Consider the series \( \sum_{n=1}^{\infty} e^{-2n} \).

(a) Use the Integral Test to determine whether or not the series converges.

(b) Draw a figure illustrating how the integral you calculated in part (a) relates to the sums of the series. Label your figure appropriately.
Consider the series \( \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} \).

(a) Use the Integral Test to determine whether or not the series converges.

(b) Draw a figure illustrating how the integral you calculated in part (a) relates to the sums of the series. Label your figure appropriately.
In the next few parts, we will determine for which values of $p$ the series $\sum_{n=1}^{\infty} \frac{1}{n^p}$ converges.

(a) Determine whether the series converges when $p = 1$.

(b) Determine whether the series converges when $p < 1$. 
(c) Determine whether the series converges when $p > 1$.

(d) Give a summary: For what values of $p$ does $\sum_{n=1}^{\infty} \frac{1}{n^p}$ converge?