Section 9.4

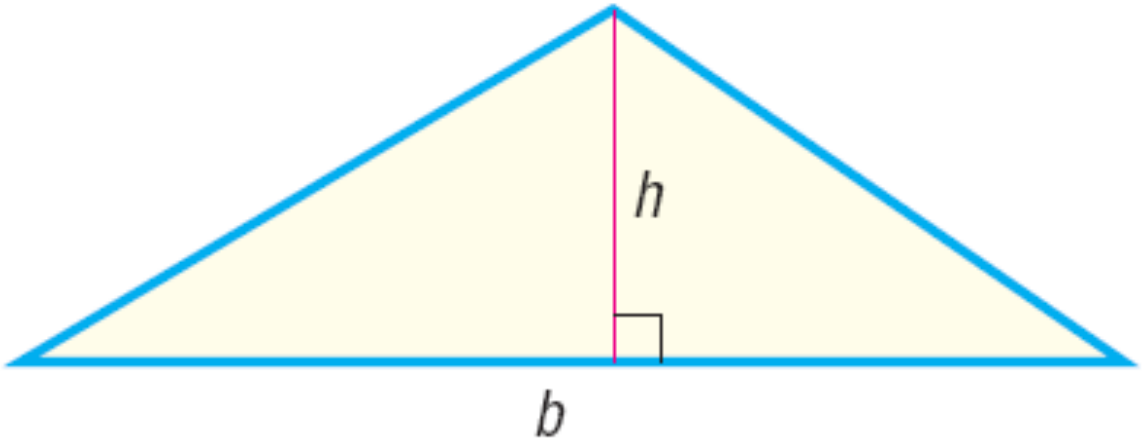
Area of a Triangle

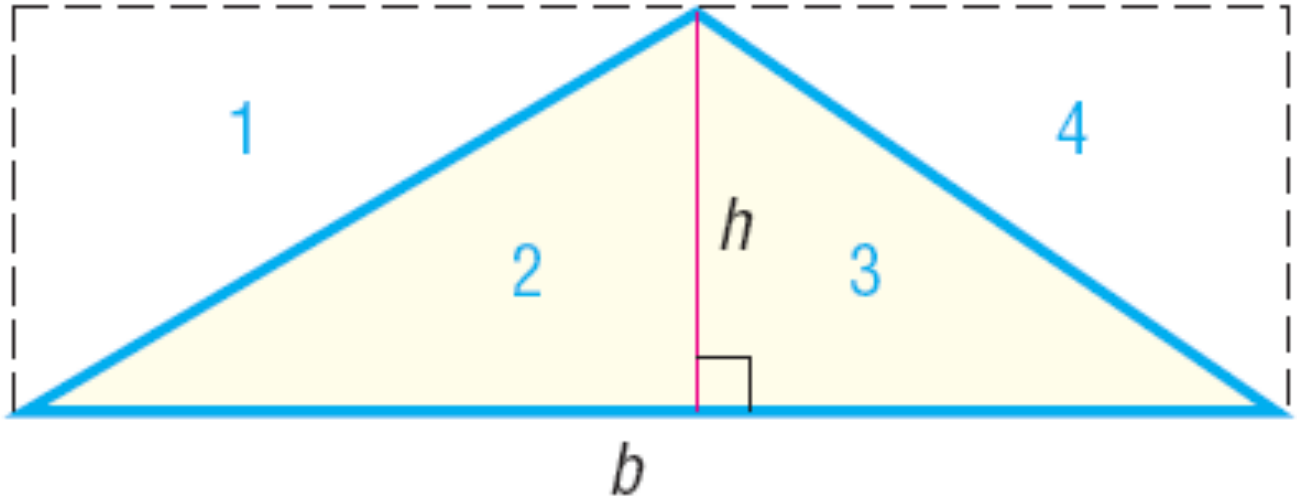
THEOREM

The area K of a triangle is

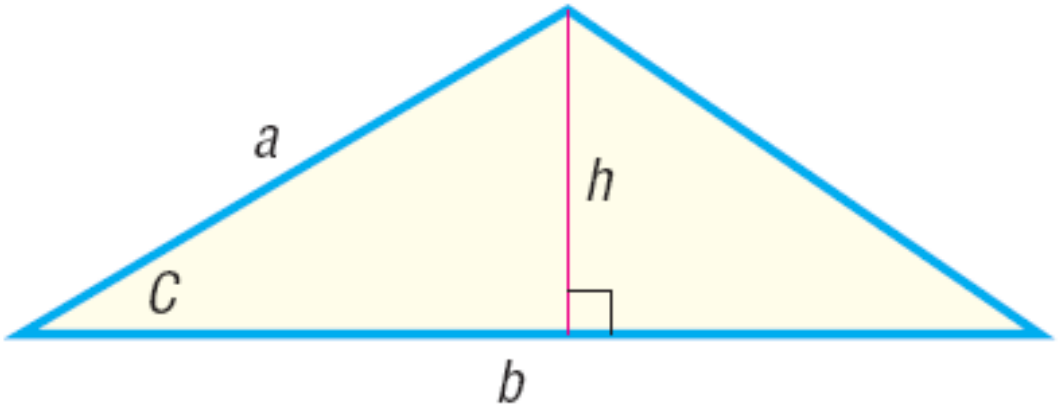
$$K = \frac{1}{2}bh$$

where b is the base and h is an altitude drawn to that base.





1 Find the Area of SAS Triangles



$$K = \frac{1}{2}ab \sin C$$

$$K = \frac{1}{2}bc \sin A$$

$$K = \frac{1}{2}ac \sin B$$

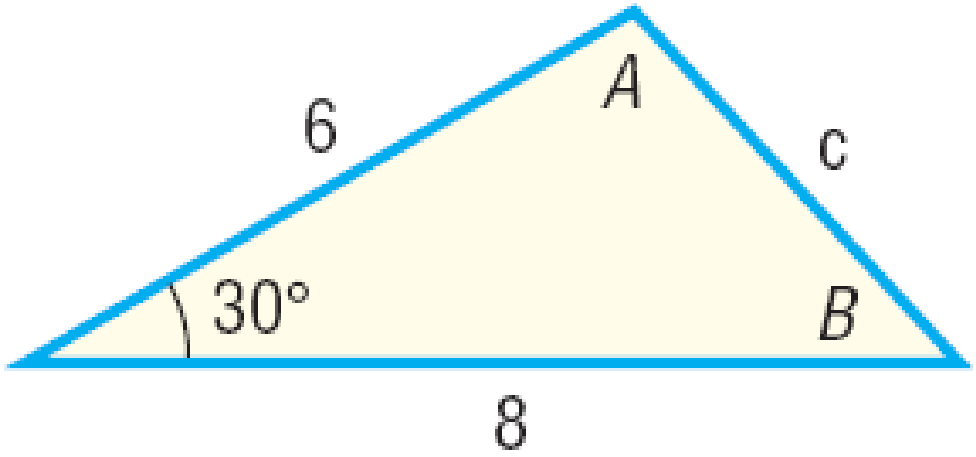
The area A of a triangle equals one-half the product of two of its sides times the sine of their included angle.

EXAMPLE

Finding the Area of an SAS Triangle

Find the area K of the triangle for which $a = 8$, $b = 6$, and $C = 30°$.

$$K = \frac{1}{2}ab \sin C = \frac{1}{2} \cdot 8 \cdot 6 \cdot \sin 30° = 12 \text{ square units}$$



2 Find the Area of SSS Triangles

THEOREM

Heron's Formula

The area K of a triangle with sides a, b, and c is

$$K = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \frac{1}{2}(a + b + c)$.

EXAMPLE Finding the Area of an SSS Triangle

Find the area of a triangle whose sides are 3, 5, and 6.

$$s = \frac{1}{2}(a+b+c) = \frac{1}{2}(3+5+6) = 7$$

$$K = \sqrt{7(7-3)(7-5)(7-6)} = \sqrt{7 \cdot 4 \cdot 2 \cdot 1} = \sqrt{56} = 2\sqrt{14}$$

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$