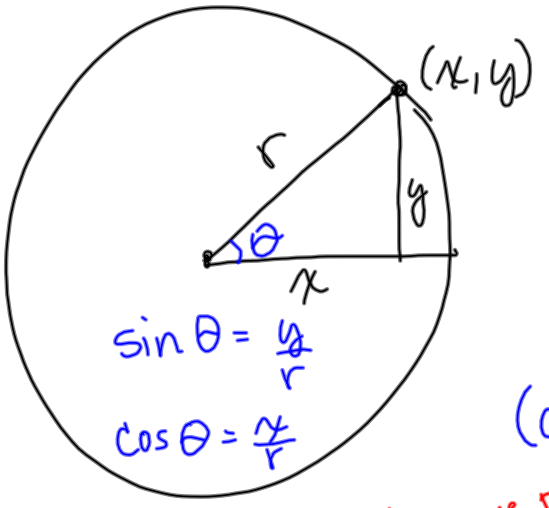
Pythagorean Identity



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

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

$x^2 + y^2 = r^2$

$\frac{x^2}{r^2} + \frac{y^2}{r^2} = 1$ Divide by r^2

$\left(\frac{x}{r}\right)^2 + \left(\frac{y}{r}\right)^2 = 1$ Power of a Quotient

$(\cos\theta)^2 + (\sin\theta)^2 = 1$ Substitute $\sin\theta = \frac{y}{r}$, $\cos\theta = \frac{x}{r}$

Where we put exponents on trig functions

$\sin^2\theta + \cos^2\theta = 1$