

The Sine Law Continued

Example 2: In $\triangle DEF$ $\angle D = 71.5^\circ$ $\angle E = 30.2^\circ$ and $d = 7.4$ m.
Solve $\triangle DEF$.

Ans: - Draw an acute triangle.

- To solve a triangle means to find all the unknown sides and angles.

- Find $\angle F$, e and f .

- Write the sine law for $\triangle DEF$.

$$\frac{d}{\sin D} = \frac{e}{\sin E} = \frac{f}{\sin F}$$

$$\frac{7.4}{\sin 71.5^\circ} = \frac{e}{\sin 30.2^\circ} = \frac{f}{\sin F}$$

- Find $\angle F$, $\angle F = 180^\circ - 71.5^\circ - 30.2^\circ$
 $= 78.3^\circ$

- Find e and f

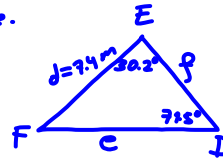
$$\frac{7.4}{\sin 71.5^\circ} = \frac{e}{\sin 30.2^\circ}$$

$$7.4 \times \sin 30.2^\circ = e \sin 71.5^\circ$$

$$\frac{7.4 \times \sin 30.2^\circ}{\sin 71.5^\circ} = \frac{e \sin 71.5^\circ}{\sin 71.5^\circ}$$

$$e = \frac{7.4 \times \sin 30.2^\circ}{\sin 71.5^\circ}$$

$$\therefore e \approx 3.9 \text{ m}$$



$$\frac{7.4}{\sin 71.5^\circ} = \frac{f}{\sin 78.3^\circ}$$

$$7.4 \times \sin 78.3^\circ = f \sin 71.5^\circ$$

$$7.4 \times \sin 78.3^\circ = f$$

$$\therefore f \approx 7.6 \text{ m}$$

$$\therefore \begin{cases} \angle F = 78.3^\circ \\ e \approx 3.9 \text{ m} \\ f \approx 7.6 \text{ m} \end{cases}$$

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Example 3: An engineer wants to build a bridge over a river from point B to point A. The distance from B to a point C is 520 m. A transit is used and $\angle A = 48^\circ$ $\angle C$ is found to be 54° . How long will the bridge be?

Ans: Draw a diagram

- Let d represent the length of the bridge.

- Use the sine law to find d .

$$\frac{520}{\sin 48^\circ} = \frac{d}{\sin 54^\circ}$$

$$\sin 54^\circ \times \left(\frac{520}{\sin 48^\circ} \right) = \sin 54^\circ \times \left(\frac{d}{\sin 54^\circ} \right)$$

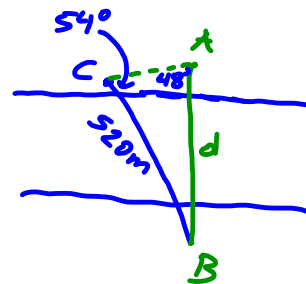
$$\frac{520 \times \sin 54^\circ}{\sin 48^\circ} = d$$

$$566.1 \approx d$$

$$\therefore d \approx 566.1$$

\therefore The bridge is approx. 566.1 m long.

Homework: Pg. 32: #11, 13, 15-17



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