December 8, 1998 | Math 6, Exam 3 | Name _____ Section _____

7.4/5.1 1. (10 pts) Find the exact value of the trigonometric function given that $\cos u = \frac{5}{13}$, $\sin v = -\frac{3}{5}$ and both u and v are in quadrant IV.

(a) $\csc(u-v)$

(b) $\cot(u+v)$

7.4/5.1 2. (10 pts) Find all solutions in the interval $[0,2\pi)$.

$\sin\left(x+\frac{\pi}{4}\right)-\sin\left(x-\frac{\pi}{4}\right)=1$

7.5/5.1 3. (8 pts) Find the exact values of $\sin\left(\frac{u}{2}\right)$ and $\cos\left(\frac{u}{2}\right)$ given

$$\tan u = \frac{6}{5} \quad \pi < u < \frac{3\pi}{2}$$

4. (12 pts) Rewrite the expression in terms of the first power of cosine.

$\sin^2 x \cos^2 x$

5. (12 pts) Solve a triangle with the given information. If 2 solutions exist find both. If no solution exists state why.

$A = 46°$ $a = 8$ $b = 10$

6. (12 pts) To approximate the length of a marsh, a surveyor walks 300 m from point A to point B, then turns 80° and walks 250 m to point C. Approximate the length from point A to point C.

7. (12 pts) Convert to trigonometric form and then perform the indicated operation. Leave your answer in trigonometric form.

(a) $\left(\sqrt{3} - i\right)\left(2 - 2\sqrt{3}i\right)$

(b) $(1 - i)^7$

8. (12 pts) Find all possible roots to $z^6 - 1 = 0$.

9. (12 pts) Because of prevailing winds, a tree grew so that it was leaning 8° from the vertical. At a point 35 m from the base of the tree, the angle of elevation to the top of the tree is 22°50′. Find the height of the tree.