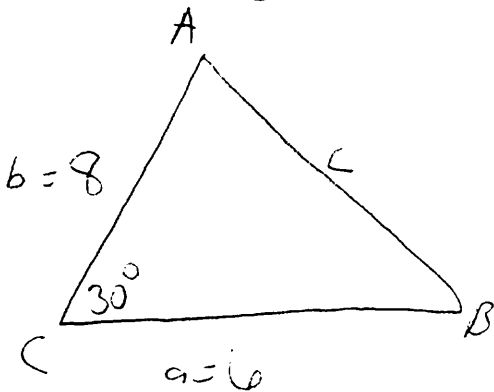


§ 8.4 Area of a Triangle

Area of a Triangle (SAS) - The area of triangle ABC is one-half the product of the lengths of any two sides and the sine of the included angle.

$$K = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B$$

Example 1 Find the area K of a triangular lot having two sides of lengths 8 meters and 6 meters and an included angle of 30° .



$$\begin{aligned} \text{use } K &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} (6)(8) \sin 30^\circ \\ &= \left(\frac{1}{2}\right)(6)(8) \left(\frac{1}{2}\right) \\ &= \boxed{12} \end{aligned}$$

Heron's Formula (SSS) - If a , b and c are the lengths of the sides of a triangle, then the area of the triangle is

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)} \quad \text{where } s = \frac{1}{2}(a+b+c)$$

Example 2 Find the area of a triangle having sides of lengths $a = 4$ meters, $b = 5$ meters, and $c = 7$ meters.

$$s = \frac{1}{2}(4 + 5 + 7) = \frac{1}{2}(16) = 8$$

$$\begin{aligned} K &= \sqrt{s(s-a)(s-b)(s-c)} \\ &= \sqrt{8(8-4)(8-5)(8-7)} \\ &= \sqrt{(8)(4)(3)(1)} = \sqrt{96} = \boxed{4\sqrt{6}} \end{aligned}$$