

Investigate Problem 2

What are the means of the solved proportion in Question 1?
What are the extremes of the solved proportion in Question 1?
Use complete sentences in your answer.

Find the product of the means and the product of the extremes from Question 1. What do you notice? Show all your work and use a complete sentence in your answer.

Use the results in Question 2 to complete the steps to solve the following proportion. Show all your work.

$$\frac{4}{3} = \frac{6}{x}$$

$$\square = \square$$

Set product of extremes equal to product of means.

$$\frac{\square}{4} = \frac{18}{\square}$$

Divide each side by 4.

$$x = \square$$

Simplify.

Use complete sentences to explain how to solve a proportion by using the proportion's means and extremes.



3. Suppose that there are 480 students in your school. Use the combined survey results from Problem 1 to predict how many students in your school would prefer to have gym class at the beginning of the day, how many students would prefer to have gym class at the end of the day, and how many students have no preference. Show all your work and use complete sentences in your answer.



Objectives

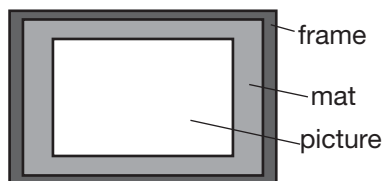
In this lesson, you will:

- Identify similar and congruent polygons.
- Identify corresponding angles and corresponding sides in similar and congruent polygons.
- Find unknown measures in similar and congruent polygons.
- Find unknown measures in a scale model.

Key Terms

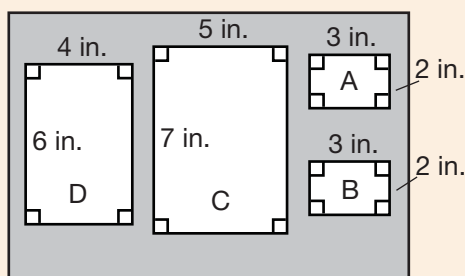
- similar
- congruent
- scale model
- scale

SCENARIO When you frame a picture, it is not unusual to put a mat inside the frame. A mat is a piece of paperboard that is used to provide a transition between a picture and the picture frame.



Problem 1 The Perfect Picture

You are creating your own collage of pictures. You have bought a large frame and will cut out rectangular holes in the mat as shown.



- A.** What are the interior angle measures of each mat opening? Use a complete sentence in your answer.
- B.** Write a ratio that compares the length of rectangle A to the length of rectangle B. Then write a ratio that compares the width of rectangle A to the width of rectangle B. Write your answers as fractions in simplest form.

What do you notice? Use a complete sentence in your answer.

Take Note

In this lesson, the length refers to the longer side of the rectangle.

Problem 1 The Perfect Picture

- C. Write a ratio that compares the length of rectangle A to the length of rectangle D. Then write a ratio that compares the width of rectangle A to the width of rectangle D. Write your answers as fractions in simplest form.

What do you notice? Use a complete sentence in your answer.

- D. Write a ratio that compares the length of rectangle A to the length of rectangle C. Then write a ratio that compares the width of rectangle A to the width of rectangle C.

What do you notice? Use a complete sentence in your answer.

Investigate Problem 1

1. Two polygons are **similar** when the corresponding angles are congruent and the ratios of the measures of the corresponding sides are equal. Which rectangles from Problem 1 are similar? Explain your reasoning. Use complete sentences in your answer.

2. Two polygons are **congruent** when the corresponding angles are congruent and the corresponding sides are congruent. Which rectangles from Problem 1 are congruent? Explain your reasoning. Use complete sentences in your answer.

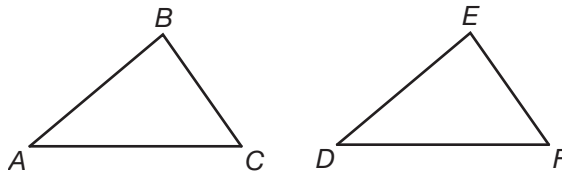
Take Note

In a rectangle, one pair of corresponding sides are the lengths and the other pair of corresponding sides are the widths.

Investigate Problem 1

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3. What do you notice about the ratios of the corresponding sides of congruent figures? Use a complete sentence in your answer.
4. Are all similar figures also congruent figures? If so, explain your reasoning. If not, give an example that shows a pair of similar figures that are not congruent. Use complete sentences in your answer.
5. Are all congruent figures also similar figures? If so, explain your reasoning. If not, give an example that shows a pair of congruent figures that are not similar. Use complete sentences in your answer.
6. The triangles shown below are congruent.



You can write $\triangle ABC \cong \triangle DEF$. Whenever you write a congruence statement like this, the letters that name the vertices should be written in corresponding order. For instance, $\angle A \cong \angle D$, so $\angle A$ and $\angle D$ are in the same position. Name the pairs of corresponding angles and corresponding sides.

The measure of $\angle A$ is 40° ; the measure of $\angle E$ is 88° ; the length of \overline{AB} is 2.3 centimeters; and the length of \overline{DF} is 2.8 centimeters. Label this information on the figures above.

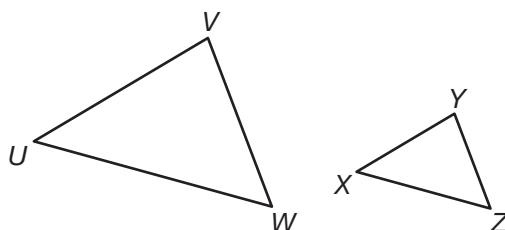
What is the length of \overline{DE} ? Explain how you found your answer. Use a complete sentence in your answer.

What is the measure of $\angle B$? Explain how you found your answer. Use a complete sentence in your answer.

Investigate Problem 1

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7. The two triangles below are similar. You can write $\triangle UVW \sim \triangle XYZ$, where the symbol \sim means “is similar to.”



Again, the order in which you write the vertices in a similarity statement indicates the corresponding angles and the corresponding sides. List the corresponding angles and the corresponding sides.

Write a ratio that compares a side length of $\triangle UVW$ to a corresponding side length of $\triangle XYZ$.

Then write a ratio that compares a side length of $\triangle XYZ$ to a corresponding side length of $\triangle UVW$.

Are the two ratios equal? Why or why not? Use complete sentences in your answer.

Because the triangles are similar, we can write a proportion that relates the ratios of the lengths of the sides. One possible proportion is $\frac{UV}{XY} = \frac{VW}{YZ}$.

Another possible proportion is $\frac{XZ}{UW} = \frac{YZ}{VW}$.

When you write a proportion relating the corresponding side lengths of two similar polygons, what must be true about both of the ratios? Use complete sentences in your answer.