

Quiz 7

Math 252

$$\begin{array}{lll} \sin 2x = 2 \sin x \cos x & \cos 2x = \cos^2 x - \sin^2 x & \sin x \cos y = \frac{1}{2}[\sin(x - y) + \sin(x + y)] \\ \sin^2 x = \frac{1}{2}(1 - \cos 2x) & \cos^2 x = \frac{1}{2}(1 + \cos 2x) & \sin x \sin y = \frac{1}{2}[\cos(x - y) - \cos(x + y)] \\ & \tan \frac{x}{2} = \frac{\sin x}{1 + \cos x} & \cos x \cos y = \frac{1}{2}[\cos(x - y) + \cos(x + y)] \end{array}$$

Show *all* your work (algebraically or geometrically) for each and simplify. No credit is given without supporting work.

1. [1] Write out the form of the partial fraction decomposition of the function (as done in class Wednesday). Do *not* determine the numerical values of the coefficients.

$$\frac{1}{(x^2 - 9)^2}$$

2. [3] Find ONLY ONE of the following. Indicate clearly which one you want graded by completely crossing out the problem you do not want graded.

$$\int \cot^3 \alpha \csc^3 \alpha \, d\alpha$$

$$\int \tan^3 x \, dx$$

3. [3] Find ONLY ONE of the following. Indicate clearly which one you want graded by completely crossing out the problem you do not want graded.

$$\int \frac{x}{\sqrt{x^2 - 7}} dx$$

$$\int \frac{\sqrt{9 - x^2}}{x^2} dx$$

4. [3] Use partial fractions to find

$$\int \frac{1}{x^2 - 1} dx$$