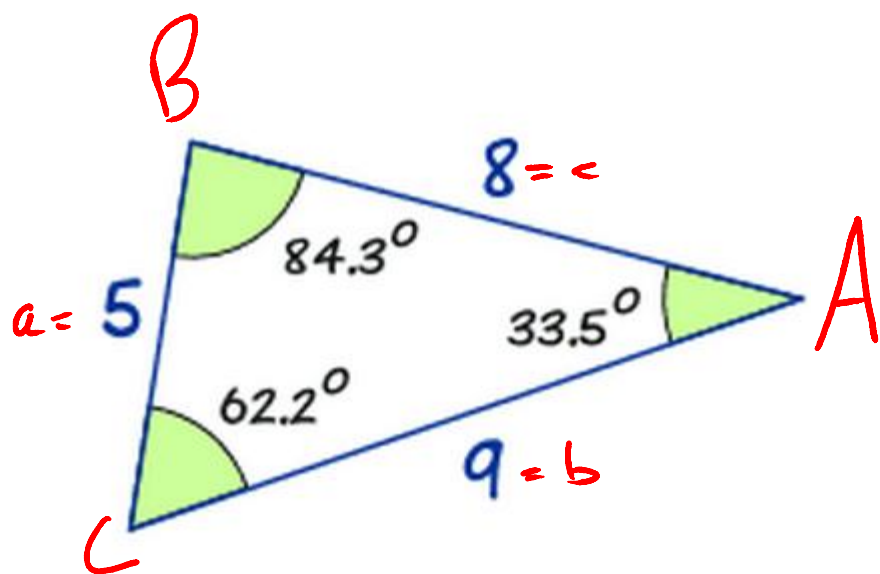


Mathematics 10D

8.1 – Exploring the Sine Law

Mr. D. Hagen



Three Bears Theorem

- The largest angle is paired with the largest side.
- smallest angle with smallest side

$$\frac{\sin A}{a} = \frac{\sin 33.5}{5} = 0.1104$$

$$\frac{\sin B}{b} = \frac{\sin 84.3}{9} = 0.1105$$

$$\frac{\sin C}{c} = \frac{\sin 62.2}{8} = 0.1106$$

equal

True if all
fractions are flipped.

Sine Law

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

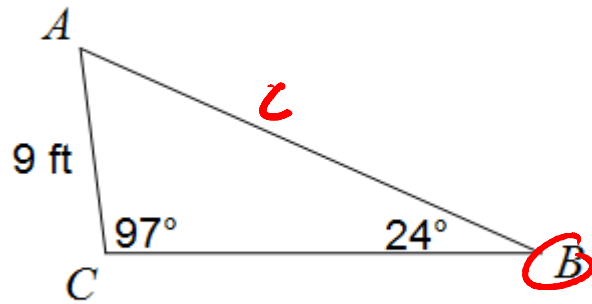
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

To use sine law:

- you need a pair.

- you need one other angle or side

1) Find AB

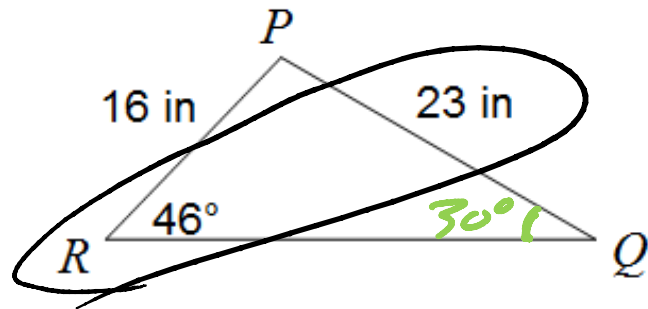


$$\frac{c}{\sin C} = \frac{b}{\sin B}$$

$$\frac{c}{\sin 97} = \frac{9(\sin 97)}{\sin 24}$$

$$c = \frac{9 \sin(97)}{\sin(24)} = 22 \text{ ft}$$

2) Find $m\angle Q$



$$\frac{\sin Q}{q} = \frac{\sin R}{r}$$

$$\frac{\sin Q}{16} = \frac{\sin 46}{23}$$

$$\sin Q = \frac{16 \sin 46}{23}$$

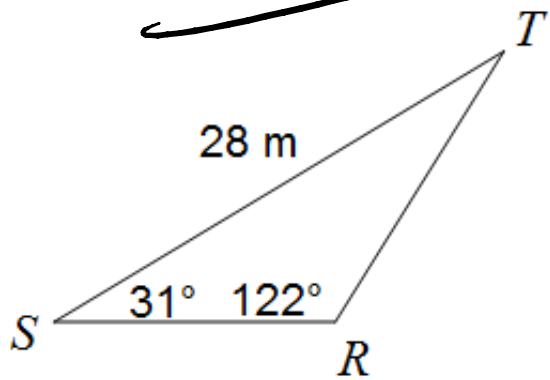
$$Q = \sin^{-1} \left(\frac{16 \sin 46}{23} \right)$$

$$Q = 30^\circ$$

$$\angle P = 180 - 46 - 30$$

$$\underline{\underline{\angle P = 104^\circ}}$$

3) Solve: means find all 6 measurements



$$\angle R = 122^\circ - r = 28m$$

$$\angle S = 31^\circ \quad s = \underline{17m}$$

$$\angle T = 27^\circ \quad t = 15m$$

$$\frac{s}{\sin 31} = \frac{28}{\sin 122}$$

$$s = \frac{28 \sin 31}{\sin 122}$$

$$s = 17$$

$$\angle T = 180 - 122 - 31$$

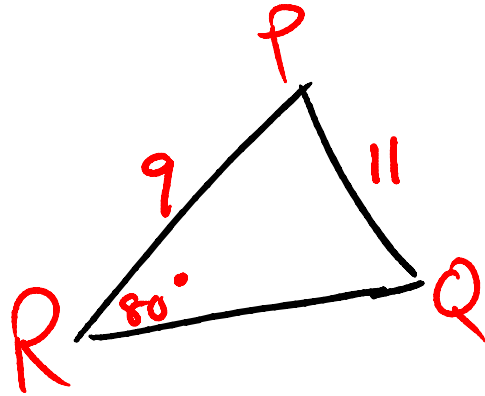
$$\angle T = 27^\circ$$

$$\frac{t}{\sin 27} = \frac{28}{\sin 122}$$

$$t = \frac{28 \sin 27}{\sin 122} = 15m$$

4) In $\triangle RPQ$, $m\angle R = 80^\circ$, $q = 9$ yd, $r = 11$ yd

Solve



$$\angle R = 80^\circ \leftrightarrow r = 11$$

$$\angle P = \textcircled{2} \quad p = \textcircled{3}$$

$$\angle Q = \textcircled{1} \quad q = 9$$
