# SEND - IN ASSIGNMENT

# UNIT 5B

# Trigonometry Equations and Identities

Name: _____

1. Solve the following equations **algebraically**

   a) $\cos x = -\frac{1}{\sqrt{2}}$ where $0 \le x < 2\pi$

   b) $\sqrt{3}\tan x = 1$ where $0 \le x < 2\pi$

   c) $\cos x = \sqrt{3} - \cos x$ where $0 \le x < 2\pi$

   d) $2\sin^2 x = 1$ where $0 \le x < 2\pi$

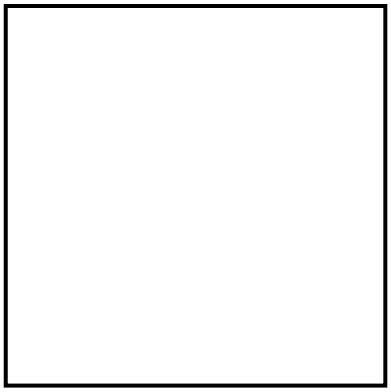
e) $2\sin x \tan x + \tan x = 0$. Find the general solution in radians.

f) $2\cos^2 x + 3\cos x + 1 = 0$. Find the general solution in radians.

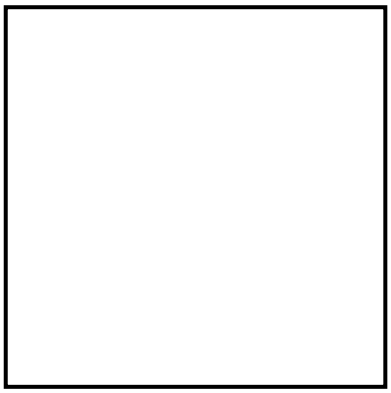
g) $\sin 2x = -\frac{1}{2}$ where $0 \le x < 2\pi$

h) $\tan \frac{1}{2}x = -\sqrt{3}$ where $0 \le x < 2\pi$

2. Answer the following using technology. Include a sketch of any graphs you make.
   a) Solve $\cos x = x^2$



   b) How many solutions does $\cos^3 x = \sin^3 x + 0.5$ have where $-\pi \le x < \pi$ ?



3. Prove $\cot x \sin x \sec x = 1$

4. Prove $\dfrac{\tan x \cos^2 x}{\sec x} = \sin x - \sin^3 x$

5. Prove $\dfrac{1-\cos x}{\sin x} = \dfrac{\tan x - \sin x}{\tan x \sin x}$

6. Prove $\sin(x+y)\sin(x-y) = \sin^2 x - \sin^2 y$

7. Prove $\dfrac{\sin 2x}{1-\cos 2x} = \cot x$

8. Simplify the following using the sum and difference identities

a) $\cos\left(\frac{3\pi}{2} - x\right)$

b) If $\tan x$ is $-1$, simplify $\tan\left(\frac{\pi}{3} + x\right)$. Answer exact value and rationalize denominator.

c) $\sin\left(\frac{\pi}{6} + x\right) - \cos\left(\frac{\pi}{3} - x\right)$

9. Find the exact value of the following

a) $\sin\left(\frac{7\pi}{12}\right)$

b) Find the exact value of $\cos(A - B)$ given $\tan A = -\frac{1}{4}$ if angle $A$ is in quadrant 2 and $\cos B = \frac{2}{5}$ if angle $B$ is in quadrant 4.

c) If $\cos\theta = -\frac{3}{5}$ and $\theta$ is in Quadrant III. Evaluate $\sin 2\theta$

10. Write the following as single trig functions

a) $2\sin 3x\cos 3x$

b) $\cos^2 4x - \sin^2 4x$

11. Determine all the restrictions for $\dfrac{\tan\theta}{1-\sin\theta}$

12. Prove $\cos 3x = 4\cos^3 x - 3\cos x$?