

Getting Ready

In this chapter, you will learn more about sequences, as explored in Chapter 1. You will identify arithmetic and geometric sequences and find the general term, t_n . You will work with decimals, rational numbers, and rational exponents. You will also simplify expressions involving exponents and solve exponential equations.

These exercises will help you warm up for the work ahead.

- Find the first five terms of each of the following sequences. Start with $n = 1$.
 - $t_n = 3n - 7$
 - $t_n = 5(n - 3) + 6$
 - $t_n = 3(2)^{n-1}$
 - $t_n = -4(n - 1) + 11$
 - $t_n = 8\left(\frac{1}{2}\right)^{n-1}$
 - $t_n = \frac{1}{2}(-2)^{n-1}$
 - $t_n = 50(1.10)^n$
 - $t_n = 1000(1.06)^{n-1}$
 - $t_n = -8(n - 1) + 15$
- Determine if each sequence is arithmetic, geometric, or neither.
 - 5, 16, 27, 38, ...
 - 3, -6, 12, -24, ...
 - 10, -15, 20, -25, ...
 - 81, 27, 9, 3, ...
 - 3, 5, 8, 12, ...
 - 61, 55, 49, 43, ...
 - 1000, 1100, 1210, 1331, ...
 - $\frac{3}{4}, \frac{5}{7}, \frac{7}{10}, \frac{9}{12}$
 - 7, 3, -1, -4, ...
- For each sequence that is either arithmetic or geometric in question 2, find the general term, t_n .
- Evaluate without using a calculator.
 - $64^{\frac{1}{2}}$
 - $16^{\frac{5}{4}}$
 - $64^{-\frac{1}{3}}$
 - $\left(\frac{3}{4}\right)^{-2}$
- Use a calculator to evaluate to four decimal places.
 - $12^{\frac{1}{2}}$
 - $(-36)^{\frac{1}{3}}$
 - $(1.16)^{-3}$
 - $(1.05)^{-\frac{1}{3}}$
 - $(1.05)^{\frac{36}{52}}$
 - $(5842)^{-\frac{2}{3}}$
 - $(1.08)^{\frac{13}{4}}$
 - $(1212)^{-\frac{101}{365}}$
- Solve.
 - $5^{2x-7} = 5^{5x+12}$
 - $3^{4x} = 27^{x+1}$
 - $5(2)^x = 160$
 - $\left(\frac{3}{2}\right)^{-x} = \frac{32}{243}$
- Evaluate to two decimal places.
 - $1000(1.10)^2$
 - $675(1.02)^{36}$
 - $8500(1.008)^{-12}$
 - $400(1.06)^{\frac{35}{4}}$
 - $100\left(\frac{(1.12)^{10} - 1}{0.12}\right)$
 - $500 \times \frac{1 - (1.008)^{-240}}{0.008}$

8. Calculate the simple interest in each situation.
 - (a) \$4000 invested at 6.5%/a for 6 years
 - (b) \$1000 borrowed at 9%/a for 28 months
 - (c) \$3300 invested at 8%/a for 150 days
 - (d) \$28 000 borrowed at 11%/a for 100 weeks
9. Determine the number of terms in each arithmetic sequence.
 - (a) 6, 13, 20, 27, ... , 97
 - (b) 18, 14, 10, 6, ... , -38
10. An antique postage stamp appreciates by 9% of its value each year. The stamp was worth \$0.34 in 1969. What is its value in 2012?
11. A new car that was purchased for \$25 600 depreciates in value by 12% each year. Determine its value at the end of seven years.
12. Determine the amount and the interest earned for
 - (a) \$3600 invested for 9 years at 5.8%/a, compounded annually
 - (b) \$18 000 borrowed for 5 years at 8.4%/a, compounded monthly
 - (c) \$7700 invested for 56 months at 6.4%/a, compounded quarterly
 - (d) \$13 500 borrowed for 2 years at 7.3%/a, compounded daily
13. Determine the present value and the interest earned for each of the following.
 - (a) \$3600 is due in 9 years if it is invested at 4.8%/a, compounded annually
 - (b) \$800 is due in 5 years if it is borrowed at 7.6%/a, compounded semiannually
 - (c) \$22 700 is due in 6 years if it is invested at 5.4%/a, compounded monthly
 - (d) \$5300 is due in 36 months if it is borrowed at 9.36%/a, compounded weekly
14. On his daughter's tenth birthday, Mr. Huceluk invests a single sum of money that will grow to \$12 000 when she turns 19. The money is invested at 9%/a, compounded monthly. How much must he invest on her tenth birthday to reach his goal?
15. Jane borrowed \$6800 at 9.8%/a, compounded quarterly, to purchase a jet ski. At the end of nine months, she paid \$2100, which includes principal and interest. What must she pay at the end of three years after the purchase to close the debt?
16. A culture of bacteria doubles in size every 20 min. How long will it take for the population to reach 60 000, if the initial population was six bacteria?
17. Kadie invested \$3000 at 6%/a, compounded quarterly. How long will it take for the investment to be worth \$8500?
18. Determine the number of terms in each geometric sequence.
 - (a) 2, 6, 18, ... , 13 122
 - (b) 5, 10, 20, 40, ... , 10 240