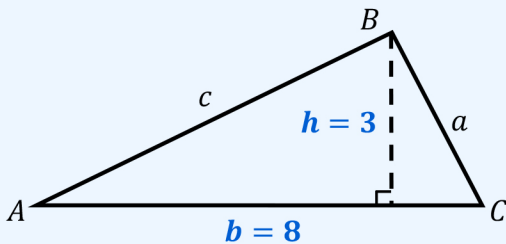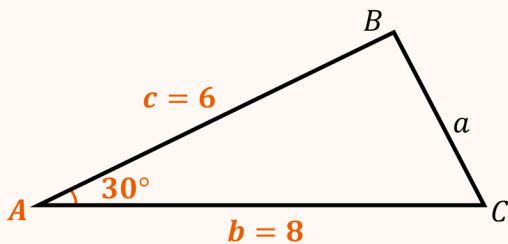# TOPIC: AREA OF SAS & ASA TRIANGLES

Calculating Area of SAS Triangles

◆ Recall: To find the area of any triangle, you always need the *height*. When not given, you can find it using _____.

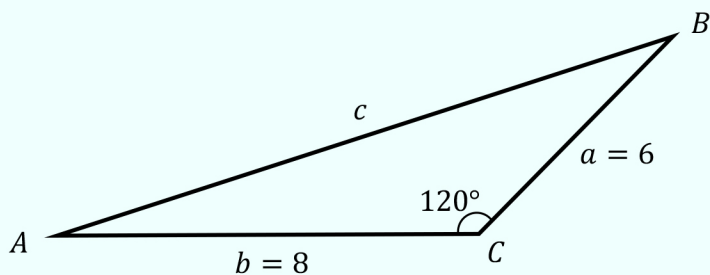| EXAMPLE | Determine the area of the triangles. |

Recall — **Known Height**	New — **Unknown Height**

Recall — Known Height

$$Area = \frac{1}{2}[base] \cdot [height]$$
$$= \frac{1}{2}b \cdot h$$

New — Unknown Height

$$Area\ (K) = \frac{1}{2}[base] \cdot [height]$$

$$Area = \frac{1}{2}\_\_ \cdot \_\_ \sin \_\_$$

$$Area = \frac{1}{2}\_\_ \cdot \_\_ \sin \_\_$$

$$Area = \frac{1}{2}\_\_ \cdot \_\_ \sin \_\_$$

EXAMPLE   Find the area of the triangle.

Recall

$$Area = \begin{cases} \dfrac{1}{2} b \cdot c \sin A \\[2mm] \dfrac{1}{2} a \cdot c \sin B \\[2mm] \dfrac{1}{2} a \cdot b \sin C \end{cases}$$
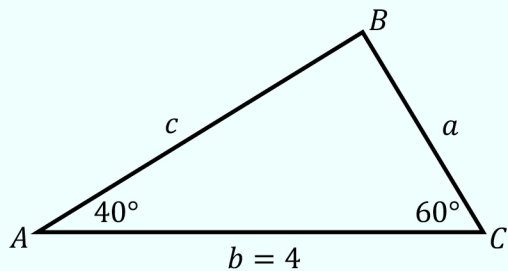
TOPIC: AREA OF SAS & ASA TRIANGLES

Calculating Area of ASA Triangles

◆ Recall: To calculate the area of a triangle when not given height, find it using $\sin$.

▪ For ASA triangles, use either **Law of Sines** or **Cosines** to find missing side(s) and/or angle(s).

| EXAMPLE | Calculate the area of the triangle: $A = 40°, C = 60°, b = 4$ |

Recall

$$Area = \begin{cases} \dfrac{1}{2}b \cdot c \sin A \\ \dfrac{1}{2}a \cdot c \sin B \\ \dfrac{1}{2}a \cdot b \sin C \end{cases}$$

TOPIC: AREA OF SAS & ASA TRIANGLES

Find the area of the triangle: $A = 30°$, $b = 10$ m, $B = 80°$

Recall

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

(Law of Sines)

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$
$$b^2 = a^2 + c^2 - 2ac \cdot \cos B$$
$$c^2 = a^2 + b^2 - 2ab \cdot \cos C$$

(Law of Cosines)

$$Area = \begin{cases} \dfrac{1}{2} b \cdot c \sin A \\[2mm] \dfrac{1}{2} a \cdot c \sin B \\[2mm] \dfrac{1}{2} a \cdot b \sin C \end{cases}$$