Math 6, Exam II
October 9th, 1996

Name : _____

Section : _____

Examination Rules :

1. All work must be shown

2. Use exact values for your answers (unless instructed to do otherwise)

3. Circle your final answer

Do not turn page until instructed to do so.

(8 points)
1) Fill in the blanks for the following;

		Domain (of x)	--->	Range (of y)
(i)	$\sin^{-1} x$:	[-1, 1]	--->	
(ii)	$\cos^{-1} x$:		--->	
(iii)	$\tan^{-1} x$:		--->	
(iv)	$1 + \sin^{-1}(2x)$:		--->	

(8 points)
2) Find exact values for the following;

(i) $\sin^{-1}(\sin(11\pi/4))$

(ii) $\cos(\tan^{-1} -2)$

(iii) $\sin(\tan^{-1} -2)$

(iv) $\tan(\tan^{-1} 10^{(\sqrt{2}+1)})$

(6 points)
2(b) Write an algebraic expression that is equivalent to

$$\cos\left(\sin^{-1}\left(\frac{x}{\sqrt{4+x^2}}\right)\right)$$

(12 points)

3. Match the trigonometric expressions with one of the following.

(a) 0 (b) 1 (c) 2 (d) $\sin x$ (e) $\cos x$ (f) $\sin^2 x$
(g) $\cos^2 x$ (h) $(\cot x - \tan x)^2$

(i) $(3 - 3 \sin x)(3 + 3 \sin x) - 8 \cos^2 x$

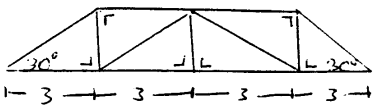
(ii) $\tan x / \sec x$

(iii) $$\frac{1}{\cot x + 1} + \frac{1}{\tan x + 1}$$

(iv) $$(1 + \sin x) + \frac{\cos^2 x}{1 + \sin x}$$

(10 points)

4. Find the length of all the unknown members of the truss.



(6 points each)

5. Find all solutions in $[0, 2\pi)$ of the following equations

(i) $\cos x + \sin x \tan x = 2/\sqrt{3}$

(ii) $2\sin^2 x - 3\sin x + 1 = 0$

(iii) $\sin(3x) = -1/2$

(12 points)

6. Using appropiate formulas, find exact values of the following

   (i) $\tan 15^\circ$

   (ii) $\sin 22.5^\circ$

   (iii) $\sin 75^\circ + \sin 195^\circ$

(12 points each)

7. Given that $\sin u = 2/3$ and that u lies in the second quadrant, find the exact values of the following;
   $\sin(2u)$, $\cos(2u)$, $\sin(u/2)$ and $\cos(u/2)$

(6 points)

8(a). Express $\cos^4 x$ as single order powers of cosine.

(8 points)

8(b). Find all solutions in the interval $[0, 2\pi)$ of the equation,
$\sin(4x) + 2\sin(2x) = 0$

(Bonus Problem, 10 points)

9. The following is a *'proof'* of the incorrect identity,
$\cos^{-1} x = -\cos^{-1} x, \qquad -1 \leq x \leq 1$

Circle the first incorrect statement and explain the error.

Let $y = \cos^{-1} x$, $\qquad -1 \leq x \leq 1$

$\Rightarrow \cos y = x$

$\Rightarrow \cos(-y) = x$

$\Rightarrow \cos^{-1}(\cos(-y)) = \cos^{-1} x$

$\Rightarrow -y = \cos^{-1} x$

$\Rightarrow y = -\cos^{-1} x$

And as y initially defined as $\cos^{-1} x$,
$\cos^{-1} x = -\cos^{-1} x$

QED !!