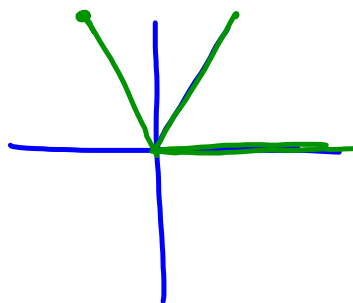


$$\cancel{\frac{\tan 67^\circ}{1} = \frac{x}{174}}$$
$$174 \tan 67^\circ = x$$
$$x = 410 \text{ in}$$

### 8.5 Law of Sines + Cosines

- are used to find  $\angle$  measures or/and side lengths of non-right triangles.

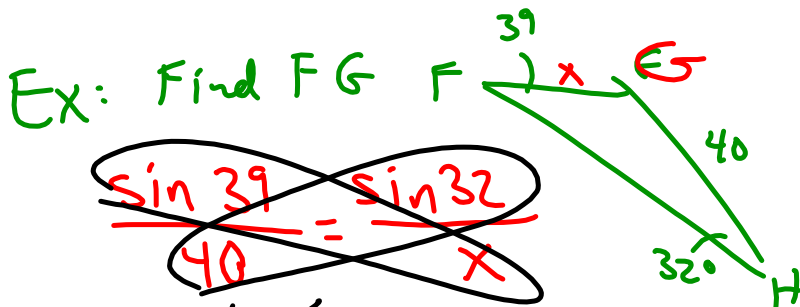
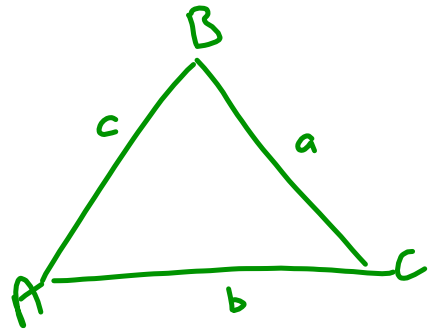
Ex:  $\sin 100 = .98$   
 $\cos 100 = -.17$   
 $\tan 100 = -5.67$



## Law of Sines

For any triangle,  $\triangle ABC$  with side length  $a, b, c$

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

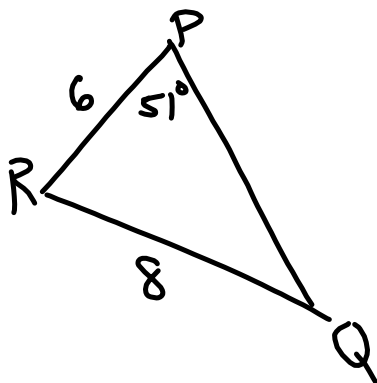


~~$$\frac{\sin 39}{40} = \frac{\sin 32}{x}$$~~

~~$$x \sin 39 = 40 \sin 32$$~~

~~$$x = 33.7$$~~

Ex:  $m\angle Q$



~~$$\frac{\sin 51}{8} = \frac{\sin Q}{6}$$~~

~~$$6 \sin 51 = 8 \sin Q$$~~

~~$$\frac{6 \sin 51}{8} = \sin Q$$~~

~~$$\sin^{-1}(.58) = \sin^{-1}(\sin Q)$$~~

~~$$35^\circ = m\angle Q$$~~

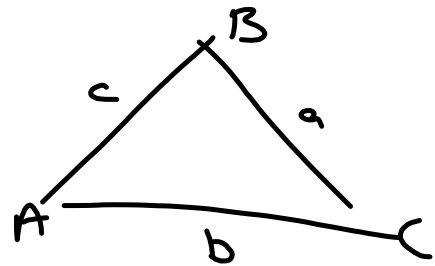
## Law of Cosines

In  $\triangle ABC$  with sides  $a, b, c$

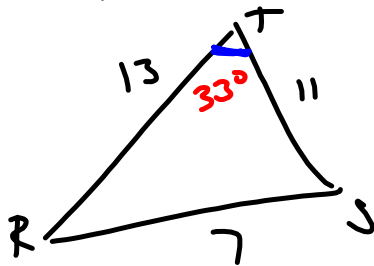
$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cdot \cos B$$

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



Ex: Find  $m\angle T$



$$7^2 = 13^2 + 11^2 - 2(13)(11) \cdot \cos T$$

$$49 = 169 + 121 - 286 \cdot \cos T$$

$$49 = 290 - 286 \cos T$$

$$\begin{array}{r} -290 \\ \hline -241 = -286 \cos T \\ \hline -286 \qquad -286 \end{array}$$

$$\cos^{-1}(\frac{84}{286}) = \cos^{-1} \cos T$$

$$33^\circ = m\angle T$$

HW: p. 555  
2-48 even, odds extra credit