

# Take-Home Quiz 1

Math 132 Section 22

Due Monday, January 9, 2006

I give you a selection of problems about trigonometry.

**Problem 1. (2 points).** Prove that

$$(1 + \cos \theta)(1 - \cos \theta) = \sin^2 \theta$$

is an identity.

**Problem 2. (2 points).** A bicycle wheel, 27 inches in diameter, has rotated through an angle of  $60^\circ$ . How far has the bicycle moved?

**Problem 3. (2 points).** Find the limit, if it exists:

$$\lim_{\theta \rightarrow 0} \frac{\sin \theta - \cos \theta}{3\theta + 2 + \cos \theta}.$$

**Problem 4. (2 points).** Find the limit, if it exists:

$$\lim_{x \rightarrow 0} \frac{\tan x}{x}.$$

**Problem 5. (3 points).** Find the limit, if it exists:

$$\lim_{x \rightarrow 0} \frac{\sin(4x)}{5x}.$$

**Problem 6. (3 points).** Find the limit, if it exists:

$$\lim_{x \rightarrow 0} \frac{\sin^2 x}{x}.$$