

$$A = \frac{1}{2}bh \quad \text{- OR -} \quad A = \frac{bh}{2}$$

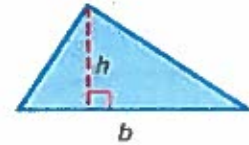
## Chapter 9 Lesson 2 Area of a Triangle

### > Area of a Triangle

**Words** The area  $A$  of a triangle is one half the product of the base  $b$  and its height  $h$ .

**Symbols**  $A = \frac{1}{2}bh$  or  $A = \frac{bh}{2}$

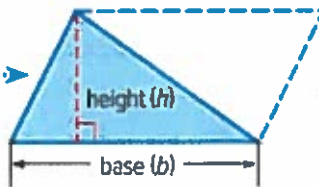
**Model**



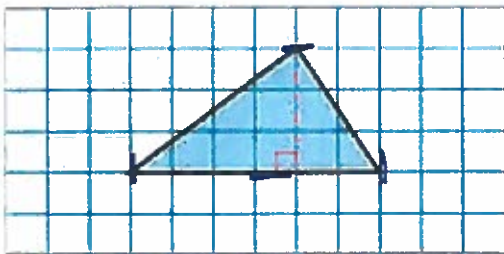
**Congruent figures** are the same SHAPE AND SIZE.

A parallelogram can be formed by TWO CONGRUENT triangles. Since congruent triangles have the same area, the area of a triangle is ONE HALF the area of a parallelogram.

The base of a triangle can be any one of its sides. The height is the perpendicular distance from that base to the opposite vertex.



**EXAMPLES: Find the area.**



$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(6)(3)$$

$$A = \frac{1}{2}(18)$$

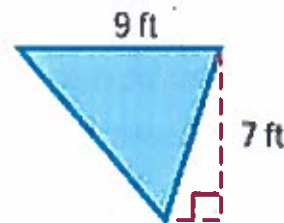
$$A = 9 \text{ units}^2$$

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

$$A = \frac{6 \cdot 3}{2}$$

$$A = \frac{18}{2}$$

$$A = 9 \text{ units}^2$$



$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(9)(7)$$

$$A = \frac{1}{2}(63)$$

$$A = 31.5 \text{ ft}^2$$

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

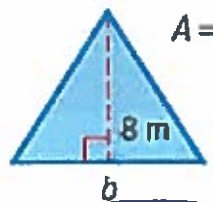
$$A = \frac{9 \cdot 7}{2}$$

$$A = \frac{63}{2}$$

$$A = 31.5 \text{ ft}^2$$

Use the formula  $A = \frac{1}{2}bh$  or  $A = bh/2$  to find the missing dimensions.

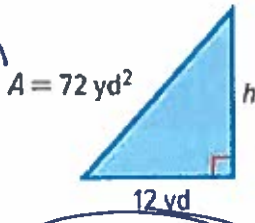
$$\begin{aligned} A &= \frac{1}{2}bh \\ 40 &= \frac{1}{2}b \cdot 8 \\ 80 &= 4b \\ \frac{80}{4} &= \frac{4b}{4} \\ 20 &= b \end{aligned}$$



$$\begin{aligned} A &= 40 \text{ m}^2 \\ 40 &= \frac{b \cdot 8}{2} \cdot 2 \\ 80 &= b \cdot 8 \\ \frac{80}{8} &= \frac{b \cdot 8}{8} \\ 10 &= b \end{aligned}$$

$10 \text{ m} = b$

$$\begin{aligned} A &= \frac{1}{2}bh \\ 72 &= \frac{1}{2}(12)h \\ 72 &= 6h \\ \frac{72}{6} &= \frac{6h}{6} \\ 12 &= h \end{aligned}$$



$12 \text{ yd} = h$

$$\begin{aligned} A &= \frac{bh}{2} \\ 72 &= \frac{12h}{2} \cdot 2 \\ 72 &= 12h \\ \frac{72}{12} &= \frac{12h}{12} \\ 6 &= h \end{aligned}$$

height: 7 in; area 21 sq in.

$6 \text{ in} = b$

$$\begin{aligned} A &= \frac{1}{2}bh \\ 21 &= \frac{1}{2}b(7) \\ 21 &= 3.5b \\ \frac{21}{3.5} &= \frac{3.5b}{3.5} \\ 6 &= b \end{aligned}$$

$$\begin{aligned} A &= \frac{bh}{2} \\ 2 \cdot 21 &= \frac{b \cdot 7}{2} \cdot 2 \\ 42 &= b7 \\ \frac{42}{7} &= \frac{b7}{7} \\ 6 &= b \end{aligned}$$

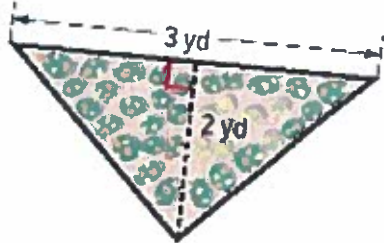
height 14.2 yd; area 63.9 sq yds.

$9 \text{ yds} = b$

$$\begin{aligned} A &= \frac{1}{2}bh \\ 63.9 &= \frac{1}{2}b(14.2) \\ 63.9 &= 7.1b \\ \frac{63.9}{7.1} &= \frac{7.1b}{7.1} \\ 9 &= b \end{aligned}$$

$$\begin{aligned} A &= \frac{bh}{2} \\ 2 \cdot 63.9 &= \frac{b \cdot 14.2}{2} \cdot 2 \\ 127.8 &= b \cdot 14.2 \\ \frac{127.8}{14.2} &= \frac{b \cdot 14.2}{14.2} \\ 9 &= b \end{aligned}$$

A flower bed in a parking lot is shaped like a triangle as shown.



a. Find the area of the flower bed in square feet.

$27 \text{ ft}^2$

b. If one bag of topsoil covers 10 square feet, how many bags are needed to cover this flower bed?

$3 \text{ bags}$

$\text{yds} \rightarrow \text{feet}$   
 $\cdot 3 = 9 \text{ ft}$   
 $\cdot 2 = 6 \text{ ft}$

$$\begin{aligned} A &= \frac{1}{2}bh \\ A &= \frac{1}{2}(9)(6) \\ A &= \frac{1}{2}(54) \\ A &= 27 \end{aligned}$$

$$\begin{aligned} A &= \frac{bh}{2} \\ A &= \frac{9 \cdot 6}{2} \\ A &= \frac{54}{2} \\ A &= 27 \end{aligned}$$