

6.3 THE AMBIGUOUS CASE

WARM-UP WEDNESDAY

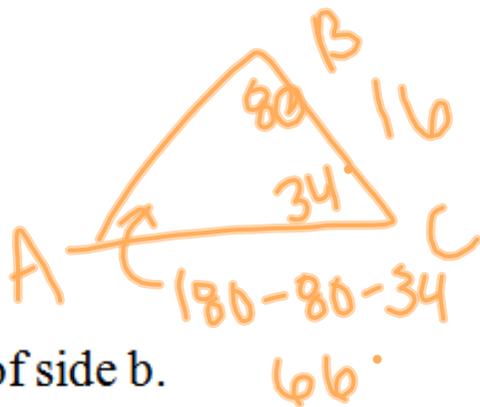
1. In $\triangle ABC$

$$m\angle B = 80^\circ$$

$$m\angle C = 34^\circ$$

$$a = 16$$

Find the length of side b.



$$\frac{\sin 66}{16} = \frac{\sin 80}{b}$$

$$\frac{b \sin 66}{\sin 66} = \frac{16 \sin 80}{\sin 66}$$

$$b = 17.2$$

ABOUT ME

1. What's your favorite cold-weather activity?
2. Predict: Will it snow this school year?

PreCalculus Unit 6.2 HW_Law_of_Sines_1.doc & Cosines

6.2 Law of Sines

Name _____

Solve each triangle for the indicated side to the nearest tenth.

1. $m\angle A = 41^\circ$, $m\angle B = 57^\circ$, $c = 52$; find b

2. $m\angle A = 35^\circ$, $m\angle B = 56^\circ$, $a = 51$; find c

Solve each triangle PQR. Give angles to the nearest degree and sides to the nearest tenth.

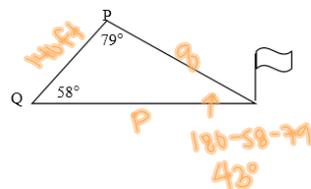
3. $p = 24$, $m\angle Q = 51^\circ$, $m\angle R = 38^\circ$

4. $q = 48$, $m\angle P = 63^\circ$, $m\angle R = 51^\circ$

5. $q = 75$, $m\angle P = 42^\circ$, $m\angle R = 20^\circ$

Solve the following word problem. Give sides to the nearest tenth.

6. From two points P and Q that are 140 ft apart, the lines of sight to a flagpole across a river make angles of 79° and 58° respectively, with the line joining P and Q. What are the distances from P and Q to the flagpole?



distance from P to Flag (q)

$$\frac{\sin 43}{140} = \frac{\sin 58}{q}$$

6.3 THE AMBIGUOUS CASE

ESSENTIAL QUESTION:

What type of oblique triangles have no solutions or multiple solutions?

6.3 THE AMBIGUOUS CASE

ESSENTIAL QUESTION: What type of oblique triangles have no solutions or multiple solutions?

SAS ASA ASS
 SSS AAS AAA ← can't use

Law of sines

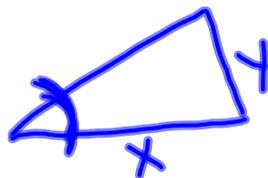
2 angles
 AAS or ASA

Law of cosines

2 sides
 SAS OR SSS
 ↑
 angle between
 2 sides



Ambiguous case:



Angle is not between two sides (ASS)

6.3 THE AMBIGUOUS CASE

ESSENTIAL QUESTION: What type of oblique triangles have no solutions or multiple solutions?

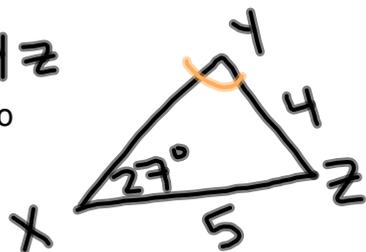
ex. ΔXYZ

$m\angle X = 27^\circ$

$y = 5$

$x = 4$

Solve for $m\angle Y$



$$\frac{\sin 27}{4} = \frac{\sin Y}{5}$$

$$\frac{5 \sin 27}{4} = \frac{4 \sin Y}{4}$$

ASS \rightarrow Ambig. $0.567... = \sin Y$

$$\sin^{-1}(0.567...) = Y$$

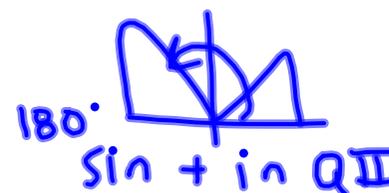
2nd sol'n
 $180 - \text{angle} =$

$145 + 27 ?$
 $172 < 180$

2 solutions

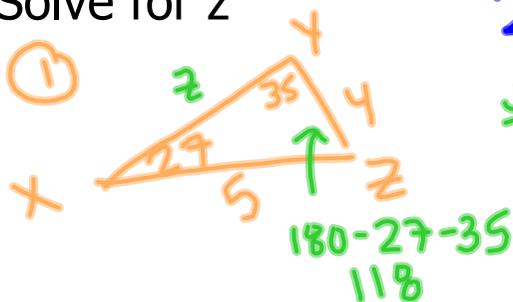
$m\angle Y = 35^\circ$
OR
 145°

unit circle



Solve for z

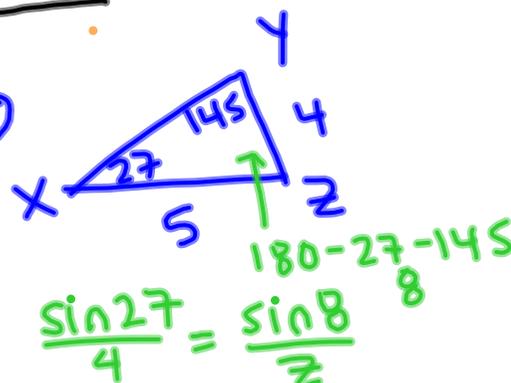
①



$$\frac{\sin 27}{4} = \frac{\sin 118}{z}$$

$z = 7.78$
OR
 1.23

②



$$\frac{\sin 27}{4} = \frac{\sin 8}{z}$$

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ESSENTIAL QUESTION: What type of oblique triangles have no solutions or multiple solutions?

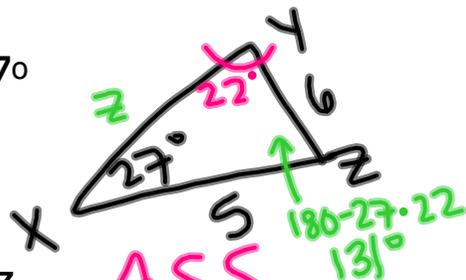
ex.

$m\angle X = 27^\circ$

$y = 5$

$x = 6$

Solve for z



ASS
* Ambig

$$\frac{\sin 27}{6} = \frac{\sin 131}{z}$$

$$z = 9.97$$

$$\frac{\sin 27}{6} = \frac{\sin Y}{5}$$

$$5 \sin 27 = 6 \sin Y$$

$$\sin^{-1}(0.378...) = Y = 22^\circ$$

check for 2nd
 $180 - 22 = 158$
 $158 + 27 < 180$
 ☺ one solution

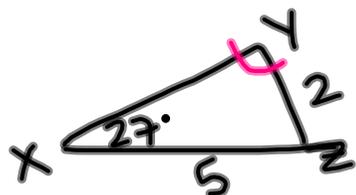
ex.

$m\angle X = 27^\circ$

$y = 5$

$x = 2$

Solve for z



ASS * Ambig

$$\frac{\sin 27}{2} = \frac{\sin Y}{5}$$

$$\sin Y = 1.13...$$

$\sin \theta \neq 1$

NO SOLUTION

PreCalculus Unit 6 Law of Sines and Cosines

6.3 The Ambiguous Case (Law of Sines Day 2) Name _____

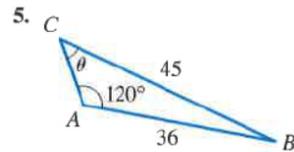
Determine how many solutions (one, two, or none) to the triangle exist.

1. $\angle A = 113^\circ, a = 49, b = 54$

2. $\angle A = 37^\circ, a = 49, b = 54$

3. $\angle A = 110^\circ, a = 76, b = 85$

4. $\angle A = 40^\circ, a = 75, b = 85$

Use the Law of Sines to find the indicated side x or the angle θ .

Solve the triangle using the Law of Sines. When either 1 or 2 solutions exist, solve the triangle or triangles. Round all lengths to the nearest tenth, and all angles to the nearest degree.

6. $a = 28, b = 15, \angle A = 110^\circ$

8. $b = 25, c = 30, \angle B = 25^\circ$

7. $a = 20, c = 45, \angle A = 125^\circ$

9. $a = 50, b = 100, \angle A = 50^\circ$

Closing on Classroom
(6.3)