

Math 2315 - Calculus II

Homework #12

Assigned - 2010.02.24

Due - 2010.03.01

Name: _____

Textbook problems:

Section 9.2 - 1, 4, 7, 10, 14, 18, 20, 22, 28, 33, 39

Fun Problems:

1. Prove that if a is a positive integer, then

$$\sum_{n=1}^{\infty} \frac{1}{n(n+a)} = \frac{1}{a} \left(1 + \frac{1}{2} + \cdots + \frac{1}{a} \right).$$

2. A ball dropped from a height of 100 ft begins to bounce. Each time it strikes the ground, it returns to two-thirds of its previous height. What is the total distance traveled by the ball if it bounces infinitely many times?

3. Prove that

$$\sum_{n=1}^{\infty} \frac{1}{n} - \frac{1}{n+a} = \sum_{n=a+1}^{\infty} \frac{1}{n-a} - \frac{1}{n}.$$