Honors Trig Chapter 2
Mr. Mumaugh

I CIRCLE SECRETS

A) For each of the following, draw a circle indicating the given. State the coordinates and radians:

1) 30° 2) 120° 3) 210° 4) 330° 5) 135° 6) 45° 7) 180°
8) 315° 9) 60° 10) 210° 11) 225° 12) 90° 13) 150° 14) 0°

B) For each of the following, draw a circle indicating the given. State the coordinates and degrees:

1) $\frac{\pi}{3}$ 2) $\frac{3\pi}{4}$ 3) $\frac{5\pi}{3}$ 4) 2π 5) $\frac{\pi}{6}$ 6) $\frac{\pi}{2}$ 7) $\frac{7\pi}{4}$

8) $\frac{\pi}{4}$ 9) $\frac{2\pi}{3}$ 10) $\frac{5\pi}{4}$ 11) $\frac{3\pi}{2}$ 12) $\frac{11\pi}{6}$ 13) $\frac{5\pi}{6}$ 14) 0

C) For each of the following, draw a circle indicating the given. State the radians and degrees:

1) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ 2) $(0, 1)$ 3) $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ 4) $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ 5) $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

6) $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ 7) $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ 8) $(-1, 0)$ 9) $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ 10) $(0, 1)$

11) $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ 12) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ 13) $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ 14) $(1, 0)$ 15) $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

II Write the general cosine add/subtract formula *EACH* time it is used!

A) Simplify: 1) $\cos\frac{5\pi}{12}$ 2) $\cos\frac{11\pi}{12}$ 3) $\cos\frac{13\pi}{12}$ 4) $\cos\frac{\pi}{12}$

5) $\cos\frac{-\pi}{12}$ 6) $\cos\frac{-13\pi}{12}$ 7) $\cos\frac{-11\pi}{12}$ 8) $\cos\frac{-5\pi}{12}$

B) WithOUT evaluating EACH factor in the original, evaluate: (hint: use Cos Add/Subtract)

1) $\cos\pi\cos\frac{2\pi}{3} + \sin\pi\sin\frac{2\pi}{3}$ 2) $\cos\frac{\pi}{6}\cos\frac{2\pi}{3} - \sin\frac{\pi}{6}\sin\frac{2\pi}{3}$

C) *USE the Cosine Add/Subtract formula* to **simplify as much as possible**.

1) $\cos(x + \pi)$ 2) $\cos(x - \pi)$ 3) $\cos\left(x + \frac{\pi}{2}\right)$ 4) $\cos\left(x - \frac{\pi}{2}\right)$ 5) $\cos(x + x)$

6) $\cos\left(\frac{x}{2} - \frac{x}{2}\right)$ 7) $\cos(0 - x)$ 8) $\cos\left(\frac{x}{2} + \frac{x}{2}\right)$ 9) $\cos\left(\frac{\pi}{2} - x\right)$

III Write the general sine add/subtract formula *EACH* time it is used!

Simplify: 1) $\sin\frac{5\pi}{12}$ 2) $\sin\frac{11\pi}{12}$ 3) $\sin\frac{13\pi}{12}$ 4) $\sin\frac{\pi}{12}$

5) $\sin\frac{-\pi}{12}$ 6) $\sin\frac{-13\pi}{12}$ 7) $\sin\frac{-11\pi}{12}$ 8) $\sin\frac{-5\pi}{12}$

IV Draw the circle and properly mark the indicated radian measurement. Specifically state the sine of the measurement and the cosine of the measurement.

a) $\frac{5\pi}{6}$ b) $\frac{5\pi}{3}$ c) $\frac{-5\pi}{4}$ d) $\frac{-8\pi}{3}$ e) $\frac{13\pi}{12}$ f) $\frac{11\pi}{3}$ g) $\frac{-4\pi}{3}$ h) $\frac{-5\pi}{3}$

i) $\frac{11\pi}{2}$ j) $\frac{40\pi}{3}$ k) $\frac{-2\pi}{3}$ l) $\frac{-7\pi}{4}$ m) $\frac{11\pi}{6}$ n) $\frac{35\pi}{6}$ o) $\frac{-17\pi}{3}$ p) $\frac{-47\pi}{4}$

V Copy each of the tables. Fill in all the missing data. Show all work. No decimals, of course.

A)

x	$\sin x$	$\cos x$	$\tan x$	x	$\sin x$	$\cos x$	$\tan x$
0				π			
$\frac{\pi}{6}$				$\frac{7\pi}{6}$			
$\frac{\pi}{4}$				$\frac{5\pi}{4}$			
$\frac{\pi}{3}$				$\frac{4\pi}{3}$			
$\frac{\pi}{2}$				$\frac{3\pi}{2}$			
$\frac{2\pi}{3}$				$\frac{5\pi}{3}$			
$\frac{3\pi}{4}$				$\frac{7\pi}{4}$			
$\frac{5\pi}{6}$				$\frac{11\pi}{6}$			

B)

x	$\csc x$	$\sec x$	$\cot x$	x	$\csc x$	$\sec x$	$\cot x$
0				π			
$\frac{\pi}{6}$				$\frac{7\pi}{6}$			
$\frac{\pi}{4}$				$\frac{5\pi}{4}$			
$\frac{\pi}{3}$				$\frac{4\pi}{3}$			
$\frac{\pi}{2}$				$\frac{3\pi}{2}$			
$\frac{2\pi}{3}$				$\frac{5\pi}{3}$			
$\frac{3\pi}{4}$				$\frac{7\pi}{4}$			
$\frac{5\pi}{6}$				$\frac{11\pi}{6}$			

VI Copy the table. Fill in all the missing data. Show all work. No decimals, of course.

x	$\tan x$	x	$\tan x$	x	$\tan x$	x	$\tan x$
$\frac{\pi}{12}$		$\frac{9\pi}{12}$		$\frac{17\pi}{12}$		$\frac{25\pi}{12}$	
$\frac{2\pi}{12}$		$\frac{10\pi}{12}$		$\frac{18\pi}{12}$		$\frac{26\pi}{12}$	
$\frac{3\pi}{12}$		$\frac{11\pi}{12}$		$\frac{19\pi}{12}$		$\frac{27\pi}{12}$	
$\frac{4\pi}{12}$		$\frac{12\pi}{12}$		$\frac{20\pi}{12}$		$\frac{28\pi}{12}$	
$\frac{5\pi}{12}$		$\frac{13\pi}{12}$		$\frac{21\pi}{12}$		$\frac{29\pi}{12}$	
$\frac{5\pi}{12}$		$\frac{14\pi}{12}$		$\frac{22\pi}{12}$		$\frac{30\pi}{12}$	
$\frac{7\pi}{12}$		$\frac{15\pi}{12}$		$\frac{23\pi}{12}$		$\frac{31\pi}{12}$	
$\frac{8\pi}{12}$		$\frac{16\pi}{12}$		$\frac{24\pi}{12}$		$\frac{32\pi}{12}$	

VII Prove: a) $\sin^2\left(\frac{x}{2}\right) = \frac{1}{2}(1 - \cos x)$ b) $\left(\frac{1 + \tan x}{1 - \tan x}\right)^2 = \frac{1 + \sin 2x}{1 - \sin 2x}$

c) $\sin 3x = 3\sin x - 4\sin^3 x$ d) $\frac{1 - \tan^2 x}{1 + \tan^2 x} = 1 - 2\sin^2 x$

VIII Which (if any) of the following are identities?

a) $\tan^2 x - \sin^2 x = (\tan^2 x)(\sin^2 x)$ b) $\frac{\cos 4x}{1 + \sin 4x} = \sec 4x - \tan 4x$

c) $\frac{1}{6}(\sin 4x)(\cos 2x) - \frac{1}{3}\cos 4x \sin 2x = \frac{1}{3}\sin^3 2x$ d) $\sin x = \frac{2\tan\frac{x}{2}}{1 + \tan^2\frac{x}{2}}$