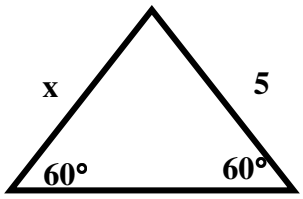
GRADE 11 ESSENTIAL
UNIT G – TRIGONOMETRY
SINE LAW (w/o Ambiguity)

Name: _____
Date: _____

- **Show** all work. **Round** all answers to two decimal places. I give the answer to one decimal place so you know if you are likely correct.
- **Notes** are at the back.
- Figures are **not necessarily to scale**, believe the numbers, not the sketched diagram.

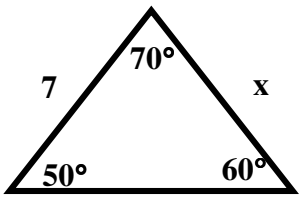
1. Find the unknown side '***x***' using the Sine Law.

a.



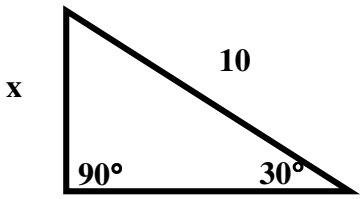
Ans: x=5 Obvious from geometry.

b.



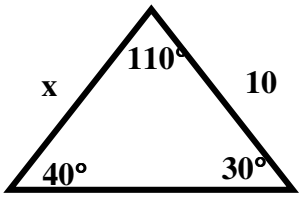
Ans: 6.2

c.



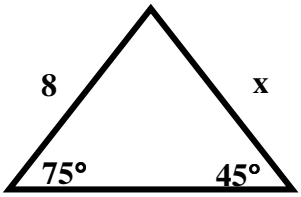
Ans: x = 5

d.

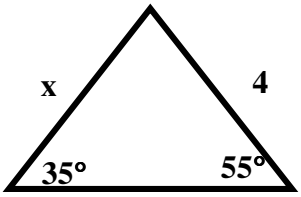


Ans: x=7.8

e.



f.

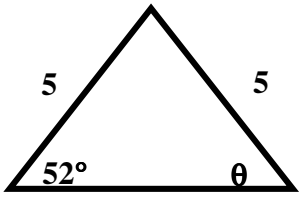


Ans: x= 10.9

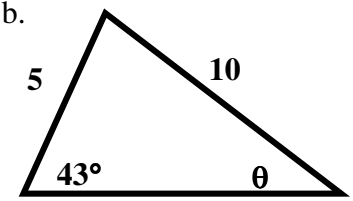
Ans: **5.7**

2. Find the value of missing angle θ to 2 decimal place degrees.

a.



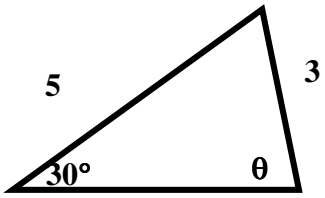
b.



Ans: θ=52.0° (Obvious)

Ans: 19.9°

c.

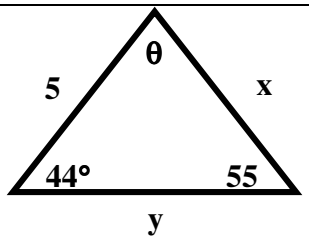


This has a special 'ambiguous case' case we will learn more about in Grade 12, **θ** *actually has two answers.*

Ans: 56.4° is *one* of the answers, *the other possible answer is 123.6°*

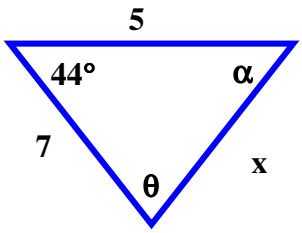
3. Solve the complete the entire triangle for all the indicated unknown values. You will need to use the sine ***and*** the cosine law. (remember, if you are given any three measures of any triangle you can figure out all the other measures [except for one case]):

a.



Ans: x = 4.2; y = 6.0; θ = 81.0°

b.



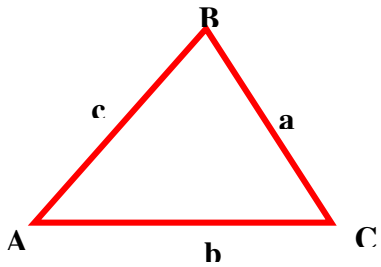
Ans: x = 4.9; θ = 45.6°; α = 90.4°

Caution; any amount of rounding off in the middle of calculations can make a big 5° or even 8° difference from this answer when corners are near 90° or 0°.

FORMULA

Sine Law

For any triangle ABC, the following relationship between an angle (big Letter) and its opposite side (little letter) is:

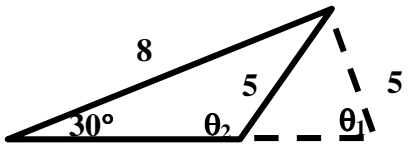
$\frac{a}{Sin\ A}=\frac{b}{\sin B}$; and $\frac{b}{Sin\ B}=\frac{c}{\sin C}$; and $\frac{a}{Sin\ A}=\frac{c}{\sin C}$; or all in one statement: $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$ since these are just ratios the following is also true: $\frac{\sin A}{a}=\frac{\sin B}{b}=\frac{\sin C}{c}$	

- Use the SINE LAW when:
  - two **angles** and one of their opposite sides is known; *or*
  - two **sides** and one of their opposite angles is known**.**

Ambiguity with Sine Law

Only occurs when finding an angle

Only occurs when given an angle, an adjacent side, and an opposite side **and** if the opposite side is shorter than the adjacent side.

	There are two possible triangles that have a short 5 stubby thing hanging off an angled long 10 thing. The sine law will always give the acute angle at θ_1; but θ_2; which is (**180° - θ_1**) also works. You are not normally asked for both answers in Grade 11 essential.

Selection of Law. If in doubt what law to use, just try one and see if you have enough information. If one law doesn't work the other will.

Cosine Law

Recall also the cosine law you may need on this assignment

$a^2=b^2+c^2-2bc*\cos(A)$; provided that ∠**A** is across from side '***a***'.

used when you have:

two sides and an included angle given; or

all three sides given