SECTION 5.3: DIVERGENCE AND INTEGRAL TESTS

1. The Divergence Test:

2. The Integral Test:

3. For each series below, find the limit if the *terms* of the series and determine **if** the Divergence Test applies. If the test applies, draw a conclusion.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{40n + 30}$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{40n^2 + 30}$

   (c) $\displaystyle\sum_{n=1}^{\infty} 8^{(n^{-2})}$

4. Why is the following claim FALSE?: "The series $\sum_{n=1}^{\infty} a_n$ converges because $a_n \to 0$ as $n \to \infty$."

5. Apply the integral test to $\sum_{n=1}^{\infty} \frac{1}{n^p}$, assuming $p > 1$.

6. Apply the integral test to $\sum_{n=1}^{\infty} \frac{1}{n^p}$, assuming $0 < p \leq 1$.

7. **p-series convergence**

$$\sum_{n=1}^{\infty} \frac{1}{n^p} \text{ converges if } p > 1 \text{ and diverges if } p \leq 1.$$

Apply the above rule about p-series to determine whether the series below converge or diverge.

(a) $\sum_{n=1}^{\infty} \frac{1}{n^{1.56}}$

(b) $\sum_{n=1}^{\infty} \frac{1}{n^{99/100}}$