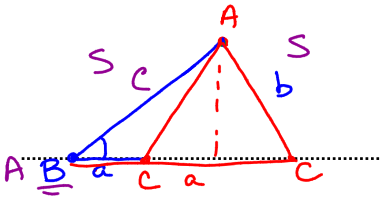
The Ambiguous Case of the Sine Law



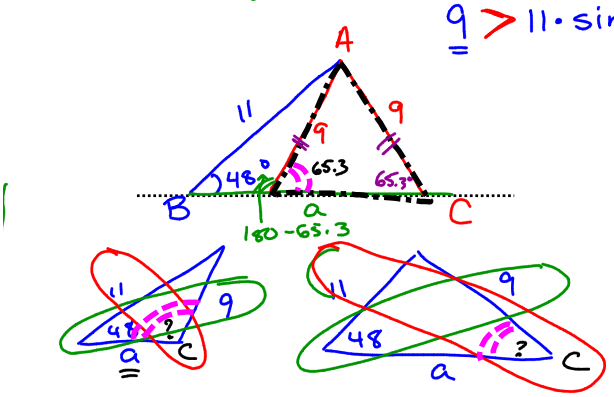
if $b < c \cdot \sin B$ then no Δ is possible

if $b = c \cdot \sin B$ there is 1 Δ

if $b > c \cdot \sin B$ 2 Δ's

ΔABC $c = 11$, $b = 9$, $\angle B = 48$

$9 > 11 \cdot \sin 48$



$$\frac{\sin C}{11} = \frac{\sin 48}{9} \quad \text{or} \quad \frac{\sin C}{11} = \frac{\sin 48}{9}$$

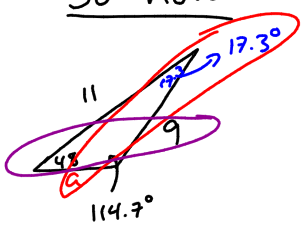
$$\sin C = \frac{11 \cdot \sin 48}{9}$$

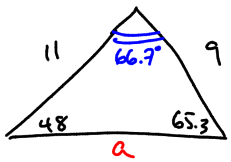
$= 65.3°$ ⇝ we always get the acute $\angle$

The OBTUSE $\angle$ from the other Δ is $180° -$ acute $\angle$

or $180° - 65.3 = 114.7°$?

So now:





$$\frac{a}{\sin 17.3} = \frac{9}{\sin 48} \qquad \frac{a}{\sin 66.7} = \frac{9}{\sin 48}$$

$a = 3.6$ $a = 11.0$

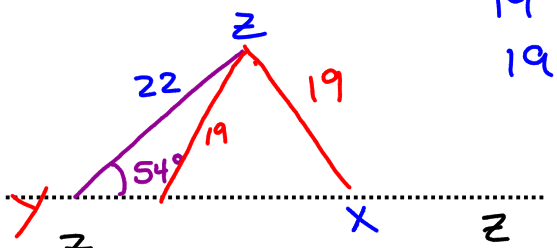
Solve for all missing sides/angles:

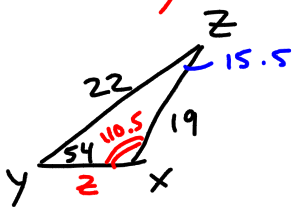
$Y = 54°$ $x = 22$ $y = 19$

$19 \;?\; 22 \cdot \sin 54$

$19 > 22 \cdot \sin 54$

2 Δ's





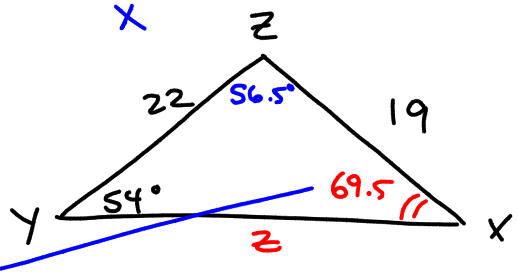
$X = 180 - 69.5°$

$X = 110.5°$

$Z = 15.5°$

$\frac{z}{\sin 15.5} = \frac{19}{\sin 54}$

$z = 6.28$



$\frac{\sin X}{22} = \frac{\sin 54}{19}$

$\sin x = \frac{22 \cdot \sin 54}{19}$

$X = 69.5°$

$Z = 180 - 54 - 69.5$

$= 56.5°$

$\frac{z}{\sin 56.5} = \frac{19}{\sin 54}$

$z = 19.6$

On your worksheet, add in # 5

When you are done the W/S, do section 2.3 from the blue sheet ü