Calculus I
Homework Review Trigonometry
Lecture 2

1. **The problem is too easy to appear on a quiz or test.** Convert from degrees to radians.

   (a) $15°$.

   (b) $30°$.

   (c) $36°$.

   (d) $45°$.

   (e) $60°$.

   (f) $75°$.

   (g) $90°$.

   (h) $120°$.

   (i) $135°$.

   (j) $150°$.

   (k) $180°$.

   (l) $225°$.

   (m) $270°$.

   (n) $305°$.

   (o) $360°$.

   (p) $405°$.

   (q) $1200°$.

   (r) $-900°$.

   (s) $-2014°$.

2. **The problem is too easy to appear on a quiz or test.** Convert from radians to degrees. The answer key has not been proofread, use with caution.

   (a) 4π.

   (b) $-\frac{7}{6}\pi$.

   (c) $\frac{7}{12}\pi$.

   (d) $\frac{4}{3}\pi$.

   (e) $-\frac{3}{8}\pi$.

   (f) 2014π.

   (g) 5.

   (h) -2014.

3. Prove the trigonometry identities.

   (a) $\sin\theta\cot\theta = \cos\theta$.

   (b) $(\sin\theta + \cos\theta)^2 = 1 + \sin(2\theta)$.

   (c) $\sec\theta - \cos\theta = \tan\theta\sin\theta$.

   (d) $\tan^2\theta - \sin^2\theta = \tan^2\theta\sin^2\theta$.

   (e) $\cot^2\theta + \sec^2\theta = \tan^2\theta + \csc^2\theta$.

   (f) $2\csc(2\theta) = \sec\theta\csc\theta$.

   (g) $\tan(2\theta) = \dfrac{2\tan\theta}{1 - \tan^2\theta}$.

   (h) $\dfrac{1}{1 - \sin\theta} + \dfrac{1}{1 + \sin\theta} = 2\sec^2\theta$.

   (i) $\tan\alpha + \tan\beta = \dfrac{\sin(\alpha + \beta)}{\cos\alpha\cos\beta}$.

   (j) $\tan(\alpha + \beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}$.

   (k) $\sin(3\theta) + \sin\theta = 2\sin(2\theta)\cos\theta$.

   (l) $\cos(3\theta) = 4\cos^3\theta - 3\cos\theta$.

   (m) $1 + \tan^2\theta = \sec^2\theta$.

   (n) $1 + \csc^2\theta = \cot^2\theta$.

   (o) $2\cos^2(2x) = 2\sin^4\theta + 2\cos^4\theta - \sin^2(2\theta)$.

   (p) $\dfrac{1 + \tan\left(\frac{\theta}{2}\right)}{1 - \tan\left(\frac{\theta}{2}\right)} = \tan\theta + \sec\theta$.

4. Find all values of x in the interval $[0, 2\pi]$ that satisfy the equation.

   (a) $2\cos x - 1 = 0$.

   (b) $\sin(2x) = \cos x$.

   (c) $\sqrt{3}\sin x = \sin(2x)$. .

   (d) $2\sin^2 x = 1$.

   (e) $2 + \cos(2x) = 3\cos x$.

   (f) $2\cos x + \sin(2x) = 0$.

   (g) $2\cos^2 x - (1 + \sqrt{2})\cos x + \dfrac{\sqrt{2}}{2} = 0$.
   .

   (h) $|\tan x| = 1$.

   (i) $3\cot^2 x = 1$.

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(j) $\sin x = \tan x$.