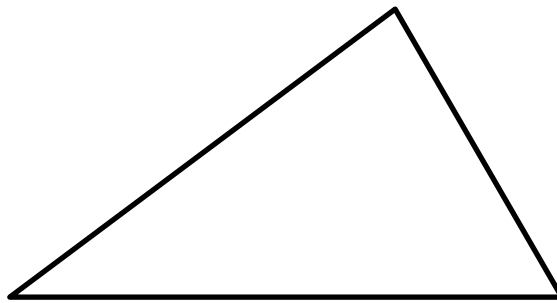# Chapter 3: Trigonometry

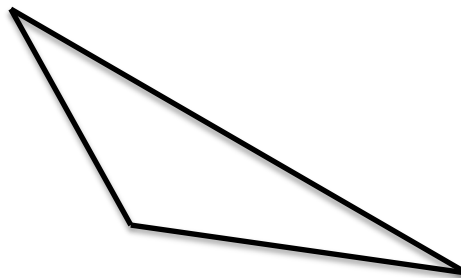**3.3 Sine Law**   *For solving some types of _____ triangles*

$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$$

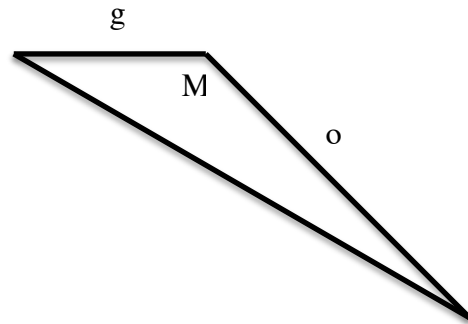**Part 1 – Labeling** a non-right triangle correctly
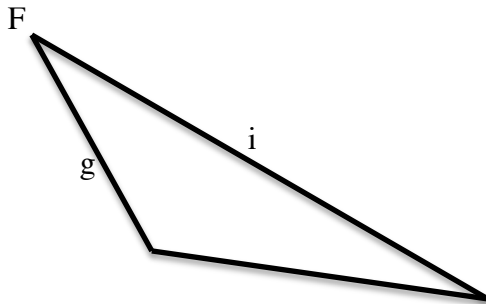
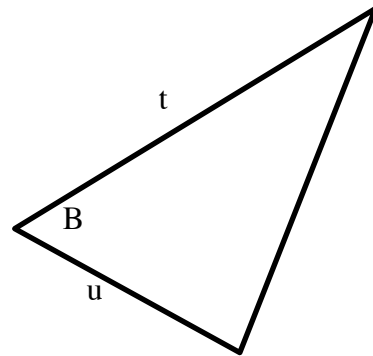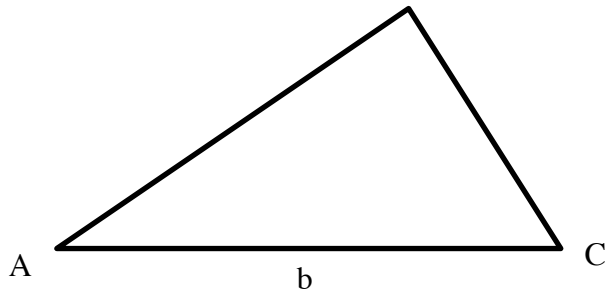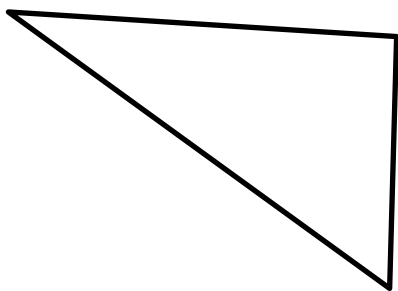The Formula uses letters ABC like this:

But any three letters can be used

Assignment:

Complete the labels for each triangle. Make sure each pair of opposite sides/angles is matched with the same letter.

A
b
C

t
B
u

F
g
i

g
M
o

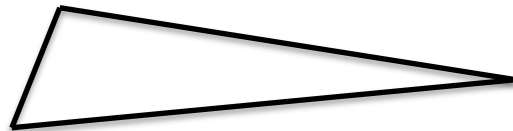*Label the following triangles with the given letters:*

FUN   *DIN*

Create your own unique triangles and label them with the following letters
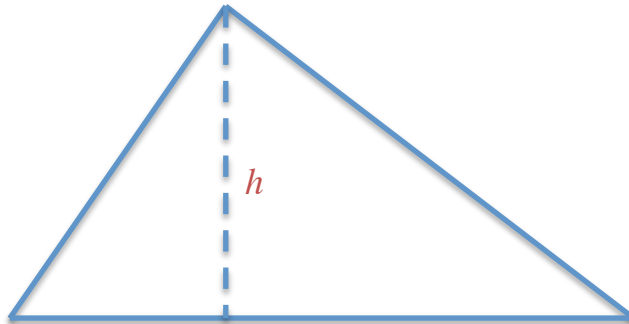
CAN   *RIP*

Part 2 – Where does sine law formula come from? Why does it work?
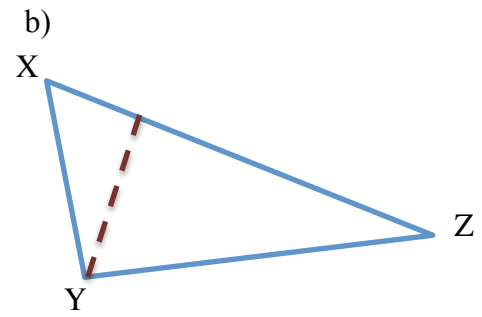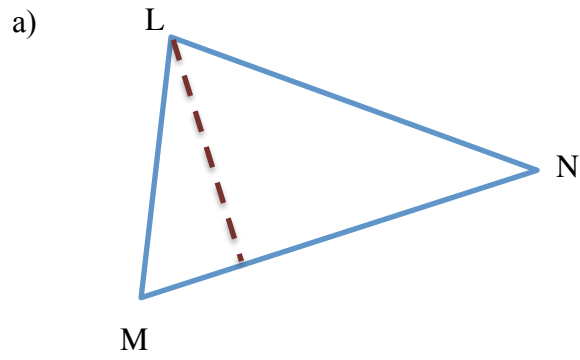
$$\frac{a}{sin\text{A}} = \frac{b}{sin\text{B}} = \frac{c}{sin\text{C}}$$

The sine law is a short cut to figure out this type of question without using SOH CAH TOA. The sine law is related to the height of a triangle.

Assignment

Follow the steps on the previous page of the notes to create equivalent ratios for these triangles:

a)

L

N

M

b)

X

Y

Z

Part 3 – How to set up the sine law ratio:

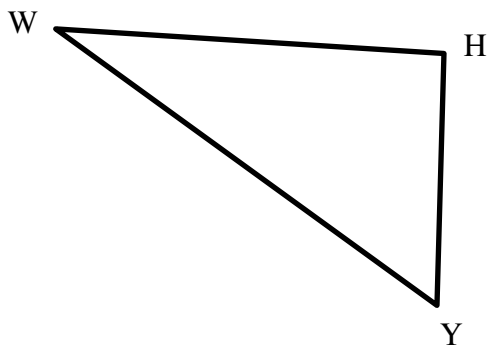On the test and final exam, the sine law formula will be written like this:

$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$$
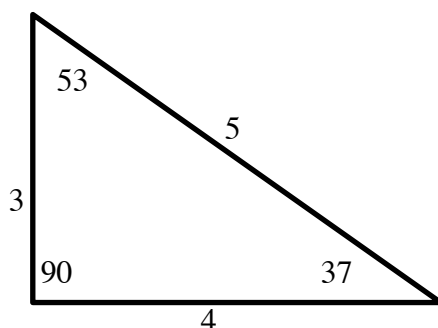
But it can also be written upside-down:

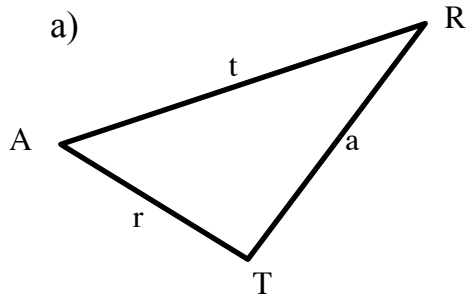And it can be made specific to the letters and numbers in the question:

Example:
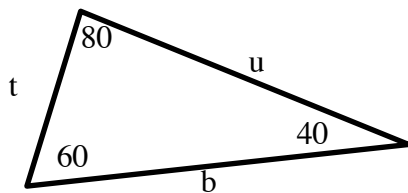
W

H

Y

Example:

53

5

3

90   37

4

Assignment:

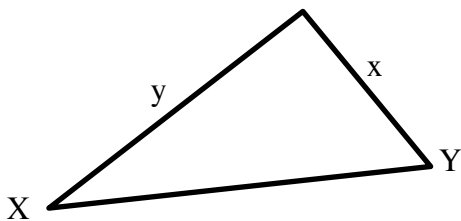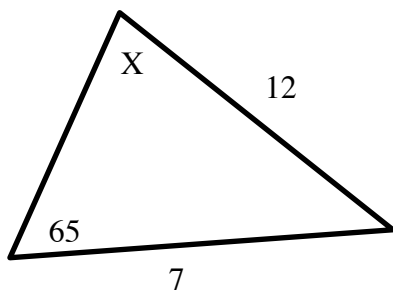1) Write the sine law ratio for each of the following triangles

a)

b)

2) Write the sine law just for the two ratios given in the question:
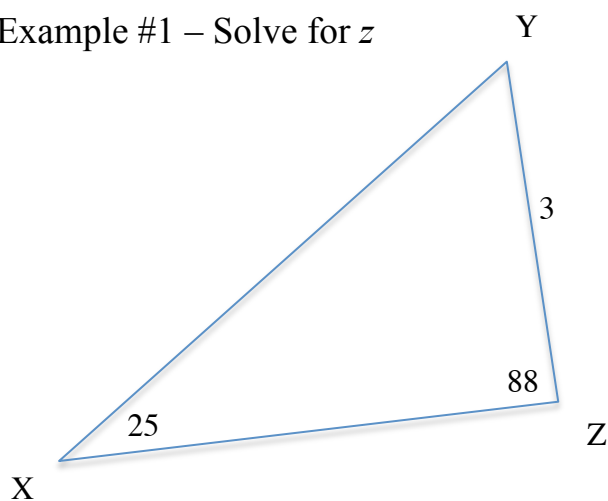
a)

b)

To use the sine law formula, you do not need all three ratios:

Step #1 - Put the unknown value on the top of the first ratio and its opposite side/angle on the bottom
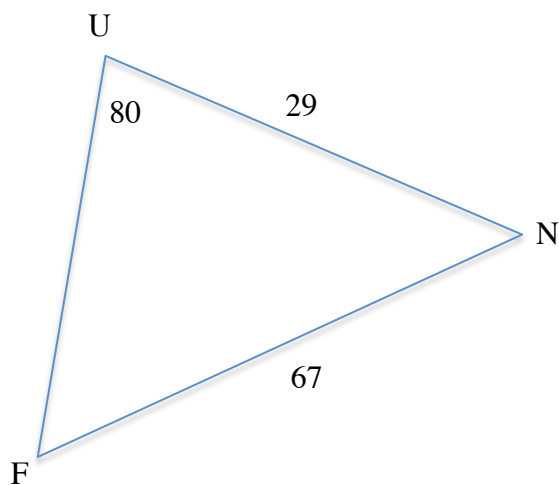
Step #2 – Use the pair of opposites that are given in the question as the other ratio.

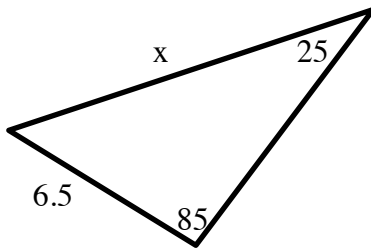**Step #3** – Solve for the unknown

Example #1 – Solve for *z*

Y

3

88

25

Z

X

Example #2 – Solve for F

U
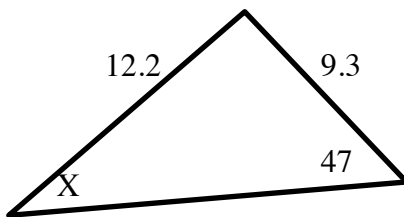
80   29

N

67

F

Assignment:

$$\frac{a}{sin\text{A}} = \frac{b}{sin\text{B}} = \frac{c}{sin\text{C}}$$

1) Solve for the unknown side length or angle. Round your answer to one decimal place.

a)

x   25

6.5

85

b)

12.2   9.3

X   47

c)

9.7

X

88   8.4

BONUS d)

115   4.3

28
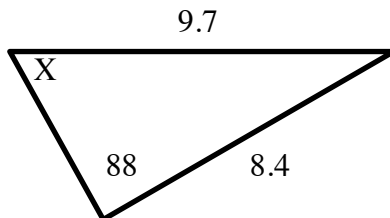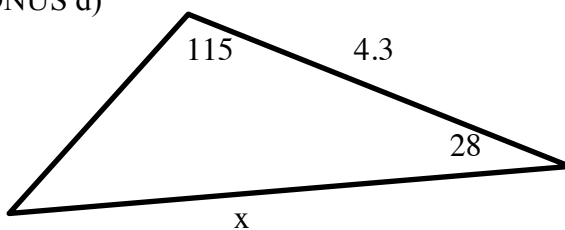
x

Answers
a) 15.3   b) 33.9   c) 59.9   d) 6.5

2) Sketch a triangle that corresponds to each equation below. Then solve for the unknown side length or angle. Round your answer to one decimal place.

a) $\dfrac{x}{sin50°} = \dfrac{8.0}{sin60°}$	b) $\dfrac{sinX}{6.0} = \dfrac{sin72°}{10.0}$
c) $\dfrac{n}{sin43°} = \dfrac{9.5}{sin85°}$	*BONUS d)* $\dfrac{12.5}{sinN} = \dfrac{14.0}{sin88°}$

Answers
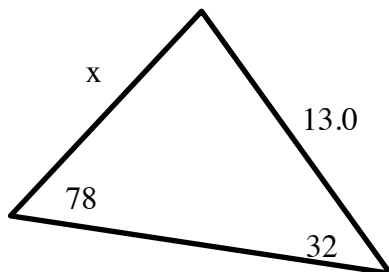a) 7.1   b) 34.8   c) 6.5   d) 63.2

Practice Quiz

$$\frac{a}{sin\text{A}} = \frac{b}{sin\text{B}} = \frac{c}{sin\text{C}}$$

1) Using basic trig ratios and the height of the triangle, write the steps to prove the Sine Law for the following triangle

E

F

D
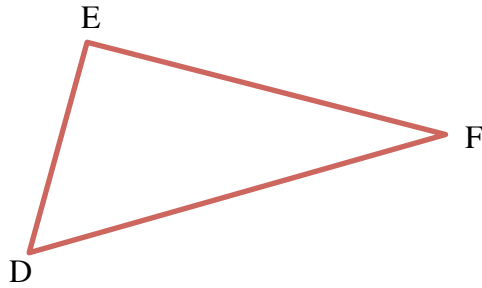
2) Solve for the unknown side length or angle. Round your answer to one decimal place.

x

13.0

78

32

Answers
1) see notes "Part 2" and change ABC to DEF
2) 7.0