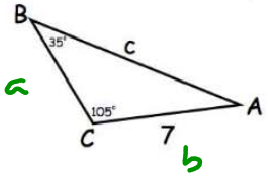
Name:_____ Date:_____
Period:____ Mr. Valentino

Aim: What is the law of cosines?

Do Now: Solve for the missing side in ΔABC. Round to the nearest tenth.



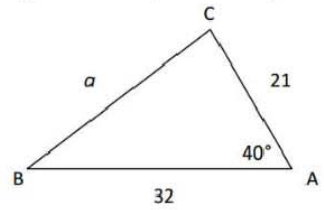
$\frac{\sin 35}{7} = \frac{\sin 105}{c}$

$c\sin 35 = 7\sin 105$

$\frac{c\sin 35}{\sin 35} = \frac{7\sin 105}{\sin 35}$

$c = 11.8$

Suppose we were given the triangle below. Could we use the Law of Sines to find a? Why or why not?



No, there is only one angle measure (not enough info) ~

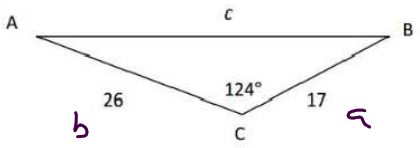
Law of Cosines

Useful for finding:

(1) Given two sides and the included angle, find a missing side.
(2) Given three sides, find a missing angle.
(3) Given two sides and the non-included angle, find a missing side.

$$c^2 = a^2 + b^2 - 2ab\cos C$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$a^2 = b^2 + c^2 - 2bc\cos A$$

Find the length of the missing side (round to the nearest hundredth)

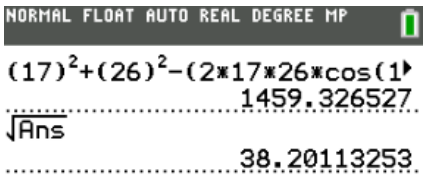


$c^2 = a^2 + b^2 - 2ab\cos C$

$c^2 = (17)^2 + (26)^2 - (2(17)(26)\cos(124))$

$\sqrt{c^2} = \sqrt{1459.326527}$

$c = 38.20$



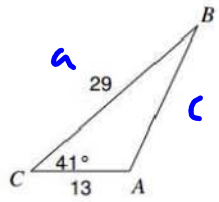
$$a^2 = b^2 + c^2 - 2bc\cos A$$

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

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

For 1-4, find the missing lengths to the nearest whole number.

1) Find AB



a
c
b

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

$c^2 = 29^2+13^2-2(29)(13)\cos 41$

NORMAL FLOAT AUTO REAL DEGREE MP

$29^2+13^2-(2*29*13*\cos(41))$

440.9489765

$\sqrt{\text{Ans}}$

20.99878512

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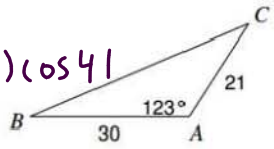
2) Find BC



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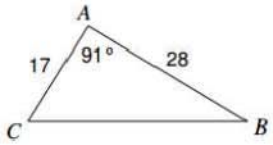
3) Find BC



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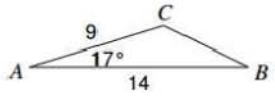
4) Find BC



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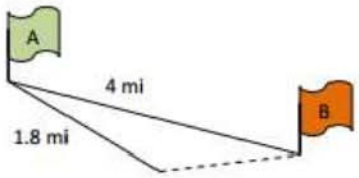
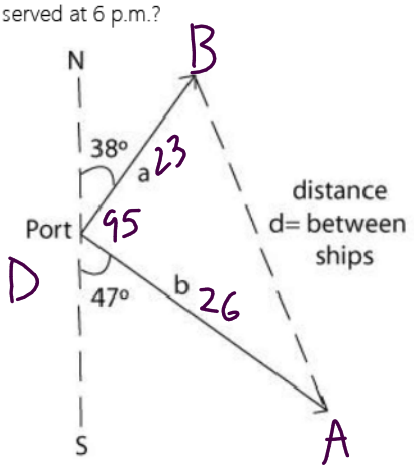
5. Mary is orienteering across a large flat plain from Marker A to Marker B which are 4 miles apart. After walking 1.8 miles she realizes she is 6° off-course. To the nearest tenth of a mile, how far from Marker B is she when she realizes her error?



6. Two ships leave port at 4 p.m. One is headed at a bearing of NE 38° and is traveling at 11.5 miles per hour. The other is traveling 13 miles per hour at a bearing of SE 47°. To the nearest mile, how far apart are they when dinner is served at 6 p.m.?



$d^2 = a^2 + b^2 - 2ab\cos 95$

$d^2 = 23^2 + 26^2 - 2(23)(26)\cos 95$

$\sqrt{d^2} = \sqrt{1309}$

$d = 36$ miles