

November 19, 1998

Math 6  
Exam 2

Name \_\_\_\_\_  
Section \_\_\_\_\_

$\frac{7.2}{5-11}$  (6 pts) Use the fundamental identities and factorization where necessary to simplify.

(a)  $\frac{\cos^2 y}{1 - \sin y}$

(b)  $\sin^2 x \sec^2 x - \sin^2 x$

$\frac{7.3}{2.5-13}$  (6 pts) Use the trigonometric substitution to write the algebraic expression as a trigonometric function of  $\theta$ , where  $0 < \theta < \frac{\pi}{2}$ .

$\sqrt{x^2 - 4}$ ,  $x = 2 \sec \theta$

$\frac{7.2}{3.5-11}$  (10 pts) Match the trigonometric expression with one of the following simplified expressions (A-J). Letters can be used more than once.

(a)  $\frac{\cot x}{\csc x} = \underline{\hspace{2cm}}$

(b)  $(\sec x + 1)(\sec x - 1) = \underline{\hspace{2cm}}$

(c)  $\cos\left(\frac{\pi}{2} - x\right) \sec x = \underline{\hspace{2cm}}$

(d)  $\tan^4 x + 2 \tan^2 x + 1 = \underline{\hspace{2cm}}$

(e)  $\frac{\sin(-x)}{\cos(-x)} = \underline{\hspace{2cm}}$

(f)  $\cos x \tan x = \underline{\hspace{2cm}}$

- A.  $\sin x$
- B.  $\tan x$
- C.  $\sec^4 x$
- D.  $\cos x$
- E.  $\sec^2 x$
- F.  $-\tan x$
- G.  $\cot x$
- H.  $\tan^2 x$
- I.  $-\tan^2 x$
- J. 1

$\frac{7.2}{4.1}$  4. (30 pts) Verify the following identities. Only work from 1 side. Work must be neat!

(a)  $\frac{\cos \theta \cot \theta}{1 - \sin \theta} - 1 = \csc \theta$

(b)  $\sin x(1 - 2 \cos^2 x + \cos^4 x) = \sin^5 x$

(c)  $\csc x - \sin x = \cos x \cot x$

3/3  
5/15.

(28 pts) Find all solutions in the interval  $[0, 2\pi)$  of the following trigonometric equations. Show all work!  
Give exact solutions.

(a)  $2\sin^2 x = 2 + \cos x$

(b)  $2\sec^2 x + \tan^2 x - 3 = 0$

(c)  $\cot x \cos^2 x = 2 \cot x$

6. (10 pts) A flagpole is mounted on the front of a library's roof. From a point 100 feet in front of the library, the angle of elevation to the base of the flagpole and the top of the flagpole are  $28^\circ$  and  $39^\circ$ . Find the height of the flagpole and the height of the library. (Round answers to the nearest whole number.)

---

---

7. (10 pts) An airplane flying at 550 miles per hour has a bearing of  $N52^\circ E$ . After flying 1.5 hours, how far north and how far east will the plane have traveled from its point of departure?

---

---