# HOMEWORK 7 - MATH 140

DUE DATE: Monday, March 28

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each homework problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. (a) Find the amplitude, the period and the phase shift and then graph the function $f(x) = 5\cos(-\frac{1}{2}x + \frac{\pi}{4})$.
   (b) Write the equation of the function $f(x) = A\sin(\omega x - \phi), A > 0$, with amplitude 7, period $3\pi$ and phase shift $-\frac{\pi}{5}$.

2. Find the value of each of the following expressions:

$$(a)\ \tan^{-1}\frac{\sqrt{3}}{3} \quad (b)\ \sin^{-1}(-\frac{\sqrt{3}}{2}) \quad (c)\ \tan(\tan^{-1}7.4) \quad (d)\ \sin(\sin(-\frac{\pi}{10}))$$

3. Compute the following:

$$(a)\ \sin(\cos^{-1}\frac{1}{2}) \quad (b)\ \tan(\sin^{-1}(-\frac{1}{2})) \quad (c)\ \tan^{-1}(\tan\frac{2\pi}{3}) \quad (d)\ \cos(\sin^{-1}\frac{\sqrt{2}}{3})$$

4. Establish the identities
   (a) $(1-\cos^2\theta)(1+\cot^2\theta) = 1$
   (b) $1 - \frac{\sin^2\theta}{1+\cos\theta} = \cos\theta$

5. Establish the identities
   (a) $\frac{1=\cot^2\theta}{1+\cot^2\theta} + 2\cos^2\theta = 1$
   (b) $\frac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta} = \sec\theta + \tan\theta$

6. find the exact value of $\sin(\alpha-\beta)$, if you know that $\cos\alpha = \frac{\sqrt{5}}{5}, 0 < \alpha < \frac{\pi}{2}, \sin\beta = -\frac{4}{5}, -\frac{\pi}{2} < \beta < 0$.

7. Establish the following identities:
   (a) $\frac{\cos(\alpha-\beta)}{\sin\alpha\cos\beta} = \cot\alpha + \tan\beta$
   (b) $\frac{\sin(\alpha+\beta)}{\sin(\alpha-\beta)} = \frac{\tan\alpha+\tan\beta}{\tan\alpha-\tan\beta}$

8. Find the exact value of the expressions

$$(a)\ \sin(\sin^{-1}(-\frac{4}{5}) - \tan^{-1}(\frac{3}{4})) \quad (b)\ \tan(\cos^{-1}\frac{4}{5} + \sin^{-1}1)$$