

Name: \_\_\_\_\_

# Quiz 1

Math 253

You have 20 minutes to complete this quiz. When you're finished, first check your work if there is time remaining, then turn it in. You may use a scientific calculator, but not a graphing one. You may not consult other people or the internet. **Show all your work.**

1. (8 points) A sequence  $(a_n)$  is defined by

$$a_n = \frac{n!}{5^n}.$$

Find a recursive formula for  $(a_n)$ , showing all your work.

**2.** (12 points) Define a sequence  $(b_n)$  by

$$b_n = \frac{2n^2 + 1}{n^2}$$

and let  $b = \lim(b_n)$ .

a) (4 points) Find  $b$ .

b) (8 points) Find an integer  $N$  so that whenever  $n \geq N$ ,

$$|b_n - b| < \frac{1}{10}.$$