Unit 6

Date: 1/18/23 Section: 6.1

Objective: I can simplify radical, find missing angle of triangle, find all trig ratios.

Simplify the following radicals.

Example 1

$\sqrt{13} \cdot \sqrt{13}$

$\sqrt{169}$

$13 \cdot 1$

13

Example 2

$\sqrt{20} \cdot 3\sqrt{32}$

$3\sqrt{2 \cdot 2 \cdot 5 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$

$24\sqrt{10}$

Steps

Simplify by rationalizing the denominator.

Steps

① times top & bottom by $\sqrt{}$ in denom

② multiply

③ simplify num & then the fraction

Example 1

$\frac{5\sqrt{20}}{3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{5\sqrt{60}}{9}$

$\frac{10\sqrt{15}}{9}$

60

5 12

4 3

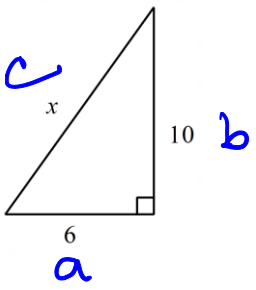
2 2

What do you use to find the missing side of a right triangle?

Pythagorean Theorem

$a^2 + b^2 = c^2$

$\sqrt{6^2 + 10^2} = \sqrt{x^2}$



$\sqrt{136}$

$2\sqrt{34} = x$ exact answer

136

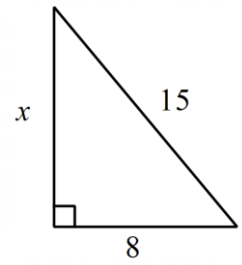
4 34

2 2 2 17

pythag _____ thm _____ can only be used on **RIGHT** triangles!!!!!!!!!

Find the missing side of the following right triangles. Leave answers in simplest radical form. NO DECIMALS!!

Example 1

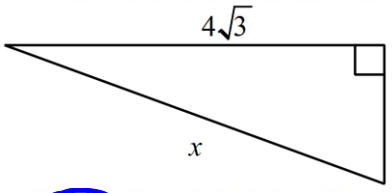


$4^2\sqrt{3}^2$

$\downarrow$

$16 \cdot 3$

Example 2



a

b

$(4\sqrt{3})^2 + 2^2 = x^2$

$48 + 4 = x^2$

$\sqrt{52} = \sqrt{x^2}$

$2\sqrt{13} = x$

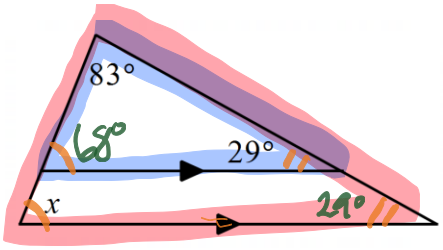
Rule: Radicals cannot have decimals in them.

So, if the square root has a decimal in it, then round your answer to the nearest hundredth.

How many degrees do all the angles of a triangle add up to? 180°

Find the missing angle.

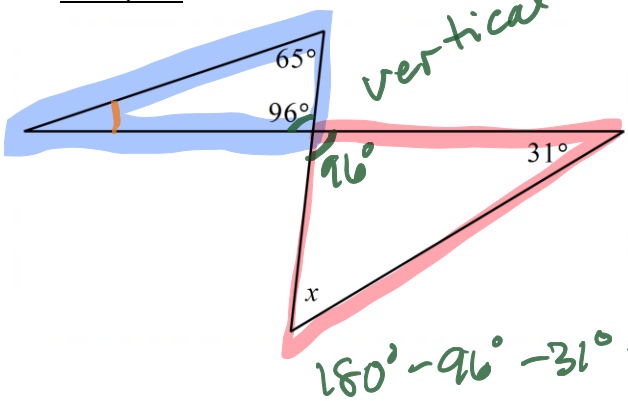
Example 1



$180^\circ - 83^\circ - 29^\circ$

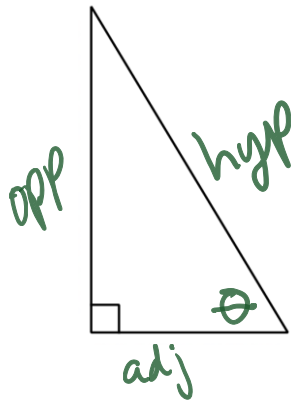
$x = 68^\circ$

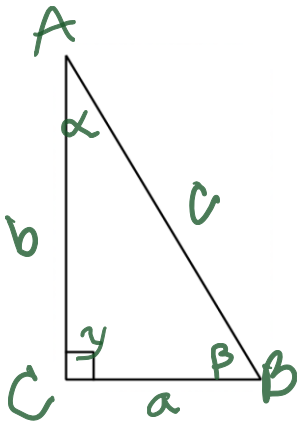
Example 2



vertical angles

$180^\circ - 96^\circ - 31^\circ = 53^\circ$





θ = theta γ = gamma α = alpha β = beta

Hypotenuse: longest side; across from biggest angle = 90°

Opposite side: side across from θ

Adjacent side: side touching θ

$y = \frac{1}{x}$

SOH-CAH-TOA
S-we
O pp
H yp
C os
A dj
T an
O pp
A dj

Ratios of the sides are the same for every angle. Example: No matter how long the sides are of a 53.1° angle, when you divide the 2 sides you will always get the same decimal.

There are 6 trigonometric functions.

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

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

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

Cosecant = $\csc\theta = \frac{hyp}{opp} = \frac{1}{\sin\theta}$

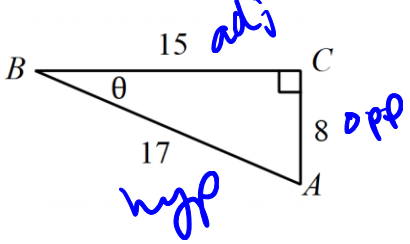
Secant = $\sec\theta = \frac{hyp}{adj} = \frac{1}{\cos\theta}$

Cotangent = $\cot\theta = \frac{adj}{opp} = \frac{1}{\tan\theta}$

type in to calc

Example: Find all 6 trigonometric ratios. - fraction

a)



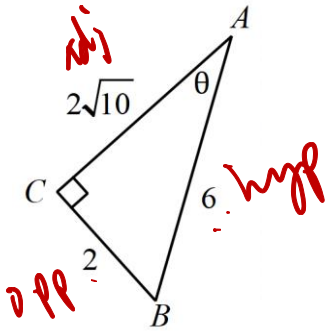
$\sin\theta = \frac{8}{17}$ $\csc\theta = \frac{17}{8}$

$\cos\theta = \frac{15}{17}$ $\sec\theta = \frac{17}{15}$

$\tan\theta = \frac{8}{15}$ $\cot\theta = \frac{15}{8}$

SOH CAH TOA

b)



$\sin\theta = \frac{2}{6} = \frac{1}{3}$ $\csc\theta = 3$

$\cos\theta = \frac{2\sqrt{10}}{6} = \frac{\sqrt{10}}{3}$ $\sec\theta = \frac{3}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$

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

$\frac{1}{2\sqrt{10}} = \frac{1}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{\sqrt{10}}{10}$