Homework 8

Name: **SOLUTIONS** Date: July 29, 2015

P 1. Determine the values of p for which the series converges or diverges, explain.

$$\sum_{n=1}^{\infty} n(1+n^2)p$$

Solution:
Divergence Test

- $$\lim_{n\to\infty} a_n = \lim_{n\to\infty} n(1+n^2)p = \begin{cases} \infty, & \text{if } p > 0 \\ -\infty, & \text{if } p < 0 \end{cases}$$

  If $p = 0$ then

  $$\sum_{n=1}^{\infty} n(1+n^2)p = \sum_{n=1}^{\infty} 0 = 0.$$

  So,

  $$\sum_{n=1}^{\infty} n(1+n^2)p$$

diverges, by the divergence test, for $p \neq 0$ and converges, since we found the sum, for $p = 0$.

P 2. Determine if the series converges or diverges, explain.

$$\sum_{n=1}^{\infty} \sin \frac{1}{n^2}$$

Solution: Done in class.