Name: _____ **MAT 296: HW 8**
Spring 2018 **Due: 03/28**

Problem 1: Use the Integral Test (if possible) to determine whether the following series converge or diverge. Justify your use of the Integral Test and be sure to show all your work.

(i) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^{1/2}}$

(ii) $\sum_{n=1}^{\infty} n^2 e^{-n^3}$

(iii) $\sum_{n=2}^{\infty} \frac{n}{\ln(n^3)}$

(iv) $\sum_{n=1}^{\infty} \frac{\tan^{-1}(n)}{1+n^2}$

(v) $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^5}$

(vi) $\sum_{n=3}^{\infty} \frac{1}{n \ln n \ln(\ln(n))}$

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

Problem 2: Find the total area of the infinitely many circles on the interval $[0, 1]$, as show in the figure below.