

**Math 120 – Teamwork # 4**

*You may write your work here or on another sheet of paper. Please box your answers.*

- 1.** Find the exact value of each expression using the **sum or difference formulas**. Do not use a calculator.

**a.**  $\cos\left(\frac{5\pi}{12}\right)$

**b.**  $\sin(255^\circ)$

**c.**  $\tan(195^\circ)$  [Be sure to rationalize your answer]

- 2.** Use the information given to find (a)  $\cos(2\theta)$  and (b)  $\sin(2\theta)$  without a calculator.

$$\cos(\theta) = \frac{5}{13}, \theta \text{ is acute}$$

- 3.** Find the exact value of each expression using the **half-angle formulas**. Do not use a calculator.

**a.**  $\cos\left(\frac{\pi}{8}\right)$

**b.**  $\sin(345^\circ)$

**c.**  $\cos\left(\frac{11\pi}{12}\right)$

- d.** Using your answer to (a) and the half-angle identities, find the exact value of  $\sin\left(\frac{\pi}{16}\right)$  and  $\cos\left(\frac{\pi}{16}\right)$ .

**4.** Establish the following identities.

**a.** 
$$\frac{\cos(\alpha + \beta)}{\cos \alpha \cos \beta} = 1 - \tan \alpha \tan \beta$$

**b.** 
$$2 \tan \theta \csc(2\theta) - \tan^2 \theta = 1$$

4. Establish the following identities.

**(continued from other side)**

c. 
$$\frac{\sin(4\theta) + \sin(8\theta)}{\sin(4\theta) - \sin(8\theta)} = -\frac{\tan(6\theta)}{\tan(2\theta)}$$