Unit 4A Assignment

Work slowly and carefully. If you are having difficulty, go back and review the appropriate *Lesson*.

As your midterm and final exams do not allow calculators, it is best to attempt all questions in this *Assignment* without a calculator.

Be sure to proofread your assignment carefully.

For full marks, show all calculations, steps, and/or explain your answers.

Total: 65 marks.

(4) 1. Determine the exact value of each of the following expressions.

a. $\cos\frac{7\pi}{6}$

b. $\tan\frac{5\pi}{3}$

c. $\sec 3\pi$

d. $\cot\left(-\frac{5\pi}{6}\right)$

e. $\csc\left(-\frac{7\pi}{6}\right)$

f. $\sin^2\left(\frac{2\pi}{3}\right)$

g. $\cos^2\left(-\frac{\pi}{4}\right)$

h. $\tan^2\left(\frac{5\pi}{6}\right)$

2. Determine all possible values of θ, $0 \leq \theta \leq 2\pi$, if

(1) a. $\cos\theta = -\frac{1}{2}$

(1) b. $\sin\theta = \frac{\sqrt{2}}{2}$

(2) c. $\tan^2\theta = 1$

(1) d. $\sec\theta = \sqrt{2}$

3. Simplify the following expressions.

(2) a. $\cos\alpha \csc\alpha$

(2) b. $\cos^2 x + \tan^2 x \cos^2 x$

(2) c. $\dfrac{\sin\theta + \cot\theta \cos\theta}{\cot\theta}$

4. Write each of the following expressions as a single trigonometric ratio.

(1) a. $\cos\frac{\pi}{3}\cos\frac{\pi}{4}+\sin\frac{\pi}{3}\sin\frac{\pi}{4}$

(1) b. $2\sin\left(\frac{\pi}{8}\right)\cos\left(\frac{\pi}{8}\right)$

(1) c. $2\cos^2\left(\frac{\pi}{4}\right)-1$

5. Determine the exact value of each of the following expressions.

(2) a. $\tan\frac{\pi}{12}$

(2) b. $\sin\frac{7\pi}{12}$

6. Prove the following equations are identities for all permissible values of x.

(2) a. $\tan^2 x - \sin^2 x = \sin^2 x \tan^2 x$

(2) b. $\dfrac{\sin\theta}{1+\cos\theta} + \dfrac{1+\cos\theta}{\sin\theta} = 2\csc\theta$

(2) c. $\frac{\sin 2x}{\sin x} - \frac{\cos 2x}{\cos x} = \sec x$

(2) d. $(\cos A + \cos B)^2 + (\sin A + \sin B)^2 = 2[1 + \cos(A - B)]$

(2) 7. Verify the equation $\sin x + \cos x \tan x = 2 \sin x$ numerically using $x = \frac{\pi}{4}$.

8. Solve the following equations on $[0, 2\pi]$.

(2) a. $2 \cos \theta - \sqrt{3} = 0$

(2) b. $\cos \alpha - \sec \alpha = 0$

(2) c. $\cos^2 x = \frac{1}{4}$

(2) d. $2\sin\theta\cos\theta = \cos\theta$

(3) e. $\sqrt{3}\cot 2x + 1 = 0$

(3) f. $\cos^2 x - \sin^2 x = \frac{1}{2}$

(3) g. $6\sin^2\theta - 5\cos\theta - 2 = 0$

9. Solve the following equation on $[-\pi, \pi]$.

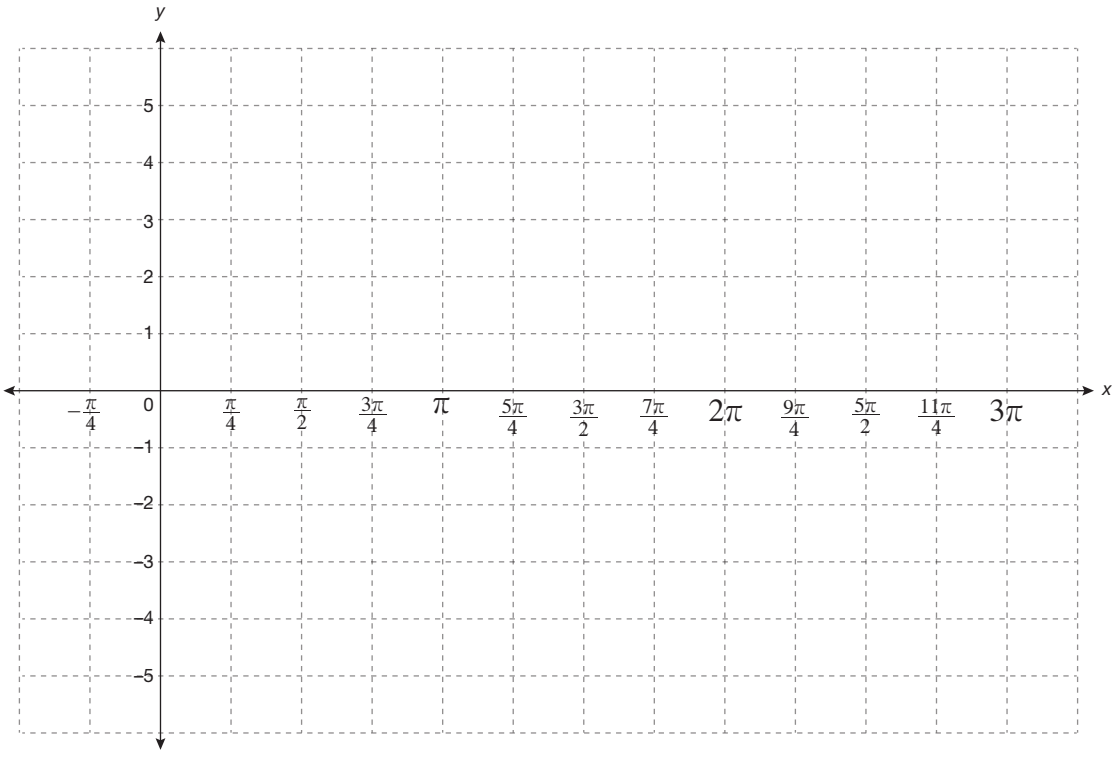
(3) a. $(2\sec x - 1)^2 = 9$

(3) b. $\cos 2x = \cos^2 x$

(3) c. $\sqrt{2}\sin x + \tan x = 0$

10. The equation of a sinusoidal function is given as $f(\theta) = -3\cos\left[2\left(\theta - \frac{\pi}{4}\right)\right] - 2$.

(4) a. Sketch the graph of the function on $[0, 3\pi]$.



(3) b. Complete the following chart.

a.	amplitude	
b.	period	
c.	phase shift	
d.	vertical displacement	
e.	range	