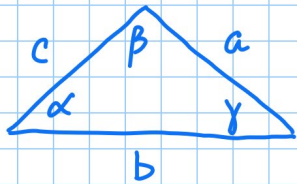


# WARMUP

What side is opposite each angle?

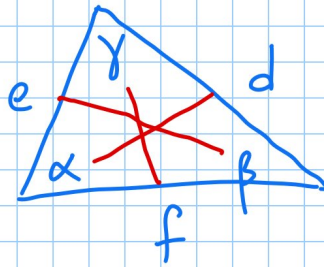


"alpha"  $\alpha$ :  $a$

"beta"  $\beta$ :  $b$

"gamma"  $\gamma$ :  $c$

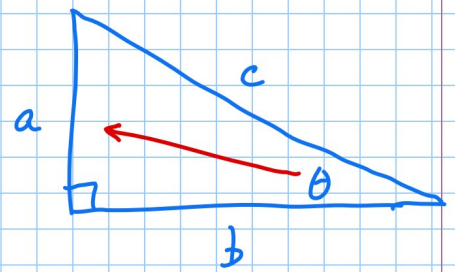
What angle is opposite each side?



$a$ :  $\alpha$

$b$ :  $\beta$

$c$ :  $\gamma$



What side is opposite  $\theta$ ?

$a$

What side is adjacent to  $\theta$ ?

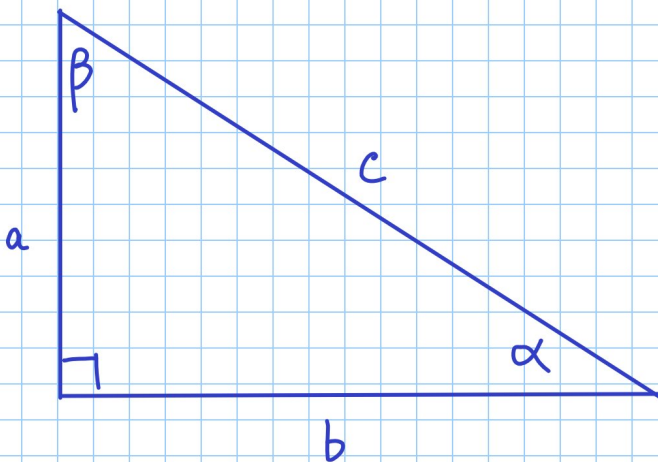
$b$

What side is the hypotenuse?

$c$

## Section 7.1 Right Triangles

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



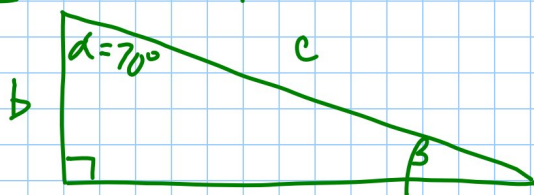
$\alpha$  is always opposite side  $a$

$\beta$  is always opposite side  $b$

The right angle is opposite side  $c$ .

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

STEP 1: Draw a picture



$$a = 10.1$$

STEP 2: What's missing?

$$b = \underline{3.7}$$

$$\beta = \underline{20^\circ}$$

$$c = \underline{10.8}$$

STEP 3: What easiest?

$$\beta = 180 - 70 - 90 = 20^\circ$$

STEP 4: Use trig to find another side:

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

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

$$.3640 = \frac{b}{10.1}$$

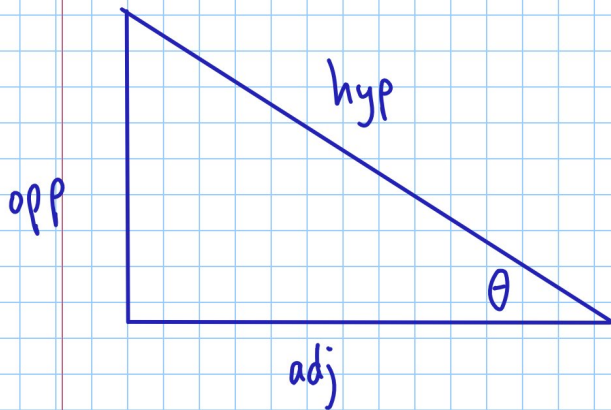
$$b = 3.7$$

STEPS: Use Pythagorean

$$10.1^2 + 3.7^2 = c^2$$

$$115.7 = c^2$$

$$c = 10.8$$



There are six trig ratios,

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\text{cosecant} \\ \csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\text{secant} \\ \sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\text{cotangent} \\ \cot \theta = \frac{\text{adj}}{\text{opp}}$$

SOH CAH TOA

CHO

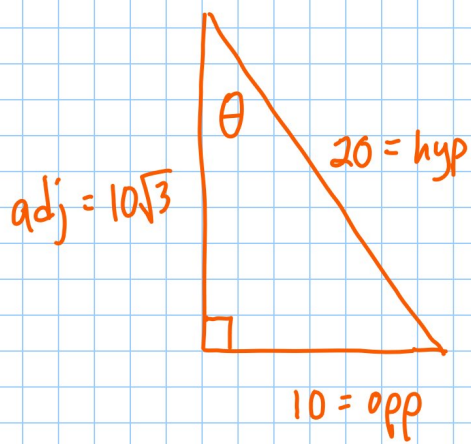
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ex: Find the six trig ratios of  $\theta$ :  $\sin \theta = \frac{10}{20} = \frac{1}{2}$   $\csc \theta = 2$

$$\cos \theta = \frac{10\sqrt{3}}{20} = \frac{\sqrt{3}}{2} \quad \sec \theta = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\tan \theta = \frac{10}{10\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \quad \cot \theta = \frac{10\sqrt{3}}{10} = \sqrt{3}$$



$$10^2 + b^2 = 20^2$$

$$b^2 = 300$$

$$b = \sqrt{300}$$

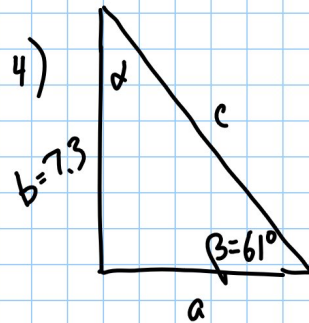
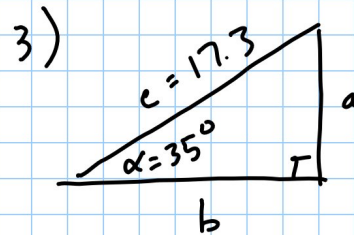
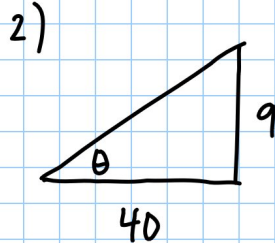
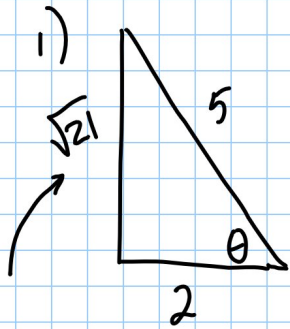
$$b = \sqrt{100} \sqrt{3}$$

$$b = 10\sqrt{3}$$

### Assignment

Find the 6 trig functions:

Solve the  $\Delta$ :



$$b^2 = 5^2 - 2^2$$

$$b^2 = 21$$

$$b = \sqrt{21}$$

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

$$\cos \theta = \frac{2}{5}$$

$$\tan \theta = \frac{\sqrt{21}}{2}$$

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

$$\sec \theta = \frac{5}{2}$$

$$\cot \theta = \frac{2}{\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}} = \frac{2\sqrt{21}}{21}$$