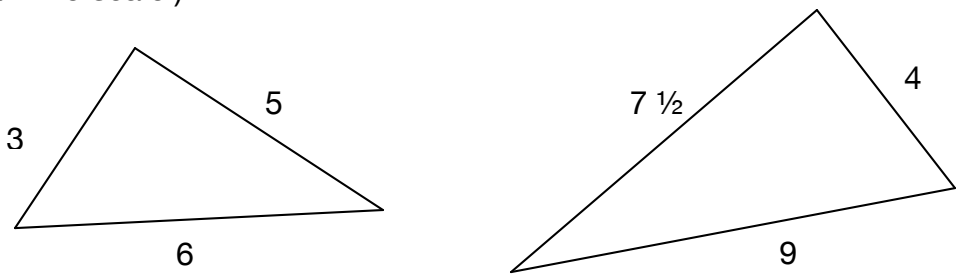
Similarity: Using Proportions

Extend Your Learning
Answers and Explanations

1. Are the following two triangles similar? Explain your reasoning. (Note: The triangles are not drawn to scale.)



If the triangles are similar, the ratio between corresponding sides should be the same. The ratio between the longest sides, 6 on the first triangle and 9 on the second, is 6:9, or 2:3. The ratio between the second longest sides, 5 on the first triangle and 7½ on the second, is 5:7½, or 2:3. The ratio between the shortest sides, 3 on the first triangle and 4 on the second, is 3:4. This is not the same as the ratio between the longest and second longest sides, so the triangles are not similar.

2. The Cedar Valley Recreational Soccer League recommends that fields be the following size for each age category.

Age Category	Field Size
Adult	60 yards by 100 yards
U-12 (under age 12)	50 yards by 80 yards
U-10 (under age 10)	40 yards by 70 yards
U-8 (under age 8)	25 yards by 50 yards
U-6 (under age 6)	15 yards by 30 yards

Which, if any, of the fields are mathematically similar? Justify your reasoning.

The fields for U-6 and U-8 each have a length that is twice the width, so those fields are similar. The ratio between the width and length of the U-10 field is 40:70, or 4:7. The ratio between the width and length of the U-12 field is 50:80, or 5:8. The ratio between the width and length of the Adult field is 60:100, or 3:5. Since none of these ratios are equivalent, none of the remaining fields are similar.

3. Julie is making a rectangular quilt and wants to add a 2-inch border around all the edges. Will the new quilt be similar to the old quilt? Justify your answer.

   The new quilt will only be similar to the old quilt if it is a square. If it is a square, each of the dimensions will proportionally increase by the same amount. If the quilt is not a square, the length will have a smaller ratio of increase than the width, thus the new quilt is not similar to the old quilt.

   For example:
   If a doll quilt measures 10 inches by 10 inches, the ratio of width to length is 10:10, or 1:1. If you add two inches to each side, the width increases by 4 inches and the length increases by 4 inches. The ratio of width to length is now 14:14, which is still 1:1. When the 2-inch border is added, the quilt is similar to the quilt without the border.

   If a doll quilt measures 10 inches by 12 inches, the ratio of width to length is 5:6. If you add 2 inches to each side, the width increases by 4 inches and the length increases by 4 inches. The ratio of width to length is now 14:16, which is 7:8. The two ratios, 5:6 and 7:8, are not equal. When you add a 2-inch border to all sides of a rectangular quilt, it is not similar to the quilt without the border.