Quiz 1 (10pts)
Math 214 Section Q1 Winter 2010

Your name:_____ ID#:_____

Please, use the reverse side if needed.

1.(5 pts) Determine whether the series is convergent or divergent. If it is convergent, find its sum.

$$\sum_{n=1}^{\infty} \frac{(-2)^{n-1}}{5^n}.$$

Solution.

$$\sum_{n=1}^{\infty} \frac{(-2)^{n-1}}{5^n} = \frac{1}{5} - \frac{2}{5^2} + \frac{2^2}{5^3} - \cdots$$

This is a geometric series with $a = \frac{1}{5}$ and $r = \frac{-2}{5}$.

Since $-1 < r < 1$, the series is convergent. Its sum is

$$\frac{a}{1-r} = \frac{\frac{1}{5}}{1-(\frac{-2}{5})} = \frac{1}{7}.$$

2.(5 pts) Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{2n^2 + n^3 - n}{2n^3 - n^2 + 3}$$

Solution.

We will use the nth term test for divergence. We have

$$\lim_{n\to\infty} \frac{2n^2 + n^3 - n}{2n^3 - n^2 + 3} = \lim_{n\to\infty} \frac{\frac{2}{n} + 1 - \frac{1}{n^2}}{2 - \frac{1}{n} + \frac{3}{n^3}} = \frac{1}{2}.$$

Since the limit is not equal to zero, the series is divergent.