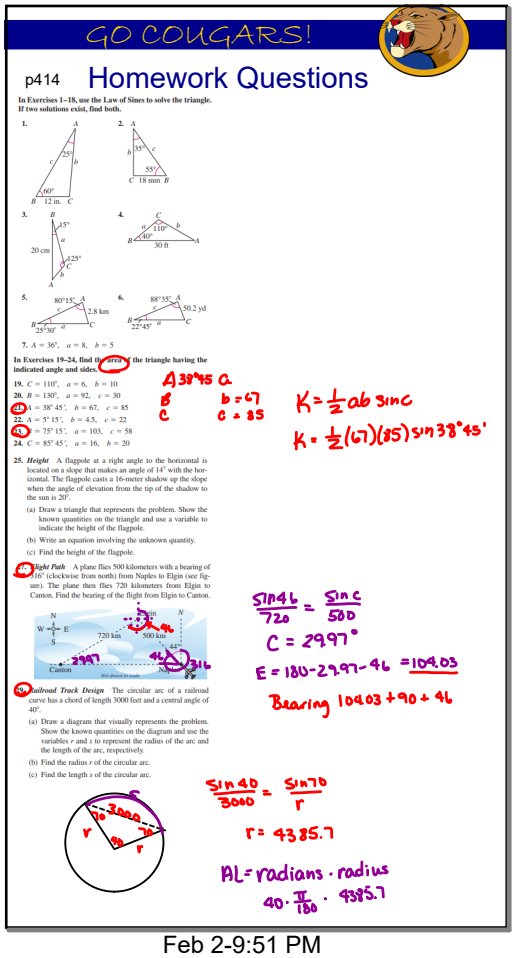

GO COUGARS!

p414 Homework Questions

In Exercises 1–18, use the Law of Sines to solve the triangle. If two solutions exist, find both.

1. A, $55°$, $60°$, B, 12 in., C
2. A, $35°$, b, c, $55°$, C, 18 mm, B
3. B, $15°$, a, 20 cm, $125°$, C, b, A
4. C, $110°$, a, b, $40°$, B, 30 ft, A
5. $80°15'$, A, C, 2.8 km, B, $25°30'$, a, C
6. $88°35'$, A, c, 50.2 yd, B, $22°45'$, a, C
7. $A = 36°$, $a = 8$, $b = 5$

In Exercises 19–24, find the area of the triangle having the indicated angle and sides.

19. $C = 110°$, $a = 6$, $b = 10$
20. $B = 130°$, $a = 92$, $c = 30$
21. $A = 38° 45'$, $b = 67$, $c = 85$
22. $A = 5° 15'$, $b = 4.5$, $c = 22$
23. $C = 75° 15'$, $a = 103$, $c = 58$
24. $C = 85° 45'$, $a = 16$, $b = 20$

25. ***Height*** A flagpole at a right angle to the horizontal is located on a slope that makes an angle of 14° with the horizontal. The flagpole casts a 16-meter shadow up the slope when the angle of elevation from the tip of the shadow to the sun is 20°.
   (a) Draw a triangle that represents the problem. Show the known quantities on the triangle and use a variable to indicate the height of the flagpole.
   (b) Write an equation involving the unknown quantity.
   (c) Find the height of the flagpole.

26. ***Flight Path*** A plane flies 500 kilometers with a bearing of 46° (clockwise from north) from Naples to Elgin (see figure). The plane then flies 720 kilometers from Elgin to Canton. Find the bearing of the flight from Elgin to Canton.

27. ***Railroad Track Design*** The circular arc of a railroad curve has a chord of length 3000 feet and a central angle of 40°.
   (a) Draw a diagram that visually represents the problem. Show the known quantities on the diagram and use the variables r and s to represent the radius of the arc and the length of the arc, respectively.
   (b) Find the radius r of the circular arc.
   (c) Find the length s of the circular arc.

A 38°45' a
B $b = 67$
C $c = 85$

$K = \frac{1}{2}ab\sin C$

$K = \frac{1}{2}(67)(85)\sin 38°45'$

$\frac{\sin 46}{720} = \frac{\sin C}{500}$

$C = 29.97°$

$E = 180 - 29.97 - 46 = 104.03$

Bearing $104.03 + 90 + 46$

$\frac{\sin 40}{3000} = \frac{\sin 70}{r}$

$r = 4385.7$

$AL = \text{radians} \cdot \text{radius}$

$40 \cdot \frac{\pi}{180} \cdot 4385.7$

Feb 2-9:51 PM

6-1 Law of Sines

Ambiguous Case

Apr 3-5:23 PM

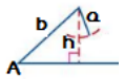
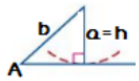
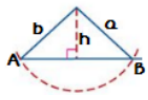
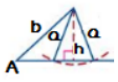
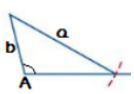
What does ambiguous mean?

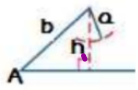
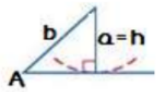
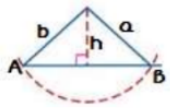
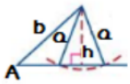
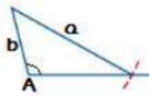
For SSA cases: where there are multiple outcomes that could occur depending on angle and side lengths

Mar 19-5:56 AM

LAW of SINES–The Ambiguous Case (SSA)

2 given sides: a and b; 1 given angle A; h is the altitude of the triangle- where h = bsin A

Conditions	What it looks like	Solutions
A is acute a < b and a < h		
A is acute a < b and a = h		
A is acute $a \geq b$		
A is acute h < a < b		
A is obtuse a > b		
A is obtuse $a \leq b$		

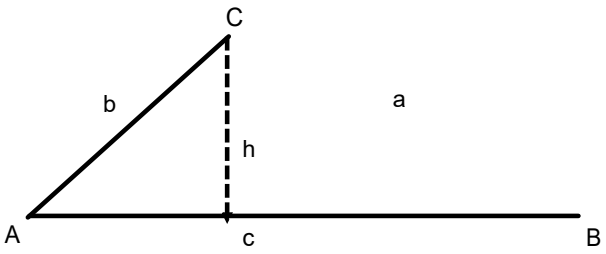
Conditions	What it looks like	Solutions
A is acute a < b and a < h		no triangle
A is acute a < b and a = h		1 triangle (Right)
A is acute $a \geq b$		1 Δ.
A is acute h < a < b		2 triangles
A is obtuse a > b		1 Δ.
A is obtuse a ≤ b		none

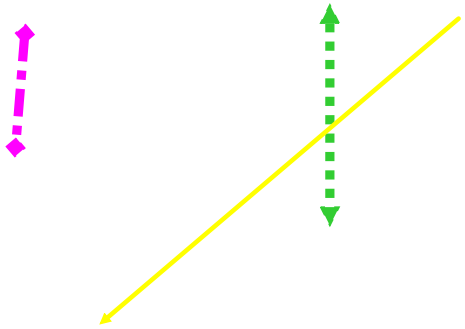
If you are given only one acute angle.....always test to determine the number of triangles.

Find h if h < a < b then two triangles!!!!
(big, bigger, biggest)

Remember: the variables may be different, so if the height is smaller than the opposite side and the opposite side is smaller than the adjacent side, then you have an ambiguous triangle.

Apr 3-11:16 AM





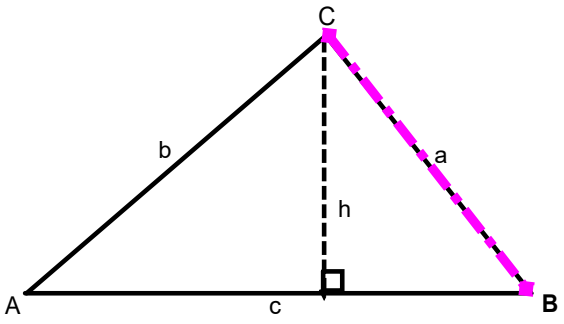
The angle given is acute. We will call it A.

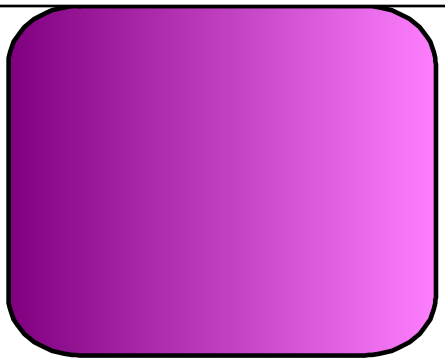
a < h no triangle

a = h one triangle - right

a ≥ b one triangle

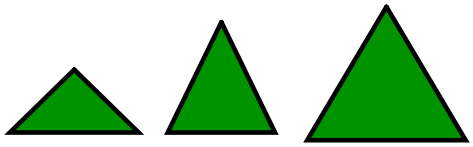
Apr 3-10:59 AM





h < a < b two triangles

What changes?



If you are given 2 angles can there be two triangles?

Apr 3-11:10 AM

Example 1

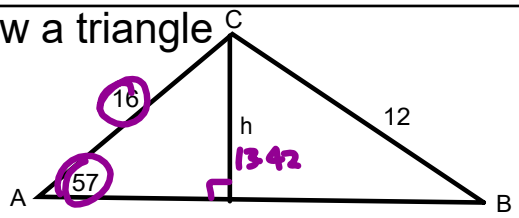
$A = 57^\circ$, $a = 12$, $b = 16$

$\sin 57 = \frac{h}{16}$

$16 \sin 57 = h$

$13.42 = h$

Draw a triangle



Only one angle is given so find h.
0, 1, or 2 triangles?

$13.42 < 12 < 16$? no not 2 Δ

$13.42 < 12$? no not 1 Δ

no Δ

A = 57	a = 12
B = X	b = 16
C = X	c = X

no Δ!

Apr 3-4:42 PM

Example 2

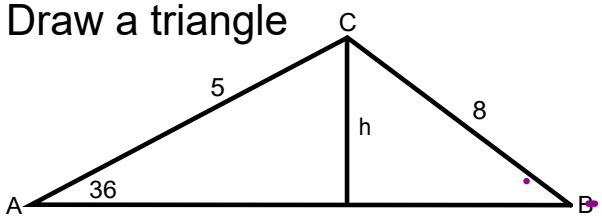
$A = 36^\circ$, $a = 8$, $b = 5$

$\sin 36 = \frac{h}{5}$

$5 \sin 36 = h$

$h = 2.94$

Draw a triangle



find h - 0, 1, or 2 triangles?

$2.94 < 8 < 5$ not 2 Δ!

$2.94 < 8$ yes so 1 Δ

use LOS to solve

A = 36	a = 8
B = 21.55	b = 5
C = 122.45	c = 11.49

Apr 3-4:50 PM

Example 3

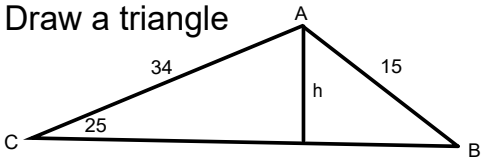
C = 25, b = 34, c = 15

$\sin 25 = \frac{h}{34}$

$34 \sin 25 = h$

$h = 14.36$

Draw a triangle



find h - 0, 1, or 2 triangles?

$14.36 < 15 < 34$? yes

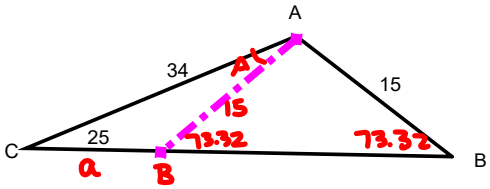
2 Δs!

Δ#1

A = 81.68 a = 35.12

B = 73.32 b = 34

C = 25 c = 15



$\frac{\sin 25}{15} = \frac{\sin 73.32}{a}$

$a = \frac{15 \sin 73.32}{\sin 25}$

$180 - 25 - 106.68$

$180 - 73.32$

A = 48.32 a = 21.51

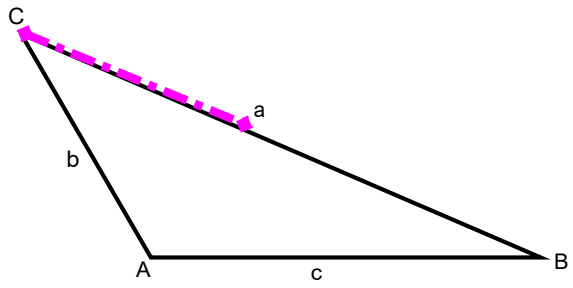
B = 106.68 b = 34

*C = 25 c = 15

A	81.68	48.32
B	73.32	106.68
a	35.12	21.51

Apr 3-4:56 PM

What if the given angle is obtuse?



If a > b 1 triangle

If a < b 0 triangle

If the given angle is obtuse can the triangle be ambiguous?
So proceed to solve as usual!

Apr 3-5:16 PM

HOMEWORK

pg. 414 (11 - 17 odd, 31, 33, 43, 44)
and
WB p. 150-151 (law of sine wd pb)

Feb 2-9:51 PM

LOS Word Problem Worksheet answers

1. ship to post A = 4.06 miles and ship to shore = 2.47 miles
2. AF = 8.06 miles, BF = 4.82 miles
3. height = 352.7 ft
4. 14,498.01 ft
5. 5.77 and 3.12
6. 108.6 ft
7. 61.7 ft
8. 158.9 ft
9. 108.8 ft
10. 1.64 miles
11. R = 7.76 mm, s = 13.4 mm
12. 39.73 ft

More LOS Practice Worksheet

1. no triangle
2. A = 38.6, B = 105.4, b = 26.2
   A = 141.4, B = 2.6, b = 1.2
3. no triangle
4. A = 37.1, C = 60.9, a = 10.4
5. A = 99, a = 28.3, b = 19.1
6. A = 24.6, B = 80.4, a = 20.7
   A = 5.4, B = 99.6, a = 4.7

Mar 20-8:19 AM