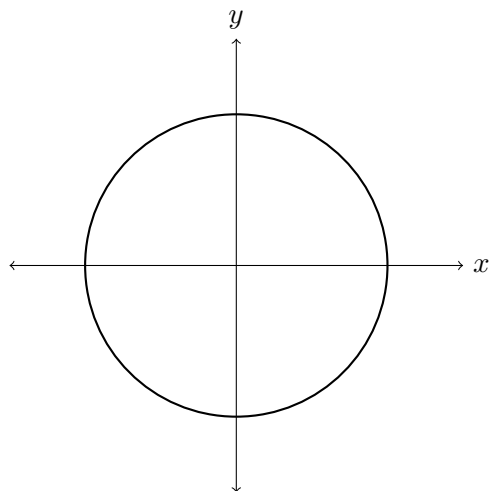


MATH 156: Precalculus
Fall 2015
Worksheet §5.2: Trigonometric Functions of Real Numbers

Plot the terminal points for $t = 0, \pi/6, \pi/4, \pi/3$, and $\pi/2$.



Definition of the Trigonometric Functions

t is any real number and $P(x, y)$ is the terminal point on the unit circle associated with t :

$$\sin(t) = \quad \cos(t) = \quad \tan(t) =$$

$$\csc(t) = \quad \sec(t) = \quad \cot(t) =$$

Example: For $t = 2\pi/3$, find the values of each of the six trigonometric functions.

1. For each value of t below, find each of the six trigonometric functions:

(a) $t = 5\pi/4$

(b) $t = -7\pi/6$

(c) $4\pi/3$

2. What is the sign of $\tan t \sec t$ if the terminal point of t is in quadrant IV?

3. If $\sin t > 0$ and $\sec t < 0$, in what quadrant is the terminal point of t ?

4. Find the values of the trigonometric function of t from the fact that $\cos t = -7/25$ and the terminal point of t is in quadrant III.

5. Determine the domain of all six trigonometric functions.

6. Write $\tan t$ in terms of $\sin t$ and $\cos t$.
7. Explain why $\csc t = \frac{1}{\sin t}$. (This is called a reciprocal identity.)
8. Find reciprocal identities for $\sec t$ and $\cot t$.
9. Explain why $\sin^2 t + \cos^2 t = 1$ for any choice of t . (This is called a Pythagorean Identity.)
10. Use the equation in the previous problem and the reciprocal identities to derive two more Pythagorean Identities.
11. Use the definition to show that $f(t) = \sin t$ is an odd function.

12. Determine whether the functions below are even or odd:

(a) $f(t) = \cos t$

(b) $f(t) = \tan t$

(c) $f(t) = t^2 \cos(t)$

13. How do you know the equation $2 - 2 \sin x = 6$ has no solutions.

14. Find all t so that $\sin t = 0$.

15. Find all t so that $\cos(t/2) = 0$.