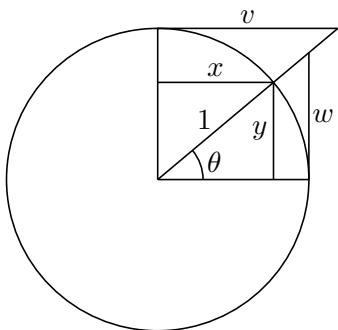


Name: _____

Mark: _____

Mini-math Div 3/4: Monday, January 4, 2021 (12 minutes)

1. (2 points) Consider the following diagram of a unit circle (lines which look perpendicular, are perpendicular):



Write x and y as trigonometric functions of θ .

Solution:

$$x = \cos \theta, \quad y = \sin \theta$$

Also: $v = \cot \theta$, $w = \tan \theta$. The hypotenuse of the right-angle triangle with height w , base 1 is $\sec \theta$ and the hypotenuse of the triangle with width v , height 1 is $\csc \theta$.

2. (2 points) Express $\tan \theta$, $\sec \theta$, $\cot \theta$, and $\csc \theta$ in terms of $\sin \theta$ and $\cos \theta$.

Solution:

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

$$\sec \theta = \frac{1}{\cos \theta},$$

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

$$\csc \theta = \frac{1}{\sin \theta}.$$

3. (2 points) Express $\sin^2 \theta$ in terms of $\cos^2 \theta$, $\tan^2 \theta$ in terms of $\sec^2 \theta$, and $\cot^2 \theta$ in terms of $\csc^2 \theta$.

Solution:

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

$$\tan^2 \theta = \sec^2 \theta - 1$$

$$\cot^2 \theta = \csc^2 \theta - 1$$

4. (2 points) Express $\sin(x + y)$ and $\cos(x + y)$ in terms of $\sin x$, $\sin y$, $\cos x$, and $\cos y$.

Solution:

$$\sin(x + y) = \sin x \cos y + \sin y \cos x$$

$$\cos(x + y) = \cos x \cos y - \sin x \sin y$$

5. (2 points) How do you convert an angle between degrees and radians?

Solution: From degrees to radians: multiply by π , divide by 180° .

From radians to degrees: multiply by 180° , divide by π .