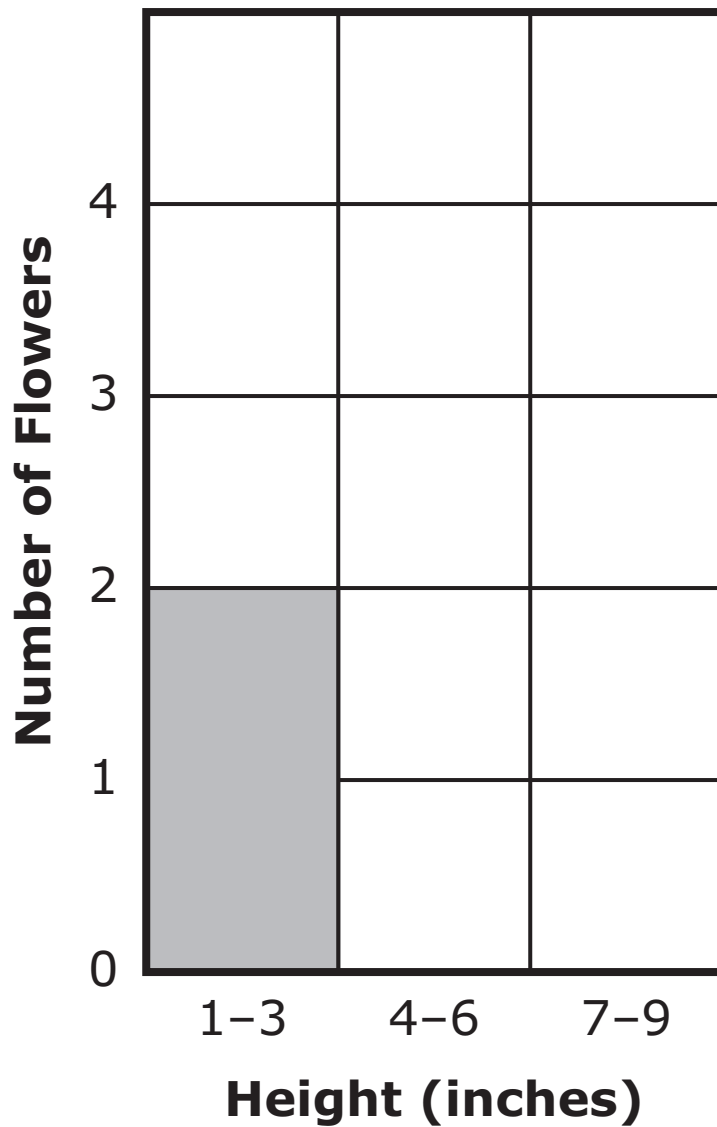
1 to 3 inches

4 to 6 inches

7 to 9 inches

This incomplete histogram shows the heights of Lisa's flowers.

Heights of Lisa's Flowers



The height of each bar shows the number of flowers in each range.

The first bar in this histogram shows there are 2 flowers with a height of 1 to 3 inches.

The list of data shows there are 3 flowers with a height of 4 to 6 inches.

The second bar in this histogram is completed in this way.

Complete the histogram to show the number of Lisa's flowers with a height of 7 to 9 inches.

These are tiles to use to complete the histogram. You may not need all of the tiles.

☐ The student provided the correct answer.

☐ The student did not provide the correct answer.

