

Name: Solutions

Date: _____

MBF 3C

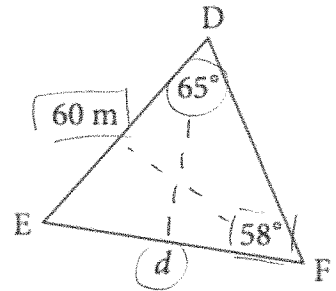
Assignment: The Sine Law

- Before you begin, make sure that your scientific calculator is in DEG mode.
- You may consult your notes, pictures, anchor charts, or Internet as resources to support your work.
- Complete EITHER Part A OR Part B to the best of your ability on the assignment paper.
- Show all organized steps neatly, including appropriate use of symbols, diagrams, labels, rounding, and key terms.

Part A

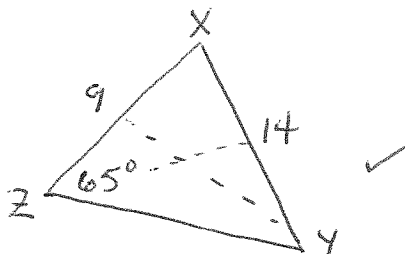
1. For the given non-right triangle, write the Sine Law equation that would allow you to solve for side d .

$$\frac{\sin D}{d} = \frac{\sin F}{f} \quad ; \quad \frac{\sin 65^\circ}{d} = \frac{\sin 58^\circ}{60} \quad \checkmark$$



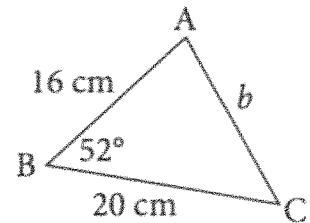
2. For the given Sine Law equation, sketch a labeled diagram of its corresponding triangle, XYZ.

$$\frac{\sin Y}{9} = \frac{\sin 65^\circ}{14}$$



3. Examine the triangle below. Would you use the Sine Law to solve for the indicated side? Explain why or why not.

NO. You NEED TO HAVE AT LEAST ONE ANGLE ACROSS FROM ONE OF THE GIVEN SIDE LENGTHS ✓



4. Solve the following Sine Law equation for z . Round the side length to the nearest unit.

$$\frac{z}{\sin 79^\circ} = \frac{14}{\sin 65^\circ}$$

$$z = \frac{14 \sin 79^\circ}{\sin 65^\circ}$$

$$z \cdot \sin 65^\circ = 14 \sin 79^\circ \quad (\text{Cross-multiply}) \quad z \approx 15 \text{ units} \quad \checkmark$$

$$\frac{z \cdot \sin 65^\circ}{\sin 65^\circ} = \frac{14 \sin 79^\circ}{\sin 65^\circ} \quad (\text{Divide by } \sin 65^\circ \text{ to isolate } z)$$

5. Solve the following Sine Law equation for angle Y . Round your answer to the nearest degree.

$$\frac{\sin Y}{9} = \frac{\sin 65^\circ}{14}$$

$$\sin Y = \frac{9 \cdot \sin 65^\circ}{14}$$

$$14 \cdot \sin Y = 9 \sin 65^\circ \quad (\text{cross-multiply})$$

$$Y = \sin^{-1} \left(\frac{9 \sin 65^\circ}{14} \right)$$

$$\frac{14 \cdot \sin Y}{14} = \frac{9 \sin 65^\circ}{14} \quad (\text{Divide by 14 to isolate } \sin Y) \quad Y \approx 36^\circ \quad \checkmark$$

← use inverse sin to calculate the angle.

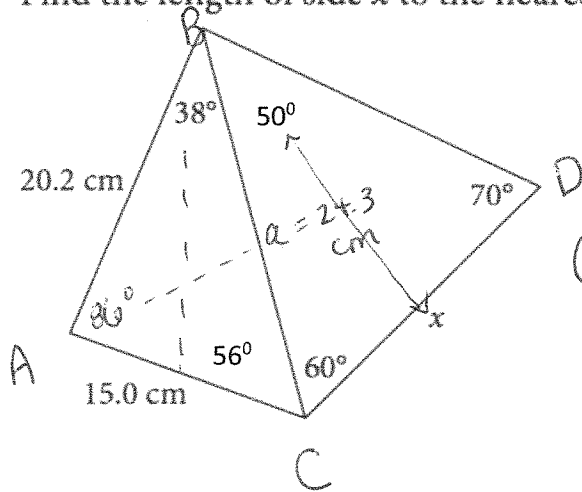
Part B

Solution.

Solve the following problem.

Problem

Find the length of side x to the nearest tenth of a centimetre.



Hint: Start by working with the triangle on the left.

(i) In $\triangle ABC$, start by finding the length of side a .

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

$$\checkmark \frac{\sin 86^\circ}{a} = \frac{\sin 38^\circ}{15}$$

$$\checkmark a \cdot \sin 38^\circ = 15 \sin 86^\circ$$

$$\frac{a \cdot \cancel{\sin 38^\circ}}{\cancel{\sin 38^\circ}} = \frac{15 \sin 86^\circ}{\sin 38^\circ}$$

$$a = \frac{15 \sin 86^\circ}{\sin 38^\circ} \checkmark$$

$$a \approx 24.3 \text{ cm} \checkmark$$

(ii) ; $\angle A = 180^\circ - (38^\circ + 56^\circ) = 86^\circ \checkmark$

(iii) Finish solution by using the Sine Law to calculating the length of x .

$$\checkmark \frac{\sin 50^\circ}{x} = \frac{\sin 70^\circ}{24.3}$$

$$\checkmark 24.3 \sin 50^\circ = x \cdot \sin 70^\circ$$

$$\checkmark \frac{24.3 \sin 50^\circ}{\sin 70^\circ} = x$$

$$\checkmark 19.8 \text{ cm} \approx x$$