Unit 8, Lesson 8

Ways to Find Unknown Length (Part 2)

Let's find the unknown lengths in figures.

Warm-up

True or False: Equations with Fractions

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $1\frac{1}{5} + 2\frac{2}{5} + 3\frac{3}{5} + 4\frac{4}{5} = 12$

- $10 - \frac{1}{2} - \frac{2}{2} - \frac{3}{2} - \frac{4}{2} = 5$

- $1\frac{1}{6} + 2\frac{2}{6} + 3\frac{3}{6} + 4\frac{4}{6} + 5\frac{5}{6} = 15\frac{3}{6}$

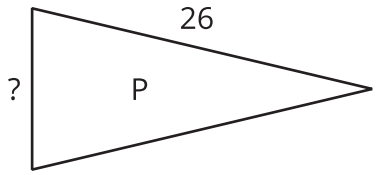
- $\frac{1}{3} + \frac{2}{3} + \frac{3}{3} = 3 \times \frac{2}{3}$

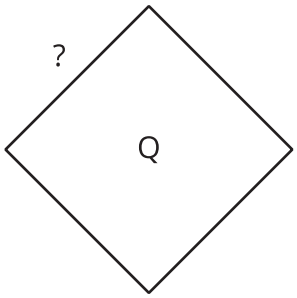
Activity 1

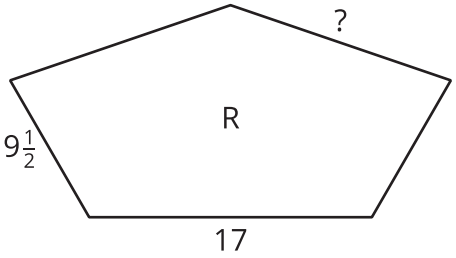
Unknown Lengths

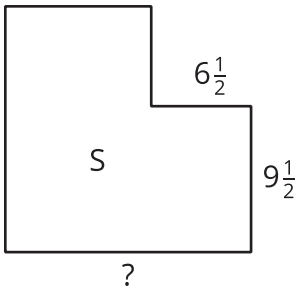
Here are 4 figures and what we know about them.

- Each figure has a perimeter of 64 inches.
- P, R, and S each have 1 line of symmetry.
- Q has 4 lines of symmetry.









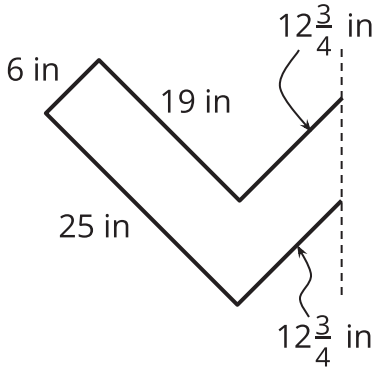
1. Draw the lines of symmetry of each figure.
2. For each figure, find the length of the side labeled "?" Explain or show your reasoning.

Activity 2

Lin's Design

Lin has 145 inches of fancy tape to make the outline for a design.

Here is half of the design. The dashed line is the line of symmetry for the entire design.



1. Sketch Lin's entire design.
2. Does she have enough tape for the entire outline? Explain or show your reasoning.

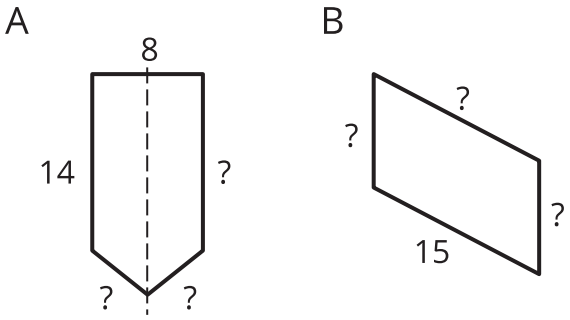
If you have time: Lin has a sheet of fancy paper that she can cut to cover the inside of the design. The paper is a rectangle that is 30 inches by 18 inches. The angles in the design are right angles. Does Lin have enough paper to cover the inside of the design? Explain or show your reasoning.

Section B Summary

We used attributes, such as side lengths, angles, lines of symmetry, and parallel sides, to solve problems about the perimeter of figures.

We learned that, if a figure has certain attributes, we can use them to find its perimeter, even when we don't know all of its side lengths. And if we know the perimeter of a figure and enough information about its attributes, we can find its side lengths.

For example, here are 2 figures:



We know the perimeter of each figure is 48 units.

If we know that the dashed line through Figure A is a line of symmetry, we can find its 3 unknown side lengths.

- Because of symmetry, the side opposite 14 units is also 14 units.
- $48 - 14 - 14 - 8 = 12$, so the other 2 sides have a total length of 12 units.
- $12 \div 2 = 6$, so each of the other 2 sides is 6 units.

If we know that the opposite sides of Figure B have equal lengths, we can find its 3 unknown side lengths.

- The side opposite 15 units is also 15 units.
- $48 - 15 - 15 = 18$, so the other 2 sides have a total length of 18 units.
- $18 \div 2 = 9$, so each of the other 2 sides is 9 units.