

12.4 EXERCISES

HOMEWORK KEY

 = **WORKED-OUT SOLUTIONS**
on p. WS1 for Exs. 13, 27, and 39

 = **TAKS PRACTICE AND REASONING**
Exs. 32, 34, 39, 40, 41, 43, and 44

SKILL PRACTICE

1. **VOCABULARY** Copy and complete: The sum S_n of the first n terms of an infinite series is called a(n) ?

2. **WRITING** Explain how to tell whether the series $\sum_{i=1}^{\infty} a_1 r^{i-1}$ has a sum.

PARTIAL SUMS For the given series, find and graph the partial sums S_n for $n = 1, 2, 3, 4,$ and 5 . Describe what happens to S_n as n increases.

3. $\frac{1}{2} + \frac{1}{6} + \frac{1}{18} + \frac{1}{54} + \frac{1}{162} + \dots$

4. $\frac{2}{3} + \frac{1}{3} + \frac{1}{6} + \frac{1}{12} + \frac{1}{24} + \dots$

5. $4 + \frac{12}{5} + \frac{36}{25} + \frac{108}{125} + \frac{324}{625} + \dots$

6. $\frac{1}{4} + \frac{5}{4} + \frac{25}{4} + \frac{125}{4} + \frac{625}{4} + \dots$

FINDING SUMS Find the sum of the infinite geometric series, if it exists.

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

8. $\sum_{k=1}^{\infty} -6\left(\frac{3}{2}\right)^{k-1}$

9. $\sum_{i=1}^{\infty} \frac{2}{5}\left(\frac{5}{3}\right)^{i-1}$

10. $\sum_{k=1}^{\infty} \frac{11}{3}\left(\frac{3}{8}\right)^{k-1}$

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

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

13. $\sum_{k=1}^{\infty} 7\left(-\frac{8}{9}\right)^{k-1}$

14. $\sum_{n=1}^{\infty} \frac{1}{2}\left(-\frac{10}{3}\right)^{n-1}$

15. $\sum_{k=1}^{\infty} 9(4)^{k-1}$

16. $\sum_{i=1}^{\infty} -2\left(-\frac{1}{4}\right)^{i-1}$

17. $\sum_{i=0}^{\infty} \left(-\frac{3}{7}\right)^i$

18. $\sum_{n=0}^{\infty} \frac{5}{6}(3)^n$

19. **ERROR ANALYSIS** Describe and correct the error in finding the sum of the infinite geometric series $\sum_{n=1}^{\infty} \left(\frac{7}{2}\right)^{n-1}$.

For this series, $a_1 = 1$ and $r = \frac{7}{2}$.

$$S = \frac{a_1}{1-r} = \frac{1}{1-\frac{7}{2}} = \frac{1}{-\frac{5}{2}} = -\frac{2}{5}$$



FINDING SUMS Find the sum of the infinite geometric series, if it exists.

20. $-\frac{1}{8} - \frac{1}{12} - \frac{1}{18} - \frac{1}{27} + \dots$

21. $\frac{2}{3} - \frac{2}{9} + \frac{2}{27} - \frac{2}{81} + \dots$

22. $\frac{4}{15} + \frac{4}{9} + \frac{20}{27} + \frac{100}{81} + \dots$

23. $3 + \frac{5}{2} + \frac{25}{12} + \frac{125}{72} + \dots$

REWRITING DECIMALS Write the repeating decimal as a fraction in lowest terms.

24. 0.222...

25. 0.444...

26. 0.161616...

27. 0.625625625...

28. 32.3232...

29. 130.130130...

30. 0.090909...

31. 0.2777...

32. **TAKS REASONING** Which fraction is equal to the repeating decimal 18.1818...?

(A) $\frac{2}{11}$

(B) $\frac{1836}{101}$

(C) $\frac{200}{11}$

(D) $\frac{181}{9}$

33. **REASONING** Show that 0.999... is equal to 1.

EXAMPLE 1
on p. 820
for Exs. 3–6

EXAMPLES 2 and 3
on p. 821
for Exs. 7–23

EXAMPLE 5
on p. 822
for Exs. 24–32