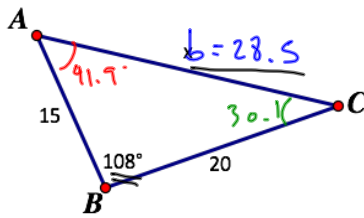


Law of Cosines

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Solve for x . Then solve the rest of the triangle.



$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$b^2 = 20^2 + 15^2 - 2(20)(15) \cos 108^\circ$$

$$b^2 = 810.41$$

$$b = \sqrt{810.41} = 28.5$$

$$\frac{\sin A}{20} = \frac{\sin 108}{28.5}$$

$$\sin A = \frac{20 \sin 108}{28.5}$$

$$\sin A = 0.668$$

$$A = \sin^{-1}(0.668)$$

$$A = 41.9^\circ$$

$$\frac{\sin C}{15} = \frac{\sin 108}{28.5}$$

$$\sin C = 15 \cdot \frac{\sin 108}{28.5}$$

$$C = \sin^{-1}(\text{ANS})$$

$$C = 30.1$$

How to use Law of Cosines to find an angle:

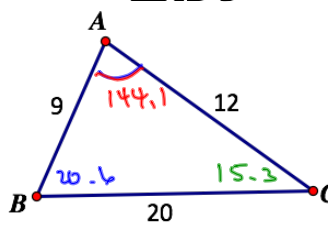
$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 - b^2 - c^2 = -2bc \cos A$$

$$\frac{a^2 - b^2 - c^2}{-2bc} = \cos A$$

$$\cos^{-1}\left(\frac{a^2 - b^2 - c^2}{-2bc}\right) = A$$

Solve $\triangle ABC$.



$a^2 = b^2 + c^2 - 2bc \cos A$
 $20^2 = 12^2 + 9^2 - 2(12)(9) \cos A$
 $400 = 144 + 81 - 216 \cos A$
 $400 = 225 - 216 \cos A$
 $-225 = -216 \cos A$
 $175 = -216 \cos A$
 $\frac{175}{-216} = \cos A$
 $\cos^{-1}\left(\frac{175}{-216}\right) = A$
 $144.1 = A$

$\sin B = \frac{\sin 144.1}{20}$
 $\sin B = \frac{12 \cdot \sin 144.1}{20}$
 $\sin B = 0.352$
 $B = \sin^{-1}(0.352)$
 $B = 20.6$

$\sphericalangle C = 180 - 144.1 - 20.6$
 $\sphericalangle C = 15.3$

HW: p 900 #13-18