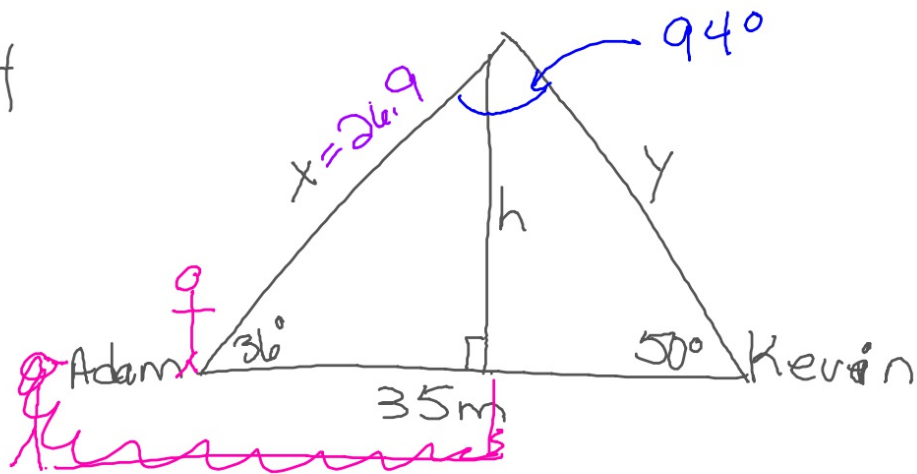


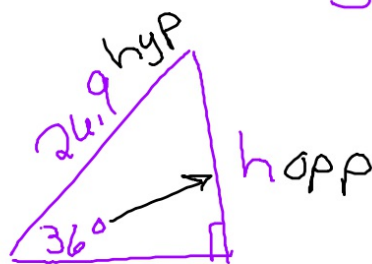
#4



$$\frac{\sin 94}{35} = \frac{\sin 50}{x}$$

$$x \sin 94 = 35 \sin 50$$

$$x = \frac{35 \sin 50}{\sin 94} \approx 26.9$$



$$\sin 36 = \frac{h}{26.9}$$

$$26.9 \sin 36 = h$$
$$h \approx 15.8 \text{ m}$$

Questions:

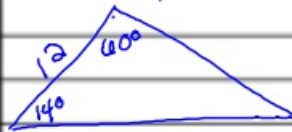
Notes:

When to use Law of Sines

- information given is

ASA, AAS, or SSA

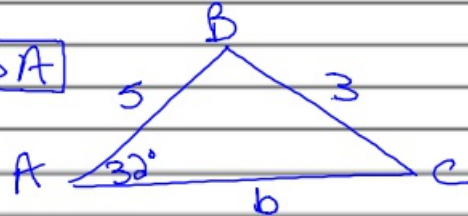
ASA



AAS



SSA



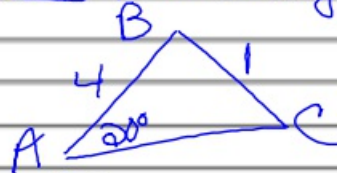
3 Things can happen:

① no triangle

② one triangle

③ two triangles

Ex | No Triangle



Find  $c$  1st:

$$\frac{\sin 20^\circ}{1} = \frac{\sin C}{4}$$

$$\sin C = 4 \sin 20^\circ$$

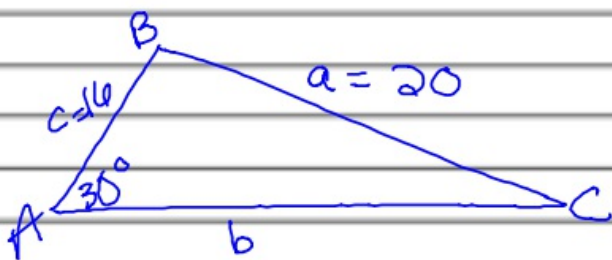
$$C = \sin^{-1}(4 \sin 20^\circ)$$

no triangle

~~C~~

Questions:

Notes: Ex 2) one (or two?) triangles



Solve the triangle (Find all missing)

$$\frac{\sin 30}{20} = \frac{\sin C}{16}$$

$$20 \sin C = 16 \sin 30$$

$$C = \sin^{-1}\left(\frac{16 \sin 30}{20}\right)$$

$$C \approx 23.6^\circ$$

$$B = 180 - A - C = 180 - 30 - 23.6 = 126.4^\circ$$

Check for another triangle

Angle C as  $\sin C = .4$   
in  $\frac{2}{3}$  places. Once at C,

and again at  $C' = 180 - C$   
(complement of C)  
Supplement

supp.

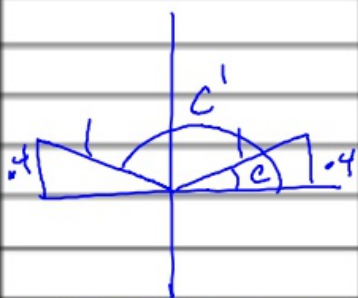
$$\text{1st: find } C' \quad 180 - 23.6 = 156.4^\circ$$

$$\text{2nd: find } B' \quad 180 - 30 - 156.4 = B'$$

$$B' = -6.4^\circ$$

angles in  
a  $\Delta$

only 1  $\Delta$



HW p. 385  
1 beg  
2

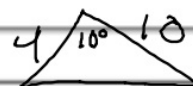
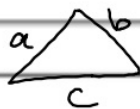
Questions:

Notes: The "Donkey Thm"

is known as the Ambiguous Case

### The Cosine Rule

- use when given SSS or SAS



- see page 386 for derivation

### Cosine Rule

Solving  
Sides

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

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

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

Solving  
angles

$$A = \cos^{-1} \left( \frac{b^2 + c^2 - a^2}{2bc} \right)$$

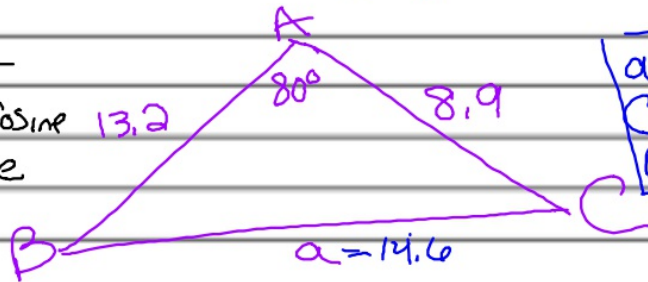
$$B = \cos^{-1} \left( \frac{a^2 + \overset{c^2 - b^2}{\cancel{b^2 - a^2}}}{2ac} \right)$$

$$C = \cos^{-1} \left( \frac{a^2 + b^2 - c^2}{2ab} \right)$$

Questions:

Notes: Ex Given  $c = 13.2 \text{ cm}$ ,  $b = 8.9 \text{ cm}$   
 $A = 80^\circ$ , Solve  $\triangle ABC$

SAS -  
Use Cosine  
Rule



$a = 14.6 \text{ cm}$   
 $C = 63.1^\circ$   
 $B = 36.9^\circ$

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

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

$$a = \sqrt{(8.9)^2 + (13.2)^2 - 2(8.9)(13.2)}$$

$\cos(80^\circ)$

$$a \approx 14.6 \text{ cm}$$

$$\frac{\sin B}{8.9} = \frac{\sin 80}{14.6}$$

$$\frac{14.6 \sin B}{14.6} = \frac{8.9 \sin 80}{14.6}$$

$$B = \sin^{-1}\left(\frac{8.9 \sin 80}{14.6}\right)$$

$$B \approx 36.9^\circ$$

$$C = 180 - 80 - 36.9 = 63.1^\circ$$

Hw p. 389 #1d, 2, 5