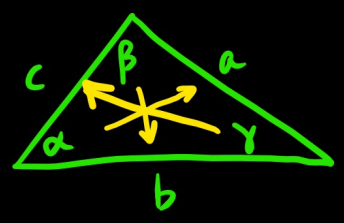


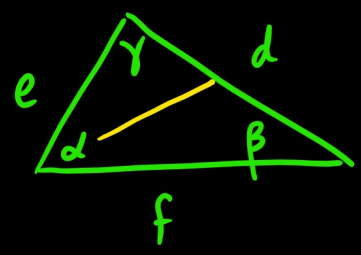
WARMUP - in notebook

What side is opposite each angle?

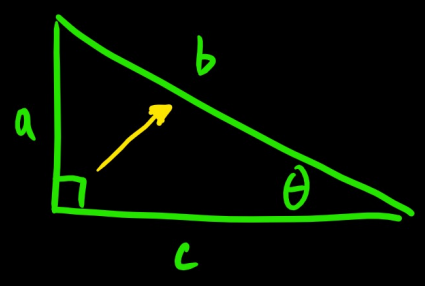


- "alpha" α : a
- "beta" β : b
- "gamma" γ : c

What angle is opposite each side?



- d: α
- e: β
- f: γ

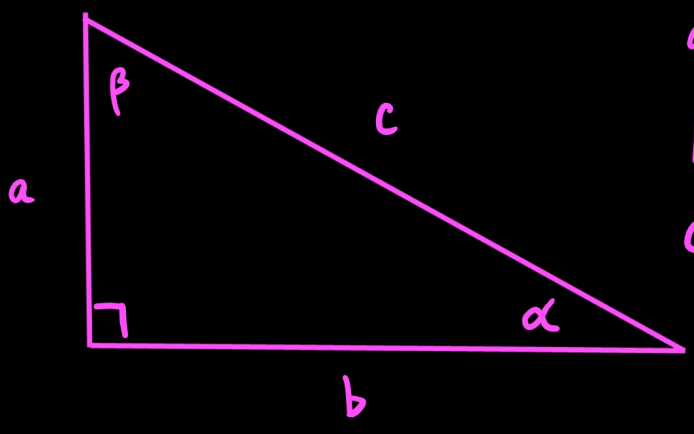


What side is opposite θ ? a

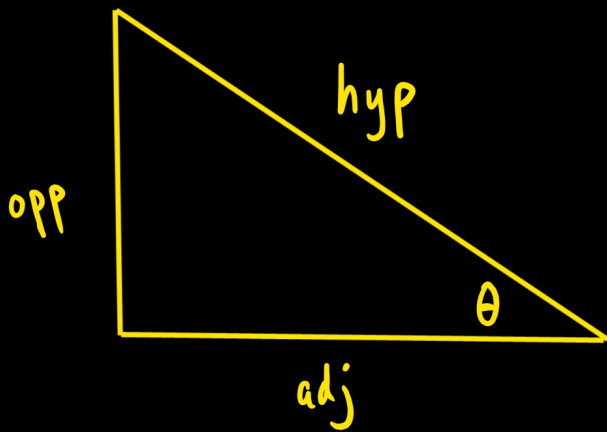
What side is adjacent to θ ? c

What side is the hypotenuse? b

Section 7.1 Right Triangles



- α is always opposite side a
- β is always opposite side b
- c is opposite the right angle



There are six trig ratios

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

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

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

SOH
CAH
TOA

cosecant

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

secant

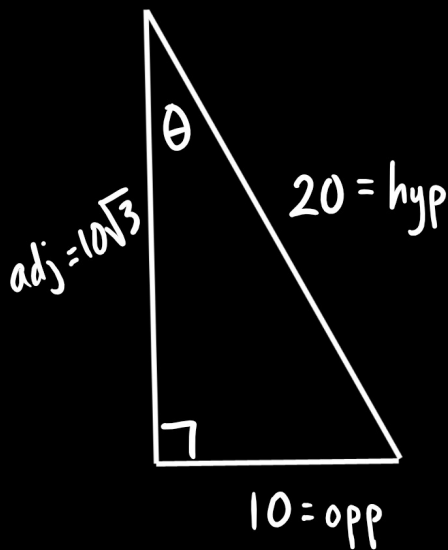
$$\sec \theta = \frac{\text{hyp}}{\text{adj}}$$

cotangent

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

CHO
SHA
CAO

ex: Find the six trig function values of θ :

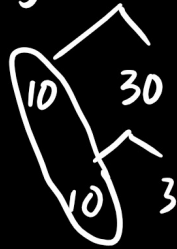


$$\text{adj}^2 + 10^2 = 20^2$$

$$\text{adj}^2 + 100 = 400$$

$$\text{adj}^2 = 300$$

$$\text{adj} = \sqrt{300} = 10\sqrt{3}$$



$$\sin \theta = \frac{10}{20} = \frac{1}{2}$$

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

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

$$\csc \theta = \frac{20}{10} = 2$$

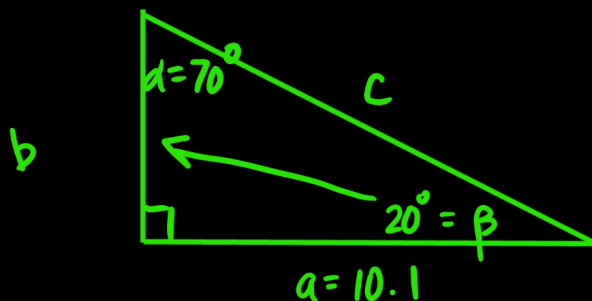
$$\sec \theta = \frac{2}{\frac{\sqrt{3}}{3}} = \frac{2\sqrt{3}}{3}$$

$$\cot \theta = \frac{10\sqrt{3}}{10} = \sqrt{3}$$

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

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

STEP 1: Draw a picture.



STEP 2: What's missing?

$$b = \underline{3.7}$$

$$c = \underline{10.8}$$

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

STEP 3: What's easiest?

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

STEP 4: Use trig

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

$$b = 10.1 \cdot \tan 20^\circ$$

Degree Mode

$$b = 3.7$$

STEP 5: Use Pythagorean Thm

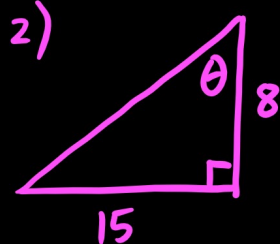
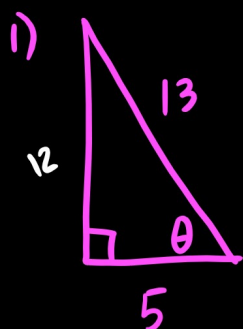
$$10.1^2 + 3.7^2 = c^2$$

$$115.7 = c^2$$

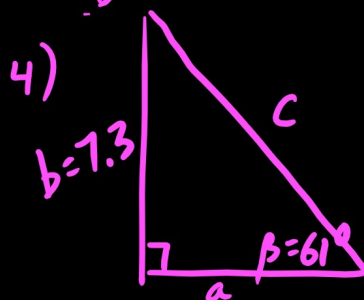
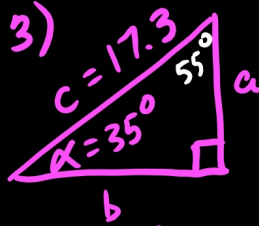
$$10.8 = \sqrt{115.7} = c$$

Assignment

Find the six trig functions



Solve each Δ :



3) $\beta = \underline{55^\circ}$
 $a = \underline{9.9}$
 $b = \underline{14.2}$

$$\sin 35^\circ = \frac{a}{17.3}$$

$$17.3 \sin 35^\circ = a$$

$$a = 9.9$$

$$9.9^2 + b^2 = 17.3^2$$

$$b^2 = 201.28$$

$$\sin \theta = \frac{12}{13} \quad \csc \theta = \frac{13}{12}$$

$$b = 14.2$$

$$\cos \theta = \frac{5}{13} \quad \sec \theta = \frac{13}{5}$$

$$\tan \theta = \frac{12}{5} \quad \cot \theta = \frac{5}{12}$$