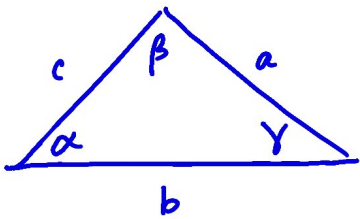


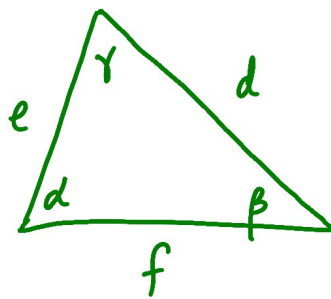
# WARMUP

What side is opposite each angle?

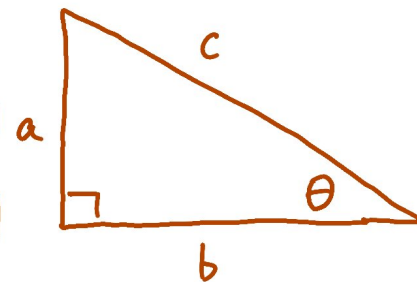


"alpha"  $\alpha$ :  $a$   
"beta"  $\beta$ :  $b$   
"gamma"  $\gamma$ :  $c$

What angle is opposite each side?



$d$ :  $\alpha$   
 $e$ :  $\beta$   
 $f$ :  $\gamma$



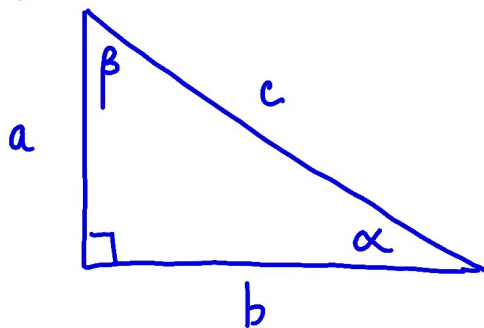
What side is opposite  $\theta$ ?  $a$

What side is adjacent to  $\theta$ ?  $b$

What side is the hypotenuse?  $c$

## Section 7.1 Right Triangles

To solve a right triangle means to find its missing sides and angles.



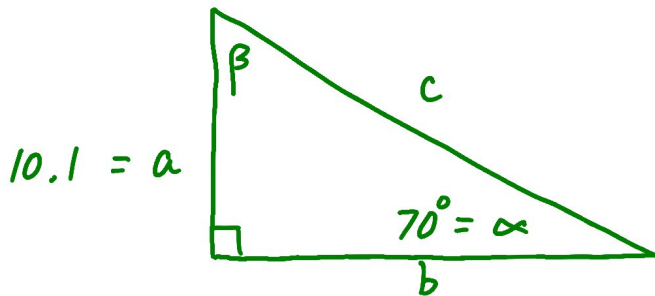
$\alpha$  is always opposite side  $a$

$\beta$  is always opposite side  $b$

The right angle is always opposite side  $c$ .

ex: Solve the right triangle that has  $\alpha = 70^\circ$  and  $a = 10.1$

STEP 1 Draw a picture



STEP 2: What's missing?  $\beta = 20^\circ$   
 $c = \underline{\hspace{2cm}}$   
 $b = \underline{\hspace{2cm}}$

STEP 3: What's easiest to find?  $\beta = 90 - 70 = 20^\circ$

STEP 4: Use trig to find another side:

Find b  $\tan \beta = \frac{b}{a}$

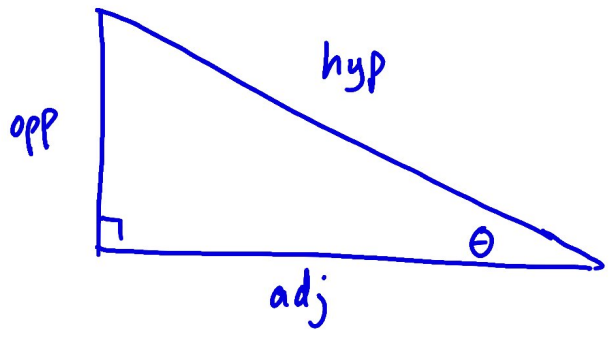
$\sin \theta = \frac{\text{opp}}{\text{hyp}}$   
 $\cos \theta = \frac{\text{adj}}{\text{hyp}}$   
 $\tan \theta = \frac{\text{opp}}{\text{adj}}$

$10.1 \cdot \tan 20^\circ = \frac{b}{10.1} \cdot 10.1$

$b = 3.7$

STEP 5: Use Pythagorean Theorem to find other side.

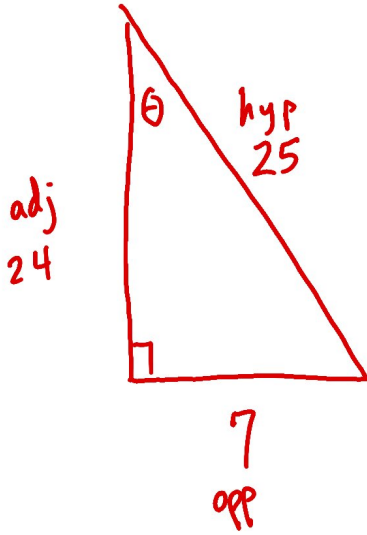
$a^2 + b^2 = c^2$   
 $10.1^2 + 3.7^2 = c^2$   
 $c^2 = 115.7$   
 $c = 10.8$



There are six trig ratios,

$\sin \theta = \frac{\text{opp}}{\text{hyp}}$	} SOH CAH TOA	$\csc \theta = \frac{\text{hyp}}{\text{opp}}$	} CHO SH/A CAO
$\cos \theta = \frac{\text{adj}}{\text{hyp}}$		$\sec \theta = \frac{\text{hyp}}{\text{adj}}$	
$\tan \theta = \frac{\text{opp}}{\text{adj}}$		$\cot \theta = \frac{\text{adj}}{\text{opp}}$	

ex: Find the six trig ratios of  $\theta$ :



$$\begin{aligned} \text{adj}^2 + 7^2 &= 25^2 \\ \text{adj}^2 + 49 &= 625 \\ \text{adj}^2 &= 576 \\ \text{adj} &= 24 \end{aligned}$$

$$\sin \theta = \frac{7}{25}$$

$$\csc \theta = \frac{25}{7}$$

$$\cos \theta = \frac{24}{25}$$

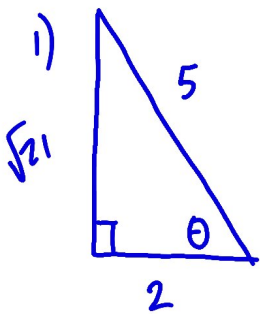
$$\sec \theta = \frac{25}{24}$$

$$\tan \theta = \frac{7}{24}$$

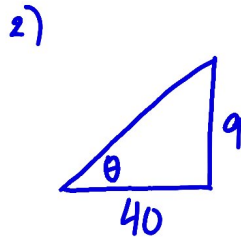
$$\cot \theta = \frac{24}{7}$$

### Assignment

Find the 6 trig functions



$$\sin \theta = \frac{\sqrt{21}}{5}$$



$$\csc \theta = \frac{5}{\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}} = \frac{5\sqrt{21}}{21}$$

Solve the  $\Delta$ :

