

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Infinite Geometric Series

Classify and evaluate infinite geometric series using exact values; marked decimal approximations are estimates.

1. Determine whether each series converges or diverges.

1. $5 - 5 + 5 - 5 \dots$

Converges / Diverges: _____

2.
$$\sum_{n=1}^{\infty} -6 \cdot (1)^{n-1}$$

Converges / Diverges: _____

3. $a_1 = -5 \quad r = \frac{2}{3}$

Converges / Diverges: _____

4. $6 - \frac{24}{5} + \frac{96}{25} - \frac{384}{125} \dots$

Converges / Diverges: _____

2. Evaluate each infinite geometric series.

5. $a_1 = -6 \quad r = \frac{-3}{4}$

Sum: _____

6. $7 - 42 + 252 - 1512 \dots$

Sum: _____

7. $a_1 = -4 \quad r = 5$

Sum: _____

8.
$$\sum_{n=1}^{\infty} -3 \cdot \left(\frac{2}{5}\right)^{n-1}$$

Sum: _____

3. Determine the common ratio of each series.

9.
$$\sum_{n=1}^{\infty} 4 \cdot (7)^{n-1}$$

$r =$ _____

10. $a_1 = 3 \quad S = \frac{9}{4}$

$r =$ _____

11. $a_1 = 2 \quad S = \frac{8}{3}$

$r =$ _____

12. $-6 + 6 - 6 + 6 \dots$

$r =$ _____

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Infinite Geometric Series

Answer Key

Classify and evaluate infinite geometric series using exact values; marked decimal approximations are estimates.

1. Determine whether each series converges or diverges.

1. $5 - 5 + 5 - 5 \dots$

Diverges; $|r| > 1$; $r = -1$

2.
$$\sum_{n=1}^{\infty} -6 \cdot \left(\frac{1}{2}\right)^{n-1}$$

Diverges; $|r| > 1$; $r = \frac{1}{2}$

3. $a_1 = -5 \quad r = \frac{2}{3}$

Converges; $|r| < 1$; $r = \frac{2}{3}$

4. $6 - \frac{24}{5} + \frac{96}{25} - \frac{384}{125} \dots$

Converges; $|r| < 1$; $r = -\frac{4}{5}$

2. Evaluate each infinite geometric series.

5. $a_1 = -6 \quad r = \frac{-3}{4}$

Sum = $\frac{-24}{7}$

6. $7 - 42 + 252 - 1512 \dots$

Diverges; no finite sum

7. $a_1 = -4 \quad r = 5$

Diverges; no finite sum

8.
$$\sum_{n=1}^{\infty} -3 \cdot \left(\frac{2}{5}\right)^{n-1}$$

Sum = -5

3. Determine the common ratio of each series.

9.
$$\sum_{n=1}^{\infty} 4 \cdot \left(\frac{1}{7}\right)^{n-1}$$

$r = \frac{1}{7}$

10. $a_1 = 3 \quad S = \frac{9}{4}$

$r = -\frac{1}{3}$

11. $a_1 = 2 \quad S = \frac{8}{3}$

$r = \frac{1}{4}$

12. $-6 + 6 - 6 + 6 \dots$

$r = -1$