Geometric Series

Evaluate each geometric series described.

1) $4 + 20 + 100 + 500..., \ n = 7$

2) $2 + 10 + 50 + 250..., \ n = 8$

3) $-3 - 9 - 27 - 81..., \ n = 6$

4) $-4 - 16 - 64 - 256..., \ n = 6$

5) $\sum_{k=1}^{10} 3 \cdot 2^{k-1}$

6) $\sum_{k=1}^{8} (-3)^{k-1}$

7) $\sum_{k=1}^{7} 2 \cdot 6^{k-1}$

8) $\sum_{k=1}^{9} 4^{k-1}$

9) $\sum_{k=1}^{10} 2^{k-1}$

10) $\sum_{k=1}^{7} -2 \cdot 2^{k-1}$

Determine the number of terms *n* in each geometric series.

11) $a_1 = 2, \ r = 5, \ S_n = 312$

12) $a_1 = 2, \ r = -6, \ S_n = -370$

13) $a_1 = -2, \ r = -5, \ S_n = 208$

14) $a_1 = 4, \ r = -2, \ S_n = 44$

Determine if each geometric series converges or diverges.

15) $4 + 2 + 1 + \frac{1}{2}...$

16) $1 - \frac{1}{4} + \frac{1}{16} - \frac{1}{64}...$

17) $32 + 8 + 2 + \frac{1}{2}...$

18) $2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125}...$

19) $\sum_{k=1}^{\infty} 2 \cdot 4^{k-1}$

20) $\sum_{n=1}^{\infty} -3 \cdot 2^{n-1}$

Evaluate each infinite geometric series described.

21) $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64}...$

22) $1 + 2 + 4 + 8...$

23) $-3 + \frac{3}{2} - \frac{3}{4} + \frac{3}{8}...$

24) $-1 - \frac{1}{3} - \frac{1}{9} - \frac{1}{27}...$

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

26) $\sum_{m=1}^{\infty} 0.5^{m-1}$

27) $\sum_{n=1}^{\infty} -\frac{3125}{256} \cdot \left(\frac{4}{5}\right)^{n-1}$

28) $\sum_{n=1}^{\infty} \frac{75}{16} \cdot \left(\frac{4}{5}\right)^{n-1}$

Determine the common ratio of the infinite geometric series.

29) $a_1 = 1.2,\ S = 0.75$

30) $a_1 = 6,\ S = \frac{15}{2}$

31) $a_1 = -45,\ S = -\frac{135}{2}$

32) $a_1 = 3.5,\ S = 35$

Geometric Series

Evaluate each geometric series described.

1) $4 + 20 + 100 + 500..., \ n = 7$

78124

2) $2 + 10 + 50 + 250..., \ n = 8$

195312

3) $-3 - 9 - 27 - 81..., \ n = 6$

−1092

4) $-4 - 16 - 64 - 256..., \ n = 6$

−5460

5) $\sum_{k=1}^{10} 3 \cdot 2^{k-1}$

3069

6) $\sum_{k=1}^{8} (-3)^{k-1}$

−1640

7) $\sum_{k=1}^{7} 2 \cdot 6^{k-1}$

111974

8) $\sum_{k=1}^{9} 4^{k-1}$

87381

9) $\sum_{k=1}^{10} 2^{k-1}$

1023

10) $\sum_{k=1}^{7} -2 \cdot 2^{k-1}$

−254

Determine the number of terms *n* in each geometric series.

11) $a_1 = 2, \ r = 5, \ S_n = 312$

4

12) $a_1 = 2, \ r = -6, \ S_n = -370$

4

13) $a_1 = -2, \ r = -5, \ S_n = 208$

4

14) $a_1 = 4, \ r = -2, \ S_n = 44$

5

Determine if each geometric series converges or diverges.

15) $4 + 2 + 1 + \frac{1}{2}...$

Converges

16) $1 - \frac{1}{4} + \frac{1}{16} - \frac{1}{64}...$

Converges

17) $32 + 8 + 2 + \frac{1}{2}...$

Converges

18) $2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125}...$

Converges

19) $\sum_{k=1}^{\infty} 2 \cdot 4^{k-1}$

Diverges

20) $\sum_{n=1}^{\infty} -3 \cdot 2^{n-1}$

Diverges

Evaluate each infinite geometric series described.

21) $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64}...$

$\frac{4}{3}$

22) $1 + 2 + 4 + 8...$

No sum

23) $-3 + \frac{3}{2} - \frac{3}{4} + \frac{3}{8}...$

-2

24) $-1 - \frac{1}{3} - \frac{1}{9} - \frac{1}{27}...$

$-\frac{3}{2}$

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

$\frac{3}{4}$

26) $\sum_{m=1}^{\infty} 0.5^{m-1}$

2

27) $\sum_{n=1}^{\infty} -\frac{3125}{256} \cdot \left(\frac{4}{5}\right)^{n-1}$

$-\frac{15625}{256}$

28) $\sum_{n=1}^{\infty} \frac{75}{16} \cdot \left(\frac{4}{5}\right)^{n-1}$

$\frac{375}{16}$

Determine the common ratio of the infinite geometric series.

29) $a_1 = 1.2,\ S = 0.75$

-0.6

30) $a_1 = 6,\ S = \frac{15}{2}$

$\frac{1}{5}$

31) $a_1 = -45,\ S = -\frac{135}{2}$

$\frac{1}{3}$

32) $a_1 = 3.5,\ S = 35$

0.9