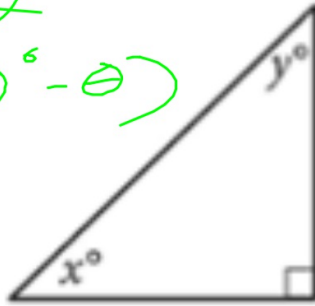


Warm Up

$$\sin x = \cos y$$

$$\sin \theta = \cos(90^\circ - \theta)$$



$$\sin x = 0.6$$
$$\cos y = 0.6$$

In the triangle above, the sine of x° is 0.6. What is the cosine of y° ?

Objective: SWBAT construct the unit circle, and convert between degrees and radians.

Agenda:

- warmup
- HW huddle
- unit circle
- notes
- practice
- reflection/exit ticket

Erratum

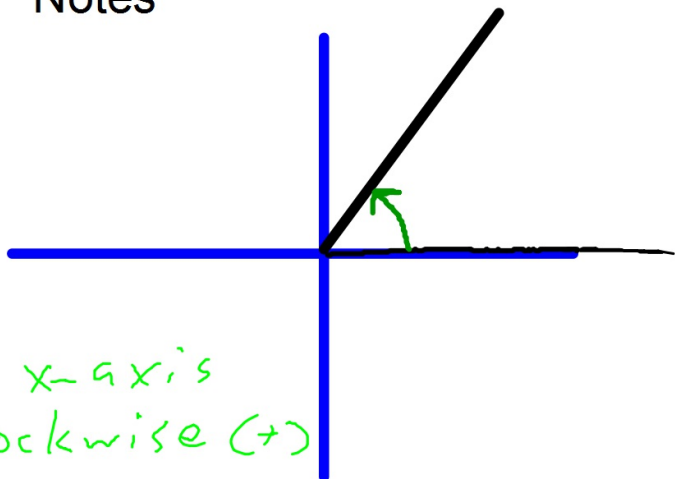
On the back of the unit circle handout, the headings should read

- degrees
- radians
- sine
- cosine
- tangent
- cosecant
- secant
- cotangent

We'll fill in the table as we go.

Notes

Standard position



What do you notice?

- starts at the x-axis
- goes counter-clockwise (+)

Unit Circle

1. Label the 90° angles, starting from the x-axis, in the bubbles.
2. Label the 45° angles in colored pencil.
3. Repeat for the 30° angles above and below the x axis in a different color.
4. Repeat for the 60° angles above and below the x axis in a third color.

Notes: Sine & Cosine on the Unit Circle

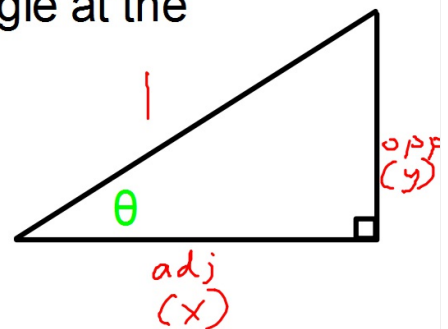
Imagine a right triangle with its acute angle at the origin.

What does $\cos\theta$ represent?

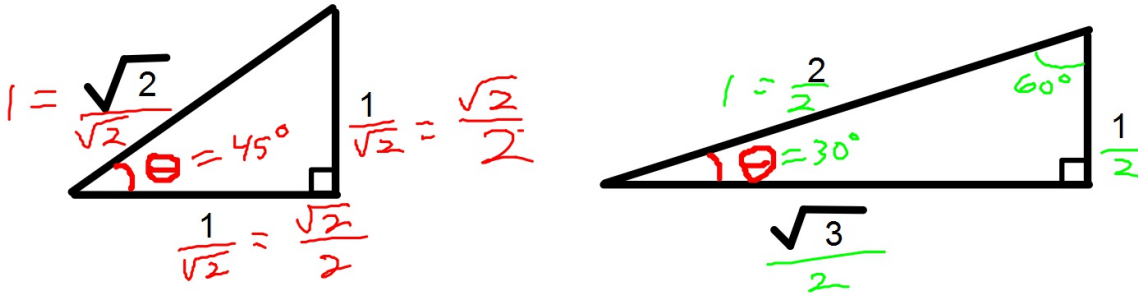
x-coordinate

What does $\sin\theta$ represent?

y-coordinate



Unit Circle



For the triangle on the left, what number can we divide the hypotenuse by to make it equal 1? The triangle on the right?

Do these triangles look like they can fit in your unit circle?

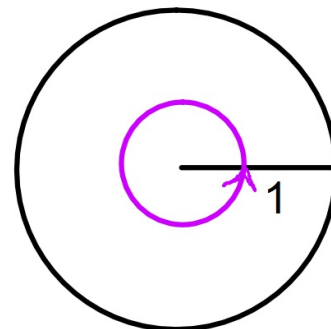
Unit Circle

What is the circumference of a circle with radius = 1?

$$C = 2\pi r$$
$$= 2\pi$$

so $360^\circ = 2\pi \text{ radians}$

$$\text{radians} = \frac{2\pi}{360} \text{ (degrees)}$$



For each angle, convert the degrees to radians.

Notes: Reciprocal Functions

Cosecant, secant, and cotangent are all reciprocals of the three functions we know. They were used during the sailing ship era, but now they're mostly used for calculus and map-making.

| | f(x) | 1/f(x) | |
|-----|-------------------------------|-----------|-----|
| y | sine | cosecant | 1/y |
| x | cosine | secant | 1/x |
| y/x | tangent = $\frac{\sin}{\cos}$ | cotangent | x/y |

Practice

Unit Circle Trig Practice

- give the exact value, for the questions that have one
- if you filled in your table, you don't need a calculator

Reflection/Exit Ticket

How is the unit circle related to special right triangles?