

Law of Sine
Law of Cosine
SOH CAH TOA

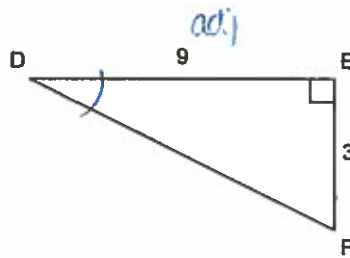
Math 2201: June Review

Chapter 3: Acute Triangle Trigonometry

1. Determine the measure of $\angle D$ to the nearest tenth of a degree.

A

- (A) 18.4°
- (B) 19.5°
- (C) 70.5°
- (D) 71.6°



$$\tan \angle D = \frac{3}{9}$$

$$\tan^{-1}\left(\frac{3}{9}\right) = \angle D$$

$$\angle D = 18.4^\circ$$

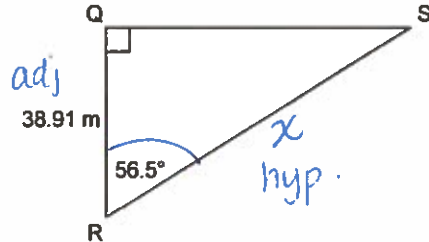
2. A surveyor made the measurements shown in the diagram. Determine the distance from R to S, to the nearest hundredth of a meter.

D

- (A) 25.75 m
- (B) 46.66 m
- (C) 58.79 m
- (D) 70.50 m

$$\cos 56.5 = \frac{38.91}{x}$$

$$0.5519 = \frac{38.91}{x}$$



$$x = \frac{38.91}{0.5519}$$

$$x = 70.5 \text{ m}$$

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

3. If a triangle has sides of lengths a , b and c , then according to the Law of Sines, what does a equal?

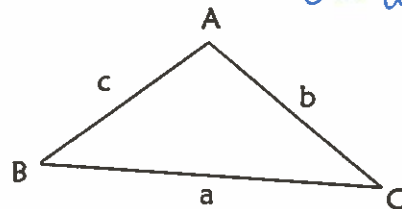
B

- (A) $\frac{c \sin C}{\sin A}$ x
- (B) $\frac{c \sin A}{\sin C}$ ✓
- (C) $\frac{c \sin B}{\sin A}$ x
- (D) $\frac{\sin C}{a \sin A}$ x

4. Which of the following would be the correct formula to use for finding the length of AB?

C

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



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

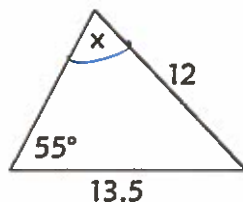
law of cosine

5. Find the measure of the missing angle to the nearest degree.

A

- (A) 67°
- (B) 23°
- (C) 50°
- (D) 35°

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$$\frac{13.5}{\sin x} = \frac{12}{\sin 55}$$

$$\frac{13.5 \cdot \sin 55}{12} = \sin x$$

$$x = 67^\circ$$

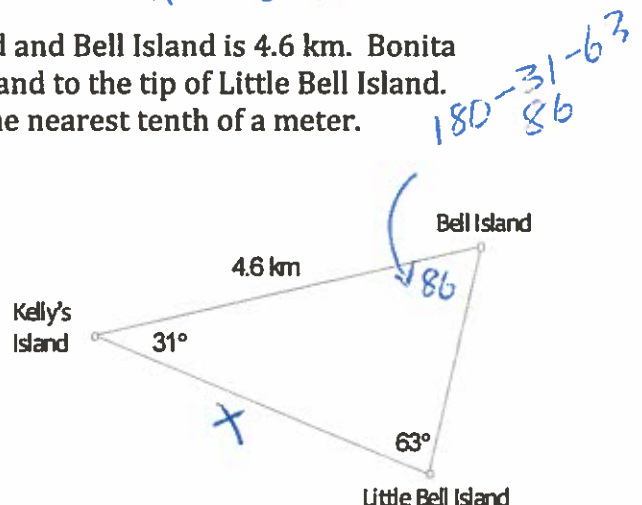
6. The straight-line distance between Kelly's Island and Bell Island is 4.6 km. Bonita and John want to take their boat from Kelly's Island to the tip of Little Bell Island. How far will they travel? Give your answer to the nearest tenth of a meter.

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law of sine

$$\frac{x}{\sin 86} = \frac{4.6}{\sin 63}$$

$$x = \frac{4.6 \cdot \sin 86}{\sin 63}$$

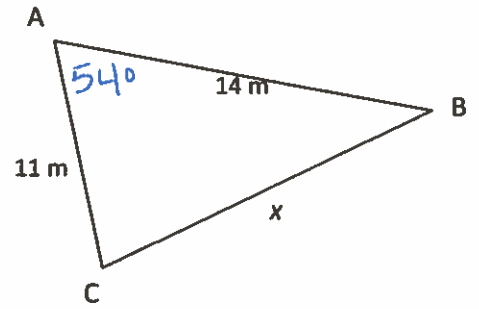
$$x = 5.2 \text{ km}$$



SAS law of cosine

7. Find the missing value of x in the following triangle to the nearest meter.

$$\begin{aligned} x^2 &= 11^2 + 14^2 - 2(11)(14)\cos 54 \\ &= 121 + 196 - 181.04 \\ &= 135.96 \\ x &= \sqrt{135.96} \\ x &= 11.7 \text{ m} \end{aligned}$$



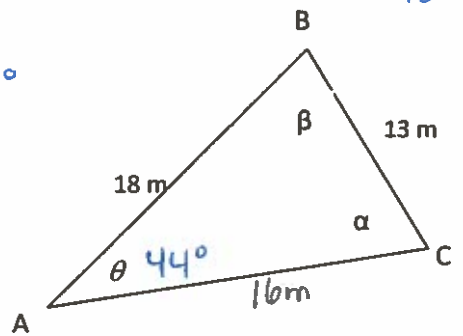
8. Solve the triangle.

Find three missing angles

SSS law of cosine to start

$$\cos \theta = \frac{18^2 + 16^2 - 13^2}{2(18)(16)} = \frac{324 + 256 - 169}{576}$$

$$\cos \theta = \frac{411}{576} \quad \theta = \cos^{-1}(0.7135) \quad \theta = 44^\circ$$



$$\frac{13}{\sin 44} = \frac{18}{\sin \alpha}$$

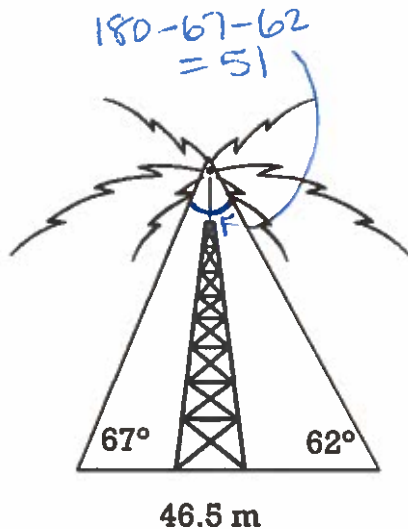
$$\sin \alpha = \frac{18 \cdot \sin 44}{13}$$

$$\alpha = \sin^{-1}(0.9618)$$

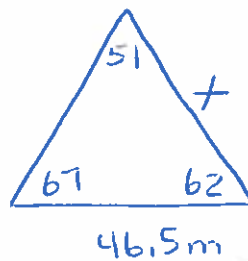
$$\alpha = 74^\circ$$

$$\begin{array}{r} \beta = 180 \\ - 44 \\ - 74 \\ \hline 62^\circ \end{array}$$

9. A radio tower is supported by two wires on opposite sides. On the ground, the ends of the wires are 46.5 m apart. The angles of elevation for the wires are 62° and 67° respectively. Determine the length of the **longest wire** and the height of the **tower** to the nearest tenth of a meter.



for height of tower
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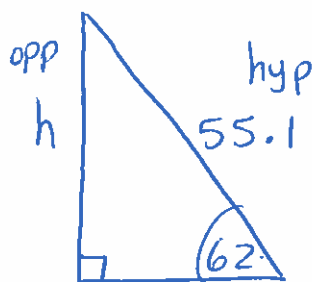


longest wire is across from the biggest angle.

$$\frac{x}{\sin 67} = \frac{46.5}{\sin 51}$$

$$x = \frac{46.5 \cdot \sin 67}{\sin 51}$$

$$x = 55.1 \text{ m}$$



$$\sin 62 = \frac{h}{55.1}$$

$$h = 55.1 \cdot \sin 62$$

$$h = 48.7 \text{ m}$$