

# Series and Convergence

Name \_\_\_\_\_

In the following exercises, determine the convergence or divergence of the series. Be sure to properly justify your conclusion. Find the sum, if possible.

1.)  $\sum_{n=0}^{\infty} \left(\frac{1}{3}\right)^n$

2.)  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} n}{3n-1}$

3.)  $\sqrt{3} + \frac{\sqrt{3}}{\sqrt{2}} + \frac{\sqrt{3}}{\sqrt{3}} + \frac{\sqrt{3}}{\sqrt{4}} + \dots$

4.)  $40 + 16 + \frac{32}{5} + \frac{64}{25} + \dots$

5.)  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n+1}$

6.)  $\sum_{n=0}^{\infty} \frac{9}{3^n}$

7.)  $\sum_{n=1}^{\infty} \frac{n+5}{5n+2}$

8.)  $1 + \frac{1}{\sqrt[5]{4}} + \frac{1}{\sqrt[5]{9}} + \frac{1}{\sqrt[5]{16}} + \dots$

$$9.) \sum_{n=0}^{\infty} 2 \left(\frac{5}{4}\right)^n$$

$$10.) \sum_{n=1}^{\infty} \frac{2^n}{n^2}$$

$$11.) 4 \sum_{n=1}^{\infty} \frac{1}{n^{0.97}}$$

$$12.) \sum_{n=1}^{\infty} \frac{1}{n^{5/4}}$$

$$13.) \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!}$$

$$14.) \sum_{n=0}^{\infty} \left(-\frac{1}{2}\right)^n$$

$$15.) 1 + \frac{1}{2\sqrt[3]{2}} + \frac{1}{3\sqrt[3]{3}} + \frac{1}{4\sqrt[3]{4}} + \dots$$

$$16.) \sum_{n=0}^{\infty} \left(\frac{7}{8}\right)^n$$