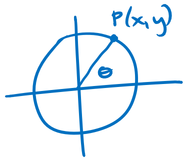
PROVE IT NOTES

I. BASIC DEFINITIONS

7 pts



1) $\cos\theta = x$

2) $\sin\theta = y$

3) $\tan\theta = \dfrac{\sin\theta}{\cos\theta} = \dfrac{y}{x}$

4) $\sec\theta = \dfrac{1}{\cos\theta} = \dfrac{1}{x}$

5) $\csc\theta = \dfrac{1}{\sin\theta} = \dfrac{1}{y}$

6) $\cot\theta = \dfrac{\cos\theta}{\sin\theta} = \dfrac{x}{y}$

II. PYTHAGOREAN IDENTITIES

5 pts

$x^2 + y^2 = 1$

$\dfrac{\cos^2\theta}{\cos^2\theta} + \dfrac{\sin^2\theta}{\cos^2\theta} = \dfrac{1}{\cos^2\theta}$

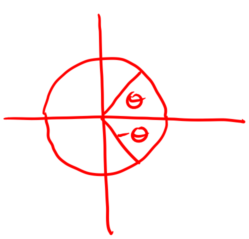
$\dfrac{\cos^2\theta}{\sin^2\theta} + \dfrac{\sin^2\theta}{\sin^2\theta} = \dfrac{1}{\sin^2\theta}$

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

8) $1 + \tan^2\theta = \sec^2\theta$

9) $\cot^2\theta + 1 = \csc^2\theta$

III. OPPOSITE ANGLES



10) $\sin(-\theta) = -\sin\theta$

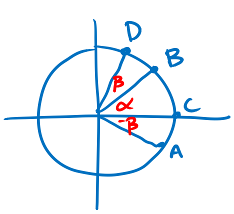
11) $\cos\theta = \cos(-\theta)$

$\tan(-\theta) = \dfrac{\sin(-\theta)}{\cos(-\theta)} = \dfrac{-\sin\theta}{\cos\theta} = -\tan\theta$

12) $\tan(-\theta) = -\tan\theta$

IV. ANGLE ADDITION

8 pts



$A(\cos\beta, -\sin\beta)$ $B(\cos\alpha, \sin\alpha)$ $C(1,0)$ $D(\cos(\alpha+\beta), \sin(\alpha+\beta))$

$AB = CD$

$\sqrt{(\cos\alpha - \cos\beta)^2 + (\sin\alpha + \sin\beta)^2} = \sqrt{(\cos(\alpha+\beta) - 1)^2 + \sin^2(\alpha+\beta)}$

$\cos^2\alpha - 2\cos\alpha\cos\beta + \cos^2\beta + \sin^2\alpha + 2\sin\alpha\sin\beta + \sin^2\beta = \cos^2(\alpha+\beta) - 2\cos(\alpha+\beta) + 1 + \sin^2(\alpha+\beta)$

$-2\cos\alpha\cos\beta + 2\sin\alpha\sin\beta + 2 = 2 - 2\cos(\alpha+\beta)$

$-2\cos\alpha\cos\beta + 2\sin\alpha\sin\beta = -2\cos(\alpha+\beta)$

13) $\boxed{\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta}$

$\cos(\alpha-\beta) = \cos(\alpha + -\beta) = \cos\alpha\cos(-\beta) - \sin\alpha\sin(-\beta)$

$= \cos\alpha\cos\beta + \sin\alpha\sin\beta$

14) $\boxed{\cos(\alpha-\beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta}$