Lesson 2: The Area of Right Triangles

Classwork

Exploratory Challenge

1. Use the shapes labeled with an “x” to predict the formula needed to calculate the area of a right triangle. Explain your prediction.

   Formula for the Area of Right Triangles: ________________________________

   Area of the given triangle: ________________________________

2. Use the shapes labeled with a “y” to determine if the formula you discovered in part one is correct.

   Does your area formula for triangle y match the formula you got for triangle x?

   If so, do you believe you have the correct formula needed to calculate the area of a right triangle? Why or why not?

   If not, which formula do you think is correct? Why?

   Area of given triangle: ________________________________
Exercises

Calculate the area of each triangle below. Each figure is not drawn to scale.

3. [Diagram of a right triangle with sides 8 ft, 17 ft, and 15 ft]

4. [Diagram of a right triangle with sides 17.7 cm, 24.8 cm, and 11.4 cm]

5. [Diagram of a right triangle with sides 6 in, 10 in, and 8 in]

6. [Diagram of a right triangle with sides 10 \(\frac{1}{3}\) m, 5 \(\frac{3}{5}\) m, and 8 \(\frac{2}{3}\) m]
7. [Diagram of a right triangle with sides labeled 21.4 km and 32.7 km]

8. Mr. Jones told his students they each need a half of a piece of paper. Calvin cut his piece of paper horizontally and Matthew cut his piece of paper diagonally. Which student has the larger area on their half piece of paper? Explain.

[Images of Calvin's and Matthew's paper]

9. Ben took 3 bathroom tiles to the store to be cut. The only direction he gave was that he needed the area of each tile to be half of the original size. If Ben wants each tile to be cut into two right triangles, did he provide the store with enough information? Why or why not?

10. If the area of a triangle is 6.22 sq. in. and its base is 3.11 in., write an equation that relates the area to the height, $h$, and the base. Solve the equation to determine the height.
Problem Set

Calculate the area of each right triangle below. Each figure is not drawn to scale.

1. \[
\begin{array}{c}
31.2 \text{ cm} \\
32.5 \text{ cm} \\
9.1 \text{ cm}
\end{array}
\]

2. \[
\begin{array}{c}
3\frac{3}{4} \text{ km} \\
5 \text{ km} \\
6\frac{1}{2} km
\end{array}
\]

3. \[
\begin{array}{c}
3.2 \text{ in.} \\
5 \text{ in.} \\
2.4 \text{ in.}
\end{array}
\]

4. \[
\begin{array}{c}
60 \text{ mm} \\
61 \text{ mm} \\
11 \text{ mm}
\end{array}
\]
5. \[
\begin{align*}
&13 \frac{1}{3} \text{ ft.} \\
&16 \frac{2}{3} \text{ ft.} \\
&10 \text{ ft.}
\end{align*}
\]

6. Elania has two congruent rugs at her house. She cut one vertically down the middle, and she cut diagonally through the other one.

\[
\text{A} \quad \text{B} \\
\text{C} \quad \text{D}
\]

After making the cuts, which rug (labeled A, B, C, or D) has the larger area? Explain.

7. Give the dimensions of a right triangle and a parallelogram with the same area. Explain how you know.

8. If the area of a right triangle is \( \frac{9}{16} \) sq. ft. and the height is \( \frac{3}{4} \) in., write an equation that relates the area to the base, \( b \), and the height. Solve the equation to determine the base.