Section 7.1: Identities: Pythagorean and Sum/Difference

Wednesday, February 17, 2016
10:56 AM

identity ≡ an equation which is true for all possible values of the variable

examples: $2x = x + x$

$3(y+1) = 3y + 3$

$z^{-1} = \frac{1}{z}$

note: although there is a place on the real number line where $\frac{1}{z}$ is not defined, this equation is true for every value of z where $\frac{1}{z}$ is defined

some basic trig identities we already know: (reciprocal identities)

$\sin x = \frac{1}{\csc x}$ $\qquad$ $\csc x = \frac{1}{\sin x}$

$\cos x = \frac{1}{\sec x}$ $\qquad$ $\sec x = \frac{1}{\cos x}$

$\tan x = \frac{1}{\cot x}$ $\qquad$ $\cot x = \frac{1}{\tan x}$

some identities: (negative identities)

$\sin(-x) = -\sin x$ $\qquad$ sine $\qquad$ odd

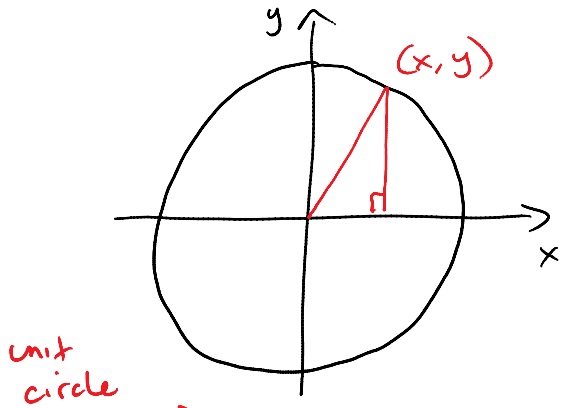
$\cos(-x) = \cos x$ $\qquad$ because cosine is even

$\cos(-x) = \cos x$ because cosine is even

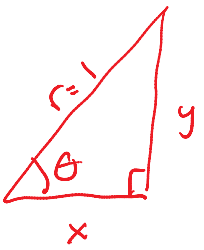
$\tan(-x) = -\tan x$ odd

recall: if $f(-x) = -f(x)$, $f(x)$ is odd

Let's examine some new ones:



unit circle (radius = 1)



$$\sin\theta = \frac{y}{r} = \frac{y}{1} = y$$

$$\cos\theta = \frac{x}{r} = \frac{x}{1} = x$$

$$\tan\theta = \frac{y}{x} = \frac{\sin\theta}{\cos\theta}$$

quotient identities:

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

$$\cot\theta = \frac{\cos\theta}{\sin\theta}$$

← this one is extremely useful