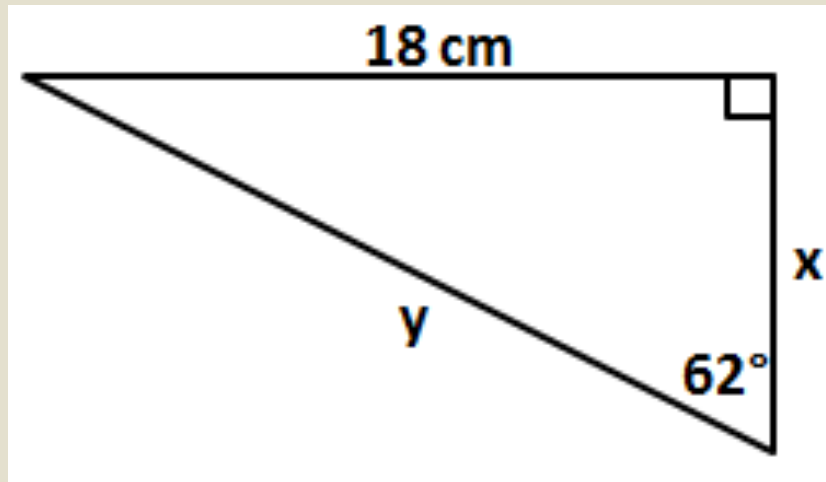


Objective: Rationalize denominators.

## Warmup

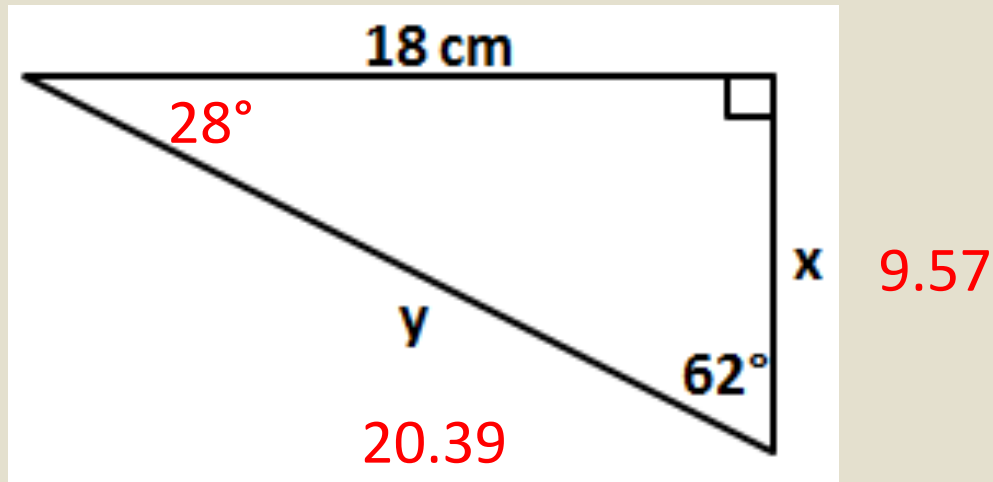
Find all unknown side lengths and all unknown angles.



Objective: Rationalize denominators.

## Warmup

Find all unknown side lengths and all unknown angles.



Objective: Rationalize denominators.

## Rationalizing Denominators

This means we want to have all of our answers in reduced fractions and we can't have any square root in the denominator. All the examples below give the same decimal, but formatting is different.

We want answers to look like this:  $\frac{5\sqrt{2}}{2}$

NOT like this:  $\frac{5}{\sqrt{2}}$

And NOT like this:  $2.5\sqrt{2}$

Objective: Rationalize denominators.

Here is how it works:

If we want to divide by a square root:  $\frac{5}{\sqrt{2}}$

We just take that fraction and multiply the numerator and the denominator by the same square root that is on the bottom.

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

Then simplify:  $\frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{\sqrt{4}} = \frac{5\sqrt{2}}{2}$

Objective: Rationalize denominators.

Here is how it works:

If we want to divide by a square root:  $\frac{5}{\sqrt{2}}$

You can use your calculator to check that your starting fraction and your final answer are the same decimal to make sure you did it correctly.

$$\frac{5}{\sqrt{2}} = 3.5355$$

$$\frac{5\sqrt{2}}{2} = 3.5355$$

When we leave it in terms of a square root, this is giving the EXACT answer (not a rounded answer).

Objective: Rationalize denominators.

Here is how it works:

Try this one:  $\frac{12}{\sqrt{3}}$

Multiply the numerator and the denominator by the same square root that is on the bottom.

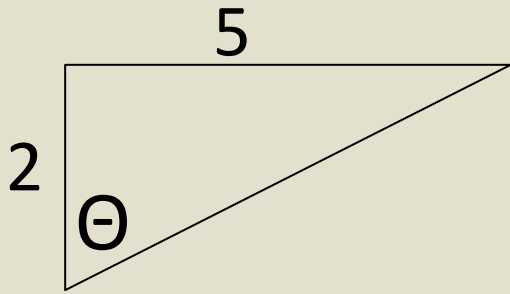
Then simplify:  $\frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{\sqrt{9}} = \frac{12\sqrt{3}}{3}$

This time our fraction also reduces further:  $\frac{12\sqrt{3}}{3} = 4\sqrt{3}$

Objective: Rationalize denominators.

Here is one example of where you would see this:

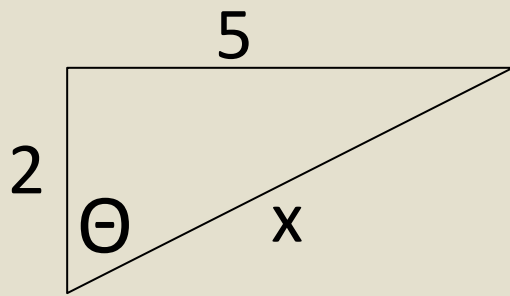
Use the figure to find the exact values of the six trigonometric functions of  $\theta$



Objective: Rationalize denominators.

Here is one example of where you would see this:

Solve for the unknown side using Pythagorean Theorem



$$2^2 + 5^2 = x^2$$

$$4 + 25 = x^2$$

$$29 = x^2$$

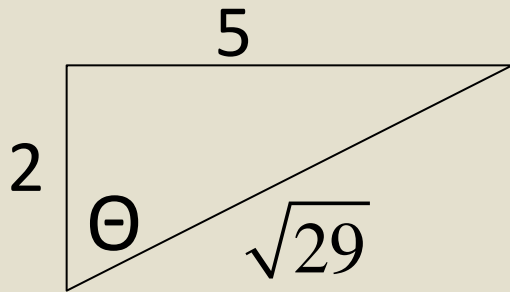
$$x = \sqrt{29}$$



Objective: Rationalize denominators.

Here is one example of where you would see this:

Now we can use the figure to find the exact values of the six trigonometric functions of  $\theta$ . Be sure to rationalize the denominators when necessary!



$$\sin \theta = \frac{5}{\sqrt{29}} = \frac{5\sqrt{29}}{29} \quad \cos \theta = \frac{2}{\sqrt{29}} = \frac{2\sqrt{29}}{29} \quad \tan \theta = \frac{5}{2}$$

$$\csc \theta = \frac{\sqrt{29}}{5} \quad \sec \theta = \frac{\sqrt{29}}{2} \quad \cot \theta = \frac{2}{5}$$

Objective: Rationalize denominators.

Rationalize the denominator and fully simplify

1.  $\frac{1}{\sqrt{2}}$

2.  $\frac{8}{\sqrt{6}}$

3.  $\frac{15}{2\sqrt{3}}$

4.  $\frac{7}{\sqrt{7}}$

Objective: Rationalize denominators.

Rationalize the denominator and fully simplify

$$1. \quad \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$2. \quad \frac{8}{\sqrt{6}} = \frac{8\sqrt{6}}{6} = \frac{4\sqrt{6}}{3}$$

$$3. \quad \frac{15}{2\sqrt{3}} = \frac{15\sqrt{3}}{6} = \frac{5\sqrt{3}}{2}$$

$$4. \quad \frac{7}{\sqrt{7}} = \sqrt{7}$$

Objective: Rationalize denominators.

Assignment:

Log in to Office 365/Teams

Complete the assignment:

**Rationalize Denominators (Week 2, Day 3)**

**SHOW ALL YOUR WORK!**

Due to the frustrations of answers being marked wrong due to formatting etc, I've decided the assignments this week will just be uploaded so I can see all your work. I will also post the answers at the end of the document so you can check, basically more like we used to do in class.

**NO WORK = NO CREDIT (now more important than ever)**