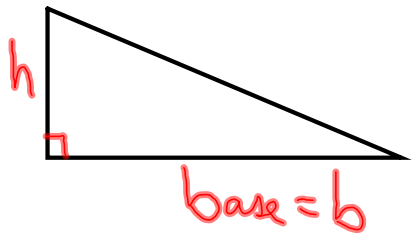
Section 7.4: Triangle Area Formulas

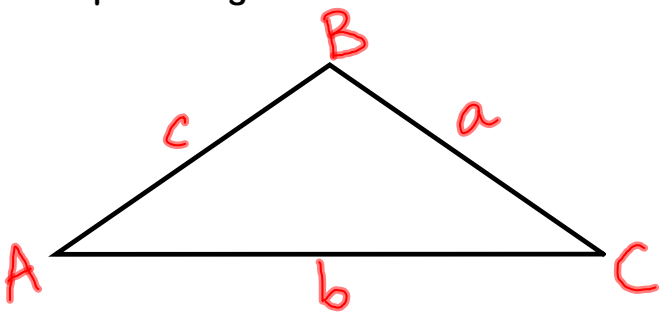
Area of a Right Triangle:



$$A = \frac{1}{2} b \cdot h$$

perpendicular

Oblique Triangle Area Formula:



$$A = \frac{1}{2}(\text{base})(\text{height})$$

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

$$\sin A = \frac{h}{c}$$

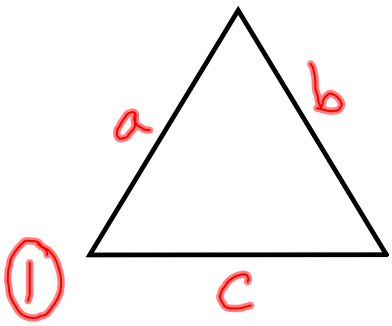
$$c \sin A = h$$

$$\text{Area} = \frac{1}{2} bc \sin A$$

$$\text{Area} = \frac{1}{2} ba \sin C$$

$$\text{Area} = \frac{1}{2} ac \sin B$$

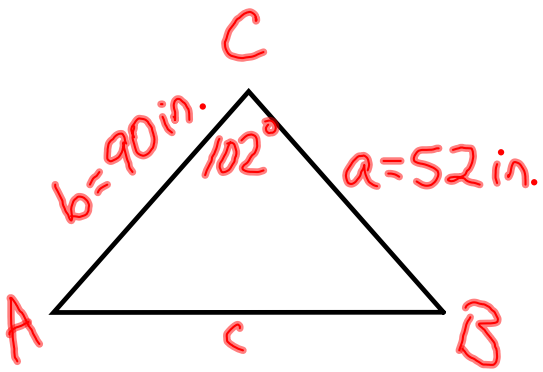
Heron's Formula: SSS



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

$$s = \frac{a+b+c}{2}$$

Example: Find the area of the triangle if a = 52 in., b = 90 in., and C = 102°.

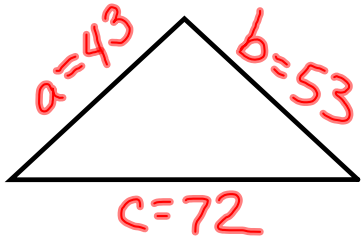


$$\text{Area} = \frac{1}{2}ab\sin C$$

$$= \frac{1}{2}(90)(52)\sin 102^\circ$$

$$\approx 2288.9 \text{ in}^2$$

Example: Find the area of the triangle if a = 43 mm, b = 53 mm, and c = 72 mm.



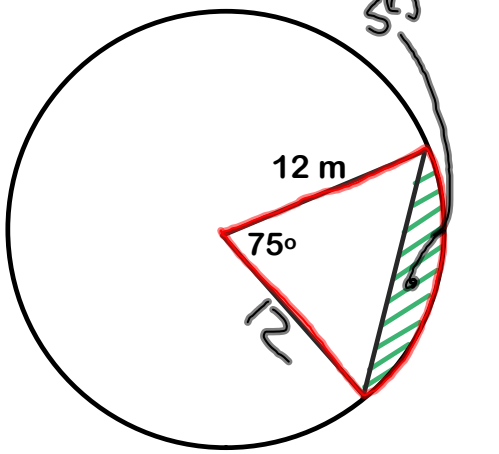
SSS use Heron's Formula

$$s = \frac{43+53+72}{2} = \frac{168}{2} = 84$$

$$\text{Area} = \sqrt{84(84-43)(84-53)(84-72)}$$

$$\approx 131.9 \text{ mm}^2$$

Example: Find the shaded area.



Area sector − Area triangle

$$\frac{1}{2}r^2\theta - \frac{1}{2}(12)(12)\sin 75^\circ$$

↑ radians

$$\frac{1}{2}(12)^2\left(\frac{75^\circ \pi}{180^\circ}\right) - \frac{1}{2}(12)^2 \sin 75^\circ$$

$$24.7 \text{ m}^2$$