# *Quiz 5*

Name: Solution Key

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit.*

1. By using the ratio test, we can conclude that the series

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

**A** converges absolutely

**B** converges conditionally

(C) the ratio test is inconclusive

**D** diverges

Only terms appearing are powers of n.

2. Determine whether the series

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

converges absolutely, converges conditionally, or diverges. Justify your answer using a convergence test.

Use the Root Test:

$$\lim_{n\to\infty}\left(\left|\left(\frac{1-2n}{3+5n}\right)\right|^n\right)^{\frac{1}{n}} = \lim_{n\to\infty}\left|\frac{1-2n}{3+5n}\right| = \lim_{n\to\infty}\left|\frac{\frac{1}{n}-2}{\frac{3}{n}+5}\right| = \left|\frac{-2}{5}\right| = \frac{2}{5}.$$

Since $\frac{2}{5} < 1$, the series converges absolutely by the root test.