

# MAT 137 (Calculus II) Prof. Swift

## Worksheet on Geometric Series and the Test for Divergence

1. Evaluate.  $1 - 2 + 4 - 8 + \dots + (-2)^n =$

2. Evaluate.  $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \dots =$

3. Suppose you know that  $\lim_{n \rightarrow \infty} a_n = 0$ . What can you conclude? Circle one.

The series  $\sum a_n$  converges to 0.

The series  $\sum a_n$  converges, but not necessarily to 0.

The series  $\sum a_n$  diverges.

The series  $\sum a_n$  might converge, and it might diverge.

4. Suppose you know that  $\lim_{n \rightarrow \infty} a_n = 1$ . What can you conclude? Circle one.

The series  $\sum a_n$  converges to 1.

The series  $\sum a_n$  converges, but not necessarily to 1.

The series  $\sum a_n$  diverges.

The series  $\sum a_n$  might converge, and it might diverge.

5. Evaluate  $\lim_{n \rightarrow \infty} \frac{\sin(n)}{n}$ , using the squeeze theorem. Does  $\sum_{n=1}^{\infty} \frac{\sin(n)}{n}$  converge?