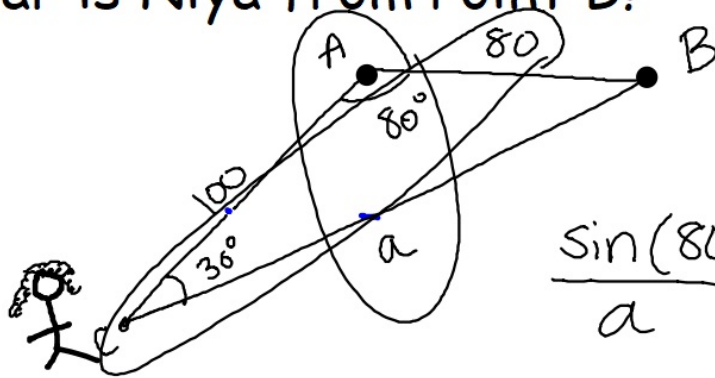


WARM UP

Niya stands on one side of a river and looks across at point A. She estimates that it is 100 yards away. Point B is also across the river 80 yards from point A. Angle A is 80 degrees, the angle Niya stands at is 30 degrees. How far is Niya from Point B?



$$\frac{\sin(80)}{a} = \frac{\sin(30)}{80}$$

$$80 \sin(80) = a \sin(30)$$

$$80 \sin(80) = a$$

$$\frac{80 \sin(80)}{\sin(30)}$$

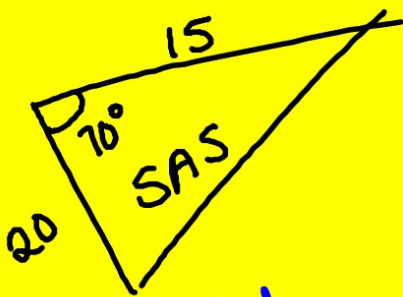
$$157.6 = a$$

4.3 Using the Law of Cosines

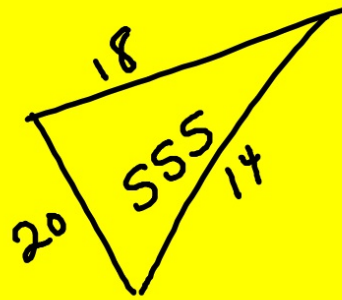
2 specific cases: SAS, SSS

side - angle - side

side - side - side



"included angle"



Law of Cosines

If A , B , and C are the measures of the angles of a triangle, and a , b , and c are the lengths of the sides opposite these angles, then:

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

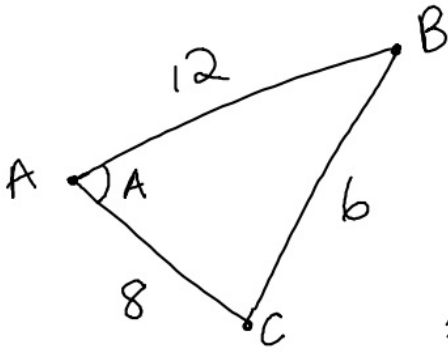
$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

When do you use Law of Cosines?

1: Solving for an angle. Solve for angle A. Round to a whole degree.

$$a=6, b=8, c=12$$



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

$$6^2 = 8^2 + 12^2 - 2(8)(12) \cos A$$

$$36 = 64 + 144 - 192 \cos A$$

$$\begin{array}{r} 36 = 208 - 192 \cos A \\ -208 \quad \cancel{208} \\ \hline \end{array}$$

$$\frac{-172}{-192} = \frac{-192 \cos A}{-192}$$

$$\frac{172}{192} = \cos A$$

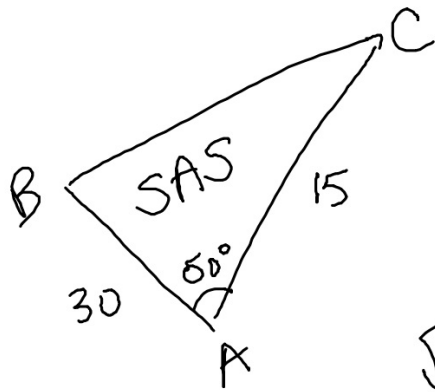
$$\cos^{-1}\left(\frac{172}{192}\right) = A$$

$$\boxed{26^\circ = A}$$

* use
Inverse trig
to find
angles.

Ex 2: Solving for a side. Use the given information to find the third side of the triangle.

$$\angle A = 50^\circ, b = 15, c = 30$$



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

$$a^2 = [15^2 + 30^2 - 2(15)(30)\cos 50]$$

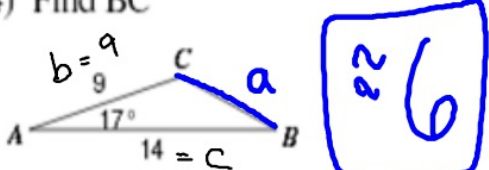
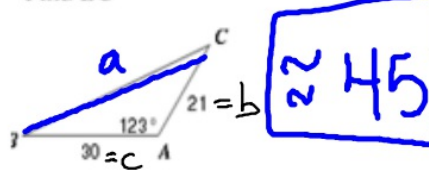
$$\sqrt{a^2} = \sqrt{546.49}$$

$$a = 23.4$$

CHECKPOINT:

Score: /2

Use the Law of Cosines to solve the information below. Round all decimals to the 10th.

<p>4) Find \overline{BC}</p>  <p>$a \approx 6$</p>	<p>5. Find \overline{BC}</p>  <p>$a \approx 45$</p>
---	---

$$a^2 = b^2 + c^2 - 2bc \cos A$$
$$a^2 = 9^2 + 14^2 - 2(9)(14) \cos 17$$

$$a^2 = 21^2 + 30^2 - 2(21)(30) \cos 123$$

Maze

- > Analyze Law of Sines vs. Law of Cosines
- > The goal is to be efficient
- > Complete all problems on the correct path
- > Turn in your work

Law of Cosines Graphic Organizer

- Complete it
- Glue it in your journal

- Maze is DUE on Thursday

Exit Journal

*Graded for complete sentences,
accuracy, and knowledge*

Explain the difference between using SOH-CAH-TOA, Law of Sines, & Law of Cosines. Use examples as needed.