Mathematics 11C

1.3 – The Sine Law

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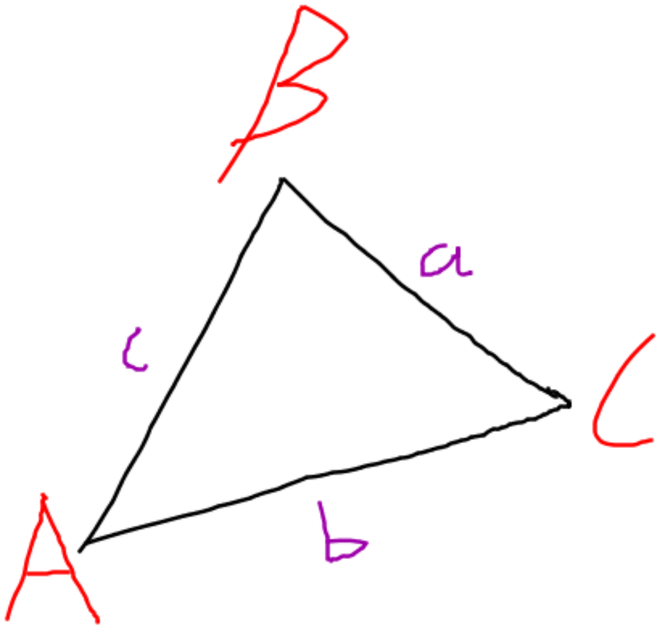
A few notes and rules on triangles.

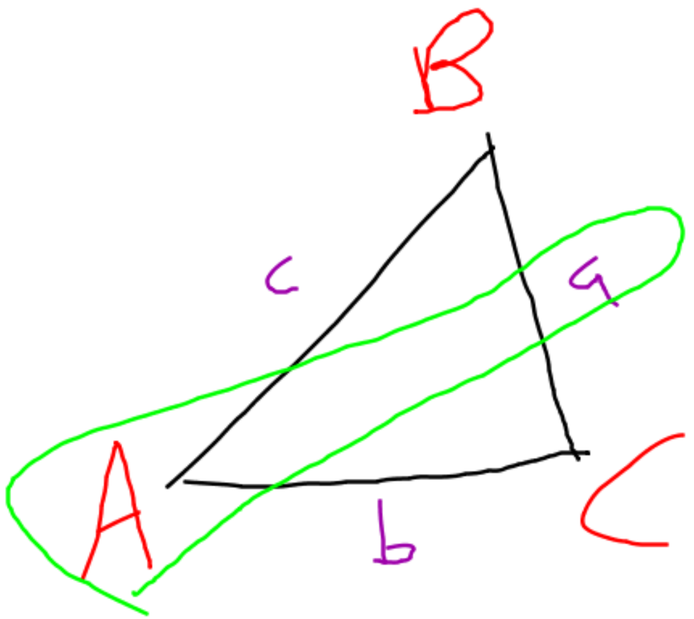
- All three angles add up to 180°



The Three Bears Theorem

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

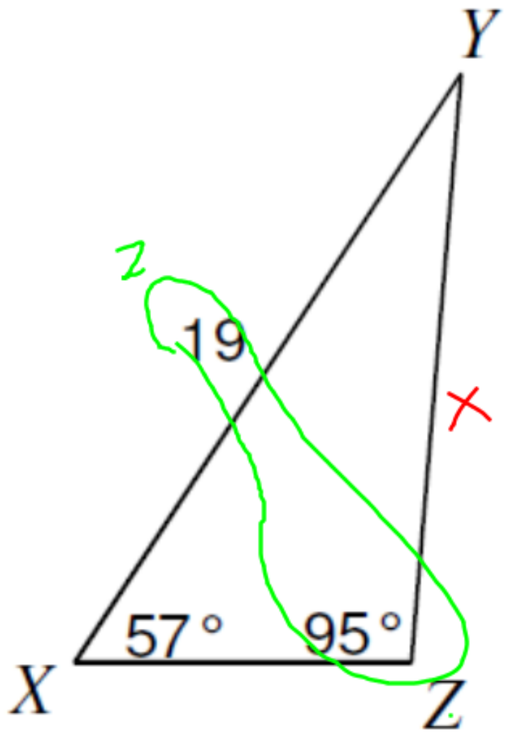
The sine law:



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

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

1) Find YZ



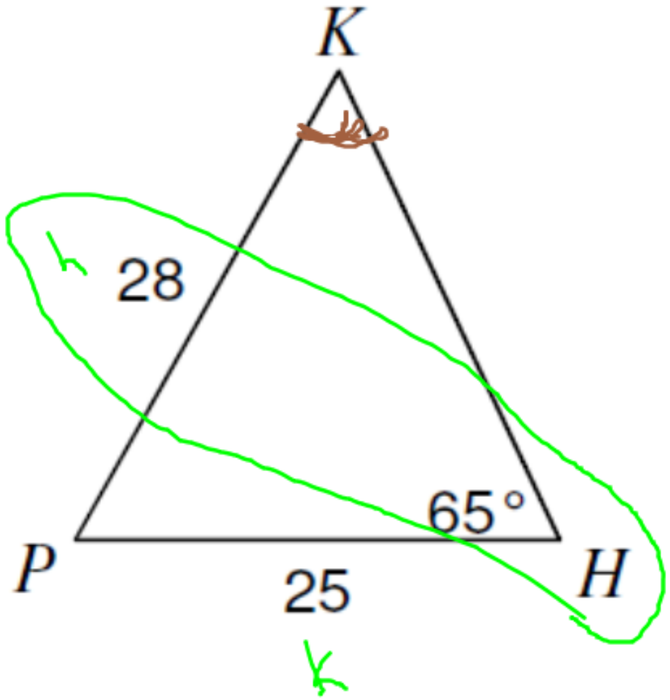
$$\frac{x}{\sin 57} = \frac{19}{\sin 95}$$

$$x = \frac{19 \sin(57)}{\sin(95)}$$

$$x = \frac{15.935}{0.9962}$$

$$x = 16$$

2) Find $m\angle K$ the measure of angle K



$$\frac{\sin K}{25} = \frac{\sin 65}{28}$$

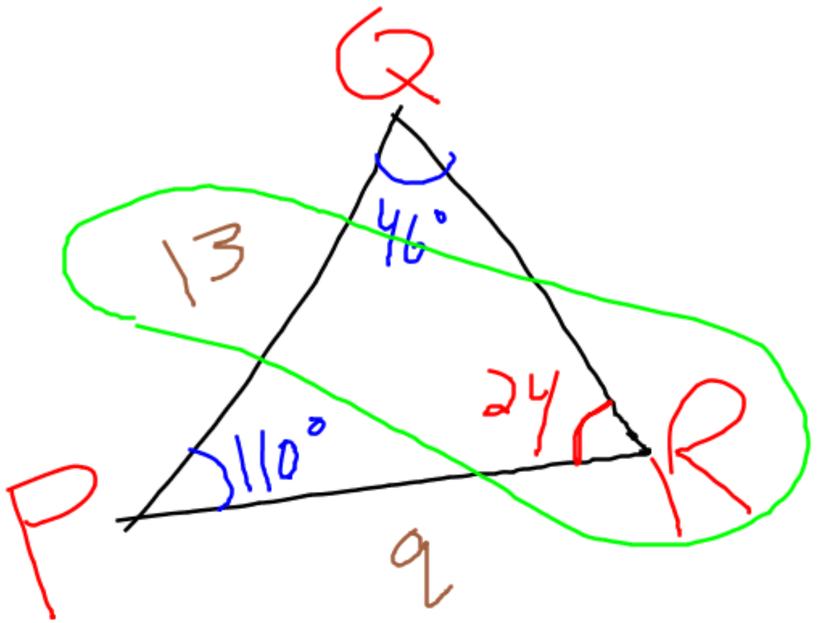
$$\sin K = \frac{25 \sin 65}{28}$$

$$\sin K = \frac{22.66}{28}$$

$$K = \sin^{-1}\left(\frac{22.66}{28}\right) = 54^\circ$$

3) In ΔPQR, $m\angle P = 110°$, $m\angle Q = 46°$, $r = 13$

Find q



$$\frac{q}{\sin 46} = \frac{13}{\sin 24}$$

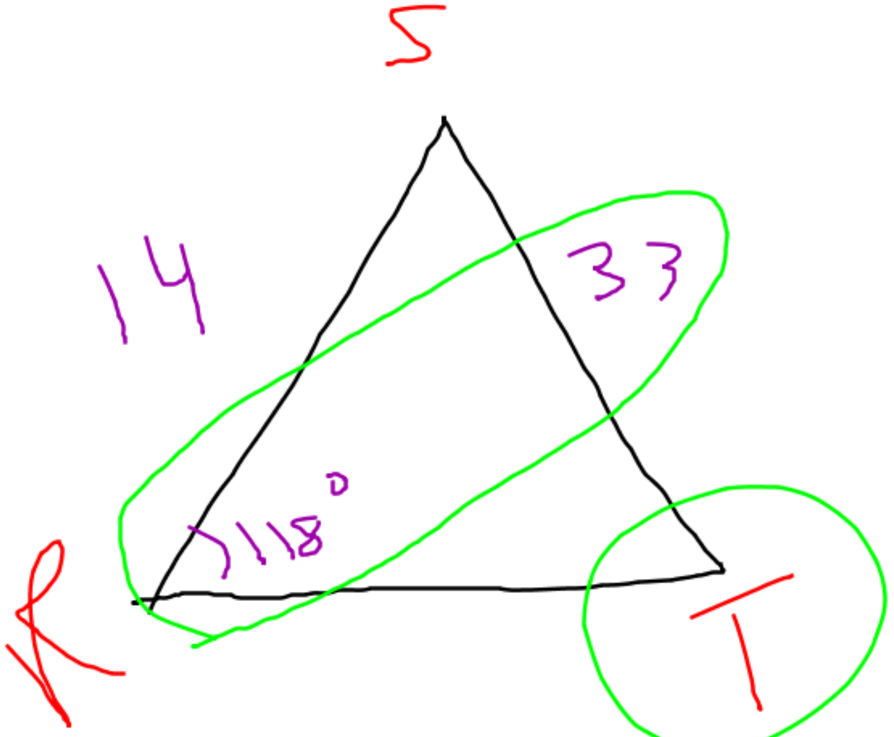
$$q = \frac{13 \sin 46}{\sin 24}$$

$$q = 23$$

$R = 180 - 110 - 46$

$= 24$

4) In ΔRST, $m\angle R = 118°$, $t = 14$, $r = 33$
Find $m\angle T$



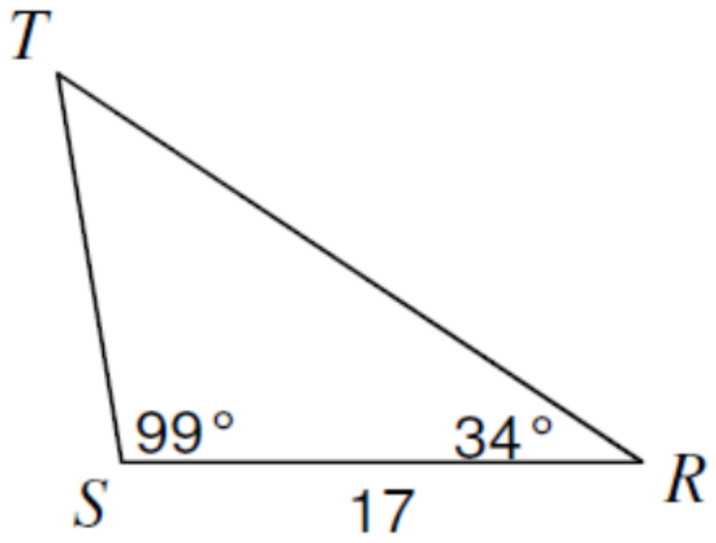
$$\frac{\sin T}{14} = \frac{\sin 118}{33}$$

$$\sin T: \frac{14 \sin 118}{33}$$

$$\sin T: \frac{12.36}{33}$$

$$T = \sin^{-1}\left(\frac{12.36}{33}\right) : 22°$$

5) Solve



$R = 34$ $\quad r = 13$

$S = 99$ $\quad s = 23$

$T = 47$ $\quad t = 17$

$T = 180 - 99 - 34$

$= 47$

$\frac{s}{\sin 99} = \frac{17}{\sin 47}$

$s = \frac{17 \sin 99}{\sin 47}$

$s = 23$

$\frac{r}{\sin 34} = \frac{17}{\sin 47}$

$r = \frac{17 \sin 34}{\sin 47}$

$r = 13$

A telephone pole is supported by two wires on opposite sides. At the top of the pole, the wires form an angle of 60°. On the ground, the ends of the wires are 15.0 m apart. One wire makes a 45° angle with the ground. How long are the wires, and how tall is the pole?