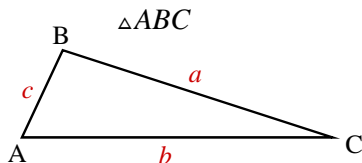


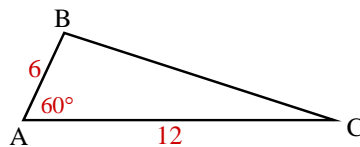
Lesson 13-6

Objective- To use the law of cosines to find the sides and angles of triangles.



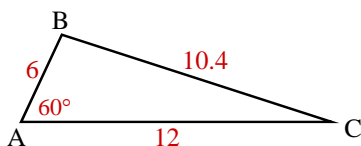
$$\begin{aligned} a^2 &= b^2 + c^2 - 2bc\cos A \\ b^2 &= a^2 + c^2 - 2ac\cos B \\ c^2 &= a^2 + b^2 - 2ab\cos C \end{aligned}$$

Solve $\triangle ABC$



$$\begin{aligned} a^2 &= b^2 + c^2 - 2bc\cos A \\ a^2 &= 12^2 + 6^2 - 2(12)(6)\cos 60^\circ \\ a^2 &= 180 - (144)\cos 60^\circ \\ a^2 &= 108 \\ a &= 10.4 \end{aligned}$$

Solve $\triangle ABC$



$$\begin{aligned} \frac{\sin 60^\circ}{10.4} &= \frac{\sin B}{12} \\ \angle B &\approx 87.8^\circ \\ \angle C &\approx 180^\circ - 87.8^\circ = 92.2^\circ \end{aligned}$$

Solve $\triangle ABC$



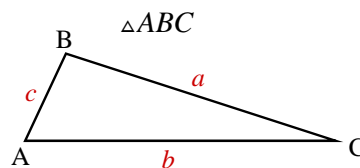
$$\begin{aligned} b^2 &= a^2 + c^2 - 2ac\cos B \\ b^2 &= 11^2 + 8^2 - 2 \cdot 11 \cdot 8 \cdot \cos 50^\circ \\ b^2 &= 185 - 176 \cdot \cos 50^\circ \\ b^2 &= 185 - 176 \cdot \cos 50^\circ \\ b^2 &= 71.9 \\ b &= 8.5 \end{aligned}$$

Solve $\triangle ABC$



$$\begin{aligned} \frac{\sin 50^\circ}{8.5} &= \frac{\sin A}{11} \\ \angle A &\approx 82.5^\circ \\ \angle C &\approx 180^\circ - 82.5^\circ = 97.5^\circ \end{aligned}$$

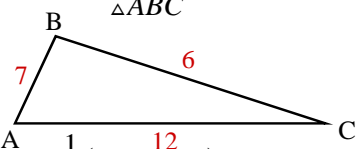
Heron's Area Formula



$$\begin{aligned} \text{Area} &= \sqrt{s(s-a)(s-b)(s-c)} \\ s &= \frac{1}{2}(a+b+c) \end{aligned}$$

Lesson 13-6 (cont.)

Find the area of
 $\triangle ABC$



$s = \frac{1}{2}(6 + 12 + 7) = 12.5$

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$
$$\text{Area} = \sqrt{12.5(12.5-6)(12.5-12)(12.5-7)}$$

Area \approx 14.9