L48 – Worksheet –The Sine Law
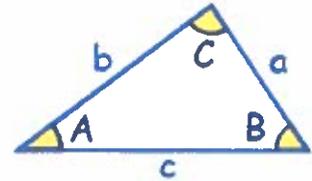
Quick Note

Sine Law:

$$\frac{Sin A}{a} = \frac{Sin B}{b} = \frac{Sin C}{c} \quad \text{or} \quad \frac{a}{Sin A} = \frac{b}{Sin B} = \frac{c}{Sin C}$$

Note: Questions have been taken from the Math 20-1 textbook, but are appropriate for Ma20-2.

Part 2 – Textbook Questions

Pg 108 #2: Determine the length of AB in each.

a)

$$\frac{Sin B}{b} = \frac{Sin C}{c}$$

$$\frac{Sin 88}{44} = \frac{Sin 57}{c}$$

$$c = 36.9 \text{ mm}$$

b)

$$\frac{Sin C}{c} = \frac{Sin A}{a}$$

$$\frac{Sin 118}{c} = \frac{Sin 52}{45}$$

$$c = 50.4 \text{ m}$$

Pg 108 #4cd: Determining the lengths of all three sides and the measure of all three angles is called solving a triangle. Solve each triangle.

c)   A   22°

29 mm = b

(119°)   39°   C

B   a

$$\frac{Sin B}{b} = \frac{Sin A}{a}$$

$$\frac{Sin 119}{29} = \frac{Sin 22}{a}$$

$$a = 12.4 \text{ mm}$$

$$\frac{Sin B}{b} = \frac{Sin C}{c}$$

$$\frac{Sin 119}{29} = \frac{Sin 39}{c}$$

$$c = 20.9 \text{ mm}$$

d)   A   b = 21 cm   48°   61° C

c   a

71°

B

$$\frac{Sin B}{b} = \frac{Sin A}{a}$$

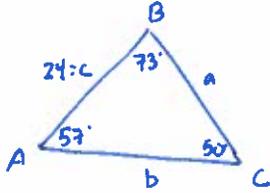$$\frac{Sin 71}{21} = \frac{Sin 48}{a}$$

$$a = 16.5 \text{ cm}$$

$$\frac{Sin B}{b} = \frac{Sin C}{c}$$

$$\frac{Sin 71}{21} = \frac{Sin 61}{c}$$

$$c = 19.4 \text{ cm}$$

Math 20-2

Pg 108 #5ab: Sketch each triangle. Determine the measure of the indicated side.

In $\triangle ABC$, $\angle A = 57^0$, $\angle B = 73^0$, and $AB = 24$cm. Find the length of AC.
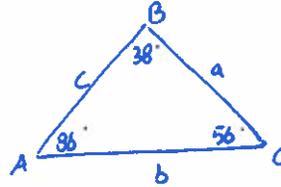

$$\frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 73}{b} = \frac{\sin 50}{24}$$

$$b = 30.0cm$$

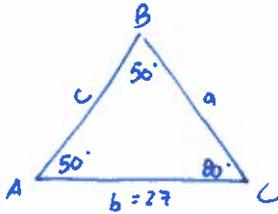In $\triangle ABC$, $\angle B = 38^0$, $\angle C = 56^0$, and $BC = 63$cm. Find the length of AB.

$$\frac{\sin A}{a} = \frac{\sin C}{c}$$

$$\frac{\sin 86}{63} = \frac{\sin 56}{c}$$

$$c = 52.4cm$$

Pg 108 #5cd: Sketch each triangle. Determine the measure of the indicated side.

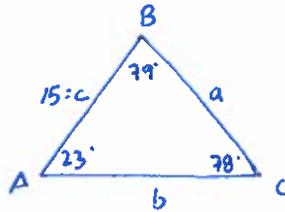In $\triangle ABC$, $\angle A = 50^0$, $\angle B = 50^0$, and $AC = 27$cm. Find the length of AB.

$$\frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 50}{27} = \frac{\sin 80}{c}$$

$$c = 34.7 \text{ cm}$$

In $\triangle ABC$, $\angle A = 23^0$, $\angle C = 78^0$, and $AB = 15$cm. Find the length of BC.

$$\frac{\sin A}{a} = \frac{\sin C}{c}$$
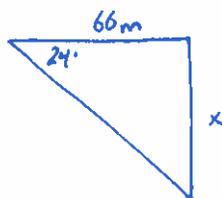
$$\frac{\sin 23}{a} = \frac{\sin 78}{15}$$

$$a = 6.0cm$$

🔲 Key 🔲

Pg 108 #14: From the window of his hotel in Saskatoon *(well above the statue)*, Max can see statues of Chief Whitecap of the Whitecap First nation and John Lake, leader of the Temperance Colonists, who founded Saskatoon. The angle formed by Max's lines of sight to the top and to the foot of the statue of Chief Whitecap is 3^0. The angle of depression of Max's line of sight to the top of the statue is 21^0. The horizontal distance between Max and the front of the statue is 66m.
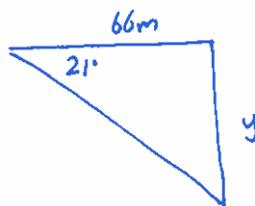
a. Sketch a diagram to represent this problem.
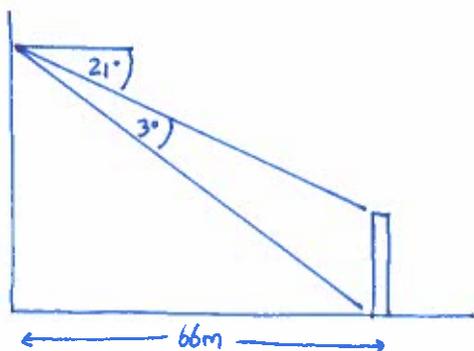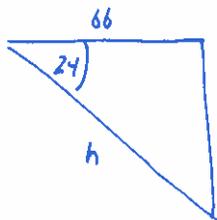

b. Determine the height of the statue of Chief Whitecap.

$$\text{Tan } \theta = \frac{o}{a}$$
$$\text{Tan } 24 = \frac{x}{66}$$
$$x = 29.4m$$

$$\text{Tan}\theta = \frac{o}{a}$$
$$\text{Tan} 21 = \frac{y}{66}$$
$$y = 25.3m$$

$$\text{Height} = x - y$$
$$= 4.1 m$$

c. Determine the line-of-sight distance from where Max is standing at the window to the foot of the statue.

$$\text{Cos } \theta = \frac{a}{h}$$
$$\text{Cos} 24 = \frac{66}{h}$$
$$h = \frac{66}{\text{Cos} 24}$$
$$h = 72.2m$$