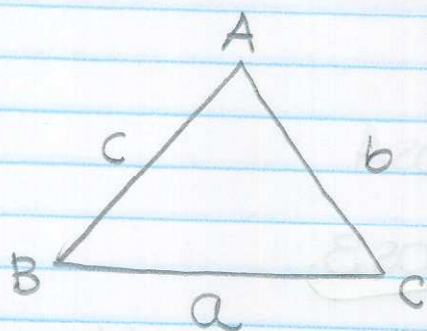


October 27<sup>th</sup>, 2008

## 4.3 Trigonometry of Oblique Triangles



↑  
- no Right angle

### SINE LAW

- unknown angle

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

- unknown side

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

- to use Sine Law you must be given  
an angle & opposite side plus one other  
angle or side

## COSINE LAW

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

opposite

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

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

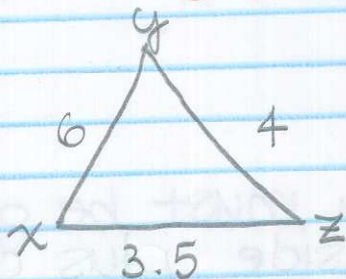
- use cosine law given 2 sides and a contained angle.

$$\cos B = \frac{b^2 - a^2 - c^2}{-2ac}$$

- use this version of the cosine law given 3 sides

(put brackets when typed into cal.)

Ex 1 Solve  $\Delta xyz$



$$\cos z = \frac{z^2 - x^2 - y^2}{-2xy}$$

$$= \frac{(6^2 - 3.5^2 - 4^2)}{(-2(3.5)(4))}$$

$$= -0.2767$$

$$z = \cos^{-1}(-.2767)$$

$$z = 106.1^\circ$$

$$\frac{\sin y}{y} = \frac{\sin z}{z}$$

$$\angle x = 180 - 106.07 - 34.09 \\ = 39.8^\circ$$

$$\frac{\sin y}{3.5} = \frac{\sin 106.07}{6}$$

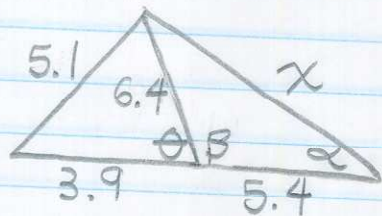
$$\sin y = \frac{3.5 \sin 106.07}{6}$$

$$= 0.5605$$

$$y = \sin^{-1}(0.5605)$$

$$= 34.1^\circ$$

Ex 2. Solve



$$\cos \theta = \frac{a^2 - b^2 - c^2}{-2bc}$$

$$= \frac{5.1^2 - 6.4^2 - 3.9^2}{-2(6.4)(3.9)}$$

$$= 0.6041$$

$$\theta = 52.8^\circ$$

$$\beta = 180 - 52.8 \\ = 127.2^\circ$$

$$x^2 = y^2 + z^2 - 2yz \cos X \\ = 6.4^2 + 5.4^2 - 2(6.4)(5.4) \cos 127.2$$

