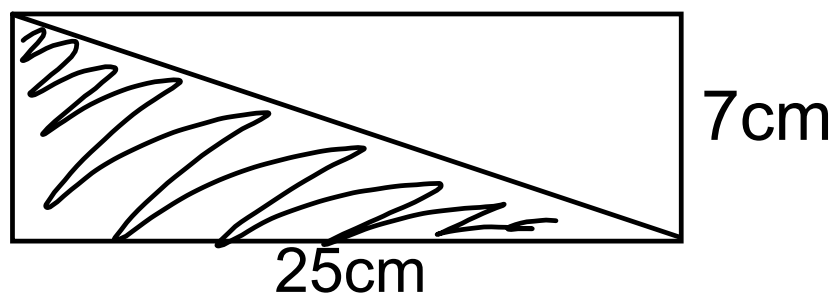
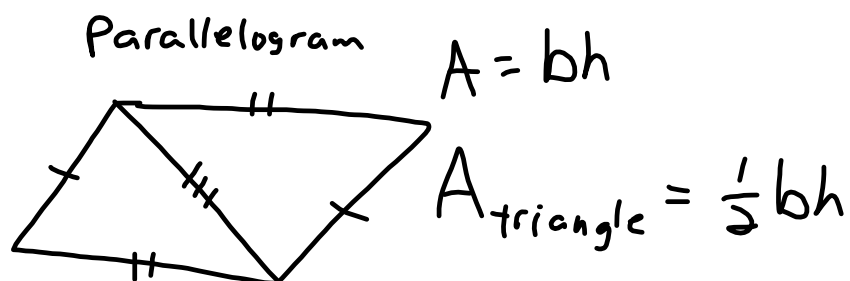
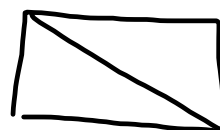


Warm-Up

Find the area of the rectangle below.



$$175 \text{ cm}^2$$





Areas of Triangles and Special Quadrilaterals

Learning Targets

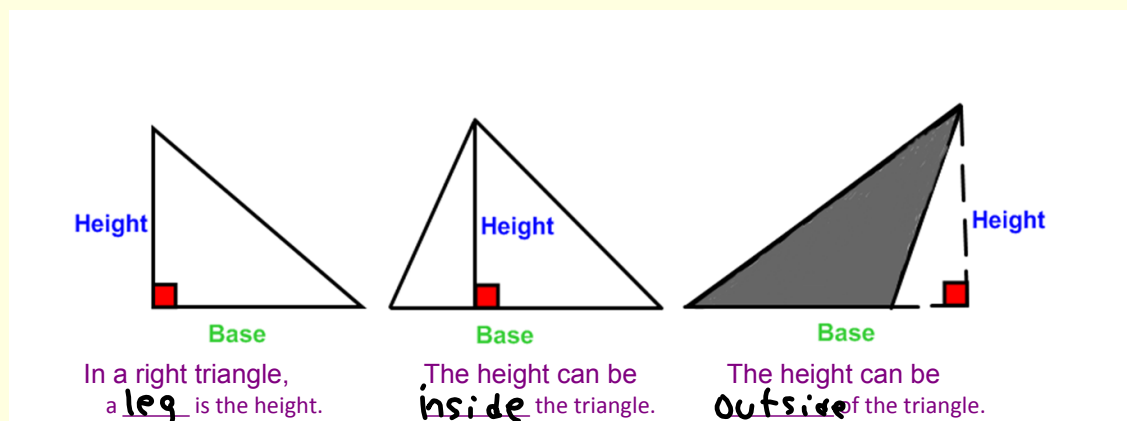
- I can apply the area formula(s) of Triangles to solve problems.
- I can apply the area formula(s) of Rhombi to solve problems.

Area of a Triangle

The **HEIGHT** of a triangle is the perpendicular segment from a vertex to the line containing the opposite side.

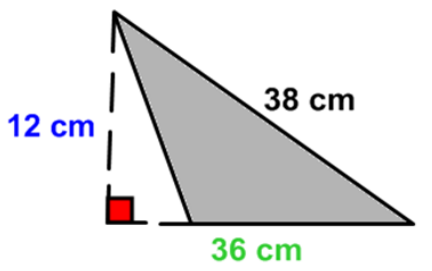
The opposite side is called the **BASE** of the triangle.

The terms **HEIGHT** and **BASE** are also used to represent the segment lengths.



$$\text{Area of Triangle} = \frac{1}{2}bh \text{ or } \frac{bh}{2}$$

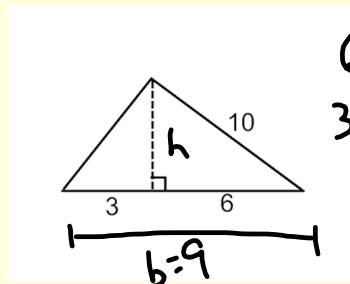
1. Find the area of the triangle.



$$A = \frac{36 \cdot 12}{2}$$

$$A = \boxed{216 \text{ cm}^2}$$

2. Find the area of the triangle



$$6^2 + h^2 = 10^2$$

$$36 + h^2 = 100$$

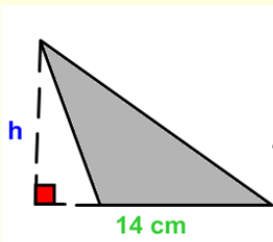
$$h^2 = 64$$

$$h = 8$$

$$A = \frac{1}{2} \cdot 9 \cdot 8 = 36 \text{ units}^2$$

$$\text{Area of Triangle} = \frac{1}{2}bh \text{ or } \frac{bh}{2}$$

3. Area of $\triangle = 63 \text{ cm}^2$



$$A = \frac{bh}{2}$$

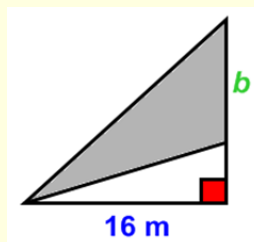
$$63 = \frac{14h}{2}$$

$$126 = 14h$$

$$9 = h$$

$$\boxed{9 \text{ cm}}$$

4. Area of $\triangle = 80 \text{ m}^2$



$$80 = \frac{b \cdot 16}{2}$$

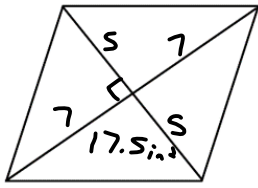
$$160 = 16b$$

$$10 = b$$

$$\boxed{10 \text{ m}}$$

Rhombus

a) Find the area of the rhombus below if the diagonals are 10 in and 14 in (use two triangles).



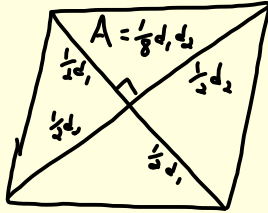
$$\begin{aligned} \text{Area of one triangle: } & \frac{5 \cdot 7}{2} \\ & = 17.5 \text{ in}^2 \end{aligned}$$



$$\text{Area of all 4 triangles} = 4 \cdot 17.5$$

$$A = \frac{1}{2} d_1 d_2 = A = \frac{1}{2} \cdot 14 \cdot 10 = 70 \text{ in}^2$$

b) Now, find the area of the rhombus below if the diagonals are d_1 and d_2 .



Area of one triangle

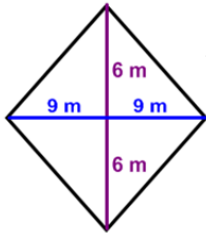
$$A = \frac{1}{2} \cdot \frac{1}{2} d_1 \cdot \frac{1}{2} d_2 = \frac{1}{8} d_1 d_2$$

$$\text{Total Area} = 4 \cdot \frac{1}{8} d_1 d_2 = \frac{1}{2} d_1 d_2$$

Area of a Rhombus: $\frac{1}{2} d_1 d_2$ or $\frac{d_1 d_2}{2}$

Find the area of each rhombus.

5.

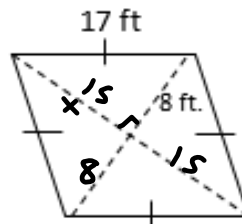


$$\begin{aligned} d_1 &= 18 \\ d_2 &= 12 \end{aligned}$$

$$A = \frac{1}{2} \cdot 18 \cdot 12$$

$$A = 108 \text{ m}^2$$

6.



$$\begin{aligned} d_1 &= 30 \\ d_2 &= 16 \\ A &= \frac{1}{2} \cdot 30 \cdot 16 \end{aligned}$$

$$= 240 \text{ ft}^2$$

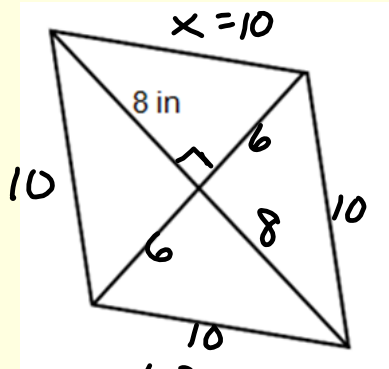
$$8^2 + x^2 = 17^2$$

$$64 + x^2 = 289$$

$$x^2 = 225$$

$$x = 15$$

8. The rhombus below has an area of 96 in^2 . Find the perimeter of the rhombus



$$\frac{1}{2} \cdot 16 \cdot d = 96$$

$$8d = 96$$

$$d = 12$$

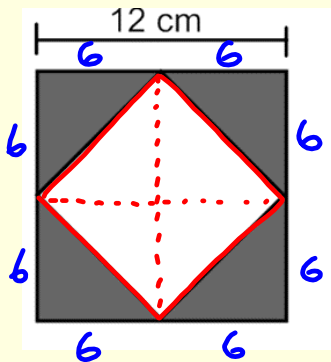
$$6^2 + 8^2 = x^2$$

$$100 = x^2$$

$$10 = x$$

$$\text{Perimeter} = 40 \text{ in}$$

9. Find the area of the shaded region using 2 different methods if the outside figure is a square.



Method 1

Area of 4 triangles

$$A = \frac{1}{2} \cdot 6 \cdot 6 = 18$$

$$\text{Total Area} = 4 \cdot 18$$

$$= 72 \text{ cm}^2$$

Method 2

Area of outside
- Area of inside

$$A_{\text{outside}} = 12 \cdot 12 = 144$$

$$A_{\text{inside}} = \frac{1}{2} \cdot 12 \cdot 12 = 72$$

$$\text{Shaded Area} = 144 - 72$$

$$= 72 \text{ cm}^2$$

Assignment:

8.1 Areas of Special Quadrilaterals Homework Day 2

