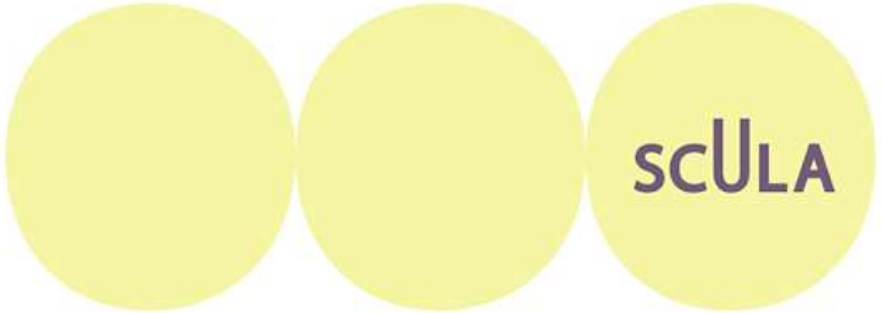
SAT MATH SECTION

Trigonometry

TRIGONOMETRY :

- Sine, Cosine, and Tangent
- Evaluating Trigonometric expressions



What is π?

Succinctly, pi—which is written as the Greek letter for p, or π—is the ratio of the circumference of any circle to the diameter of that circle.

For this session, we will work with a circle of a radius = .1

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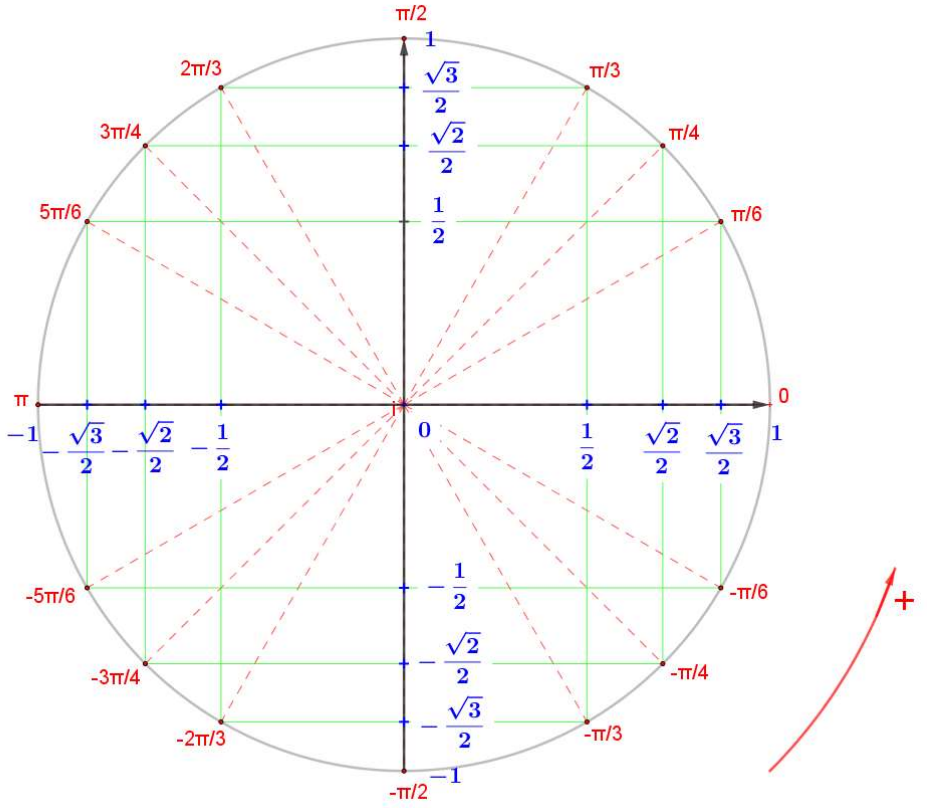
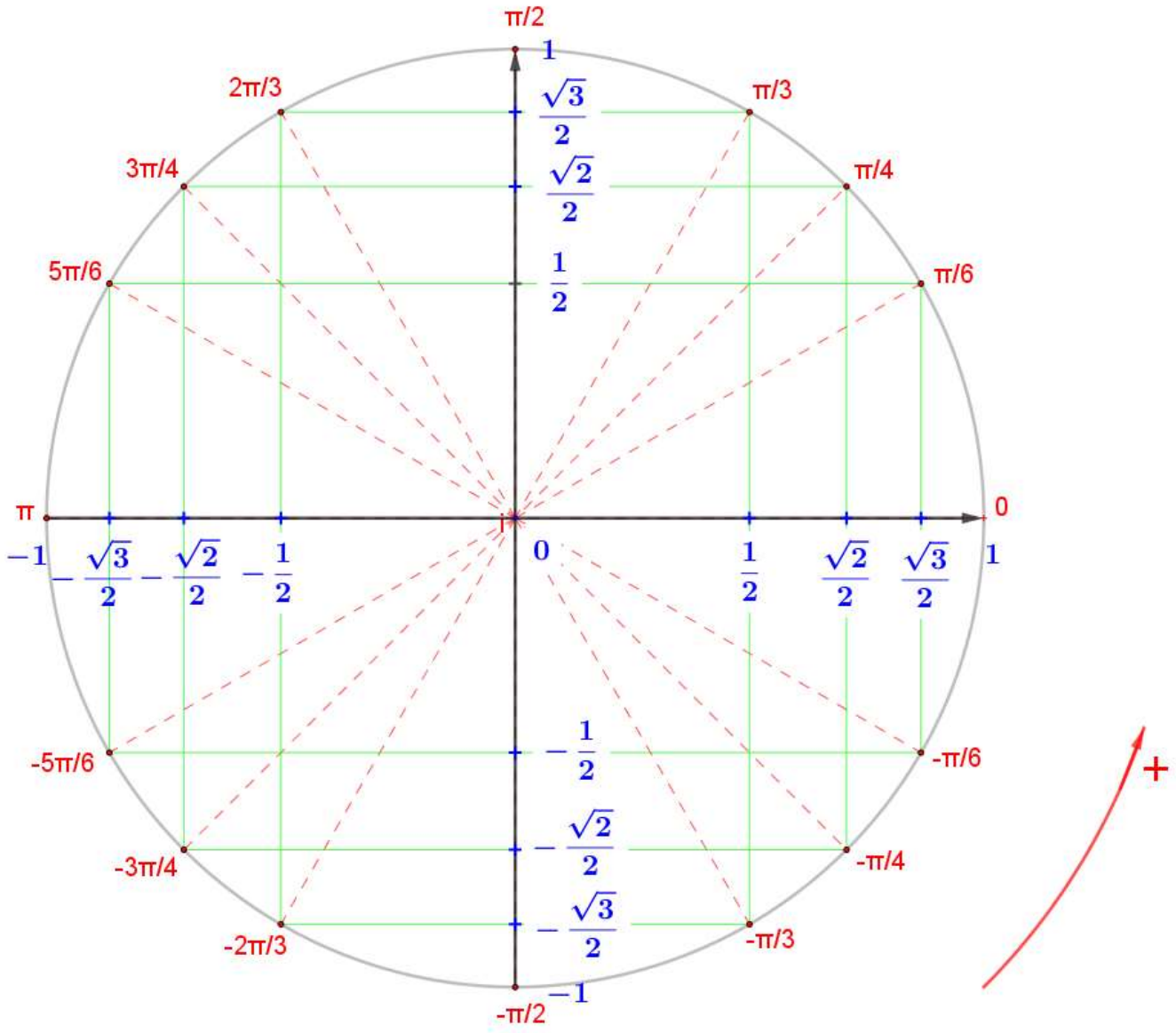
We will start measuring the angles in the counterclockwise direction.

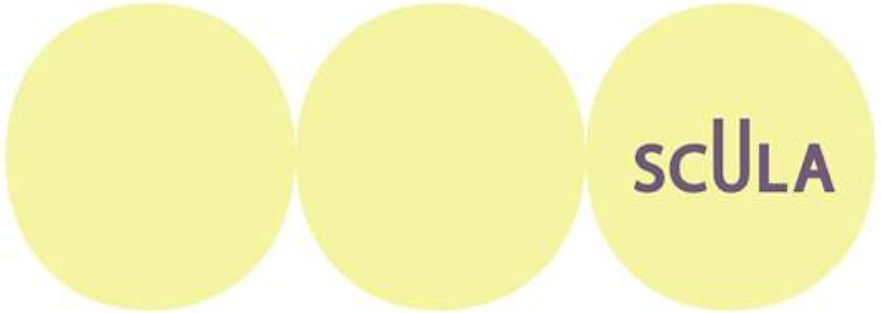


Trigonometric circle



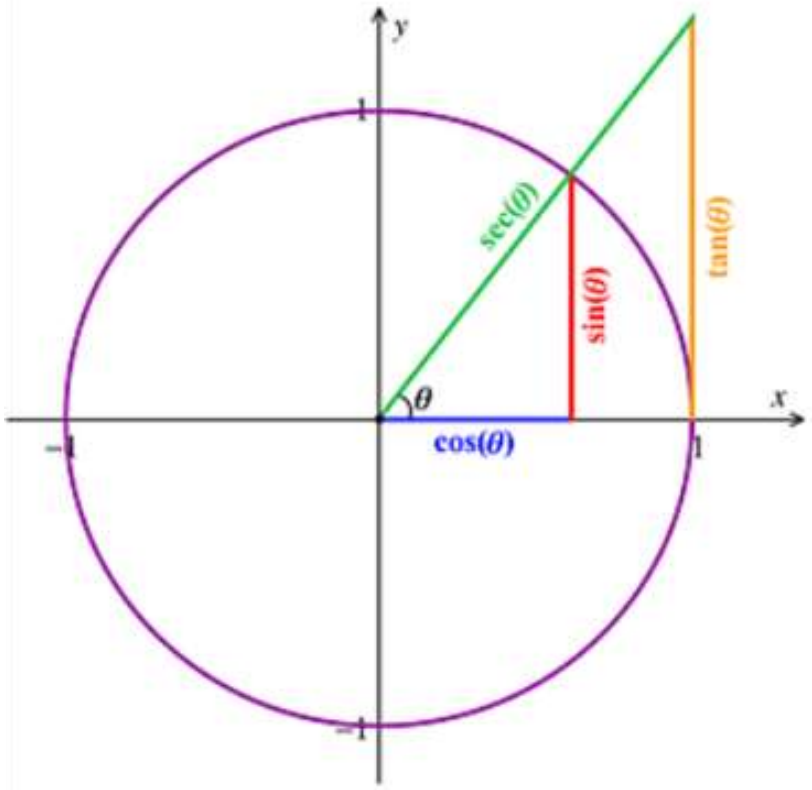
We can split the circle to four quadrants .

1. The first quadrant has positive values for both sine and cosine .
2. The second quadrant has positive values for the sine function and negative cosine function values.
3. The third quadrant has positive values for the cosine function and negative sine function values.
4. The fourth quadrant has negative values for both sine and cosine .



We will attribute the x-axis to the cosine and the y-axis to the sine values .

By projecting on the x-axis and the y- axis, we obtain :



$$\sin x = \frac{measure\ of\ the\ opposite\ side\ to\ the\ angle}{measure\ of\ the\ hypothenuse}$$

$$\cos x = \frac{measure\ of\ the\ adjacent\ side\ to\ the\ angle}{measure\ of\ the\ hypothenuse}$$

SCULA

$$\tan x = \frac{\textit{measure of the opposite side of the angle}}{\textit{measure of the adjacent side of the angle}} = \frac{\sin x}{\cos x}$$

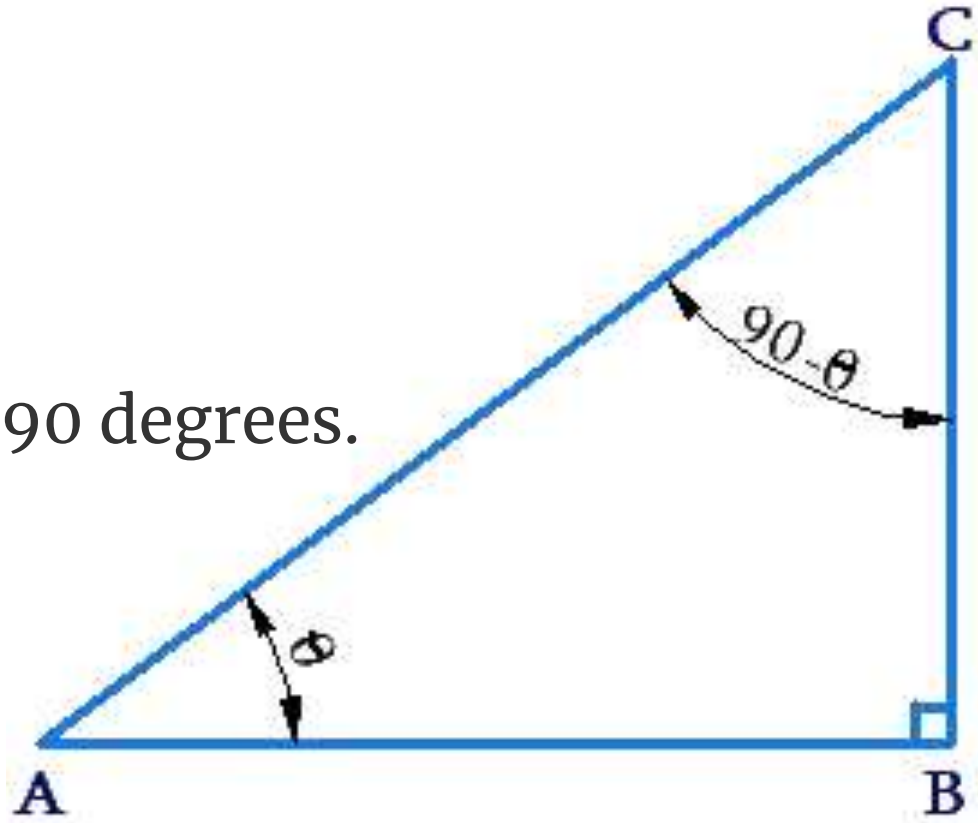
You should also know the complementary angle relationship for sine and cosine, **which is sin(x°)=cos(−90°x°).**

DEMONSTRATION :

In a right triangle, A+B + C = 180°

The sum of two angles A and C is equal to 90 degrees.

C = A - 90°



$$\sin(C) = \sin(\theta) = \frac{AB}{AC}$$

$$\cos\ (90° - C) = \cos(90° - \theta) = \frac{AB}{AC}$$

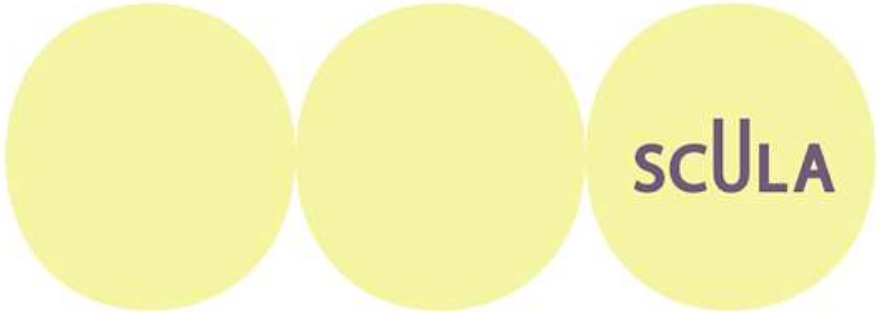
To find the value of a trig function for an angle without a calculator :

1- Determine what the sign of the result should be (positive or negative)

2- Add or subtract multiples of 90° from the angle until you get an angle in the first quadrant.

3- Use your 45-45-90 or 30-60-90 special right triangles to get the value.

4- Make sure your result has the correct sign from step one.



EXAMPLE :

What is the value of sin 330° ?

Preferably, try to work with radians.

Convert 330° to radians.

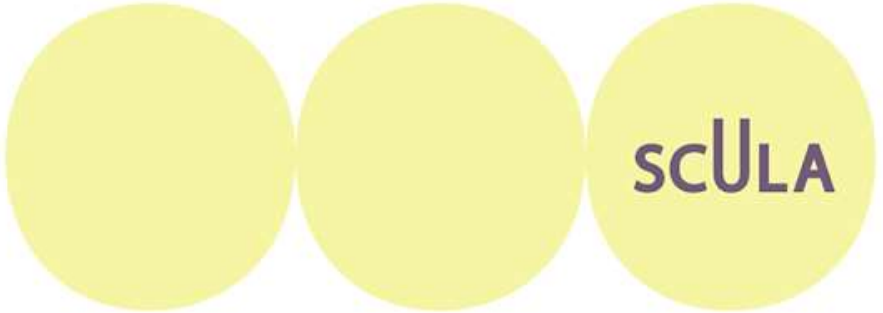
360 → 2π

330 → $11\pi/6$

Since $11\pi/6$ is in the fourth quadrant, the result should be negative. $11\pi/6$ is congruent to $\pi/6$.

$\sin(\pi/6) = \sqrt{3}/2$

$\sin 330° = -\sqrt{3}/2$



THANK YOU!

DO YOU HAVE ANY QUESTIONS?