Unit 4 Comprehensive Review - Version 1 - Answer Key

Section A - Geometric Sequences and Growth/Decay

1. $r = 3$; next terms: $405,\ 1215,\ 3645$
2. $r = \frac{1}{2}$; next terms: $10,\ 5,\ \frac{5}{2}$
3. Yes; $r = -2$.
4. No; the consecutive ratios are not constant.
5. $-4,\ 12,\ -36,\ 108,\ -324$
6. $243,\ 81,\ 27,\ 9,\ 3$
7. $a_6 = 160$
8. $a_5 = \frac{5}{4}$
9. value = 288
10. $r = 1.25$; value = 500
11. $r = 0.8$; value = 512
12. $r = \frac{2}{3}$; value = 160

Section B - Recursive Formulas

13. $a_1 = 3, \quad a_n = 3a_{n-1}$
14. $a_1 = 160, \quad a_n = \frac{1}{2}a_{n-1}$
15. $a_1 = 4, \quad a_n = -2a_{n-1}$
16. $4,\ 12,\ 36,\ 108,\ 324,\ 972$
17. $96,\ 48,\ 24,\ 12,\ 6$
18. $5,\ -10,\ 20,\ -40,\ 80$
19. $r = 3$; $a_1 = 12, \quad a_n = 3a_{n-1}$
20. $r = \frac{1}{2}$; $a_1 = 6400, \quad a_n = \frac{1}{2}a_{n-1}$
21. $a_1 = 80, \quad a_n = 1.25a_{n-1}$
22. $a_1 = 1800, \quad a_n = 0.8a_{n-1}$
23. $a_1 = 30, \quad a_n = 3a_{n-1}$
24. $r = \frac{1}{3}$; terms: $243,\ 81,\ 27,\ 9,\ 3$

Section C - Explicit Formulas and Exponential Models

25. $a_n = 4(2)^{n-1}$
26. $a_n = 96\left(\frac{1}{2}\right)^{n-1}$
27. $a_n = 5(-3)^{n-1}$
28. $a_n = 7(4)^{n-1}$
29. $a_n = 243\left(\frac{1}{3}\right)^{n-1}$
30. $a_1 = 6, \quad a_n = 5a_{n-1}$
31. $a_1 = 80, \quad a_n = -\frac{1}{2}a_{n-1}$
32. $r = 3$; $a_n = 6(3)^{n-1}$; $a_6 = 1458$
33. $r = \frac{1}{2}$; $a_n = 3200\left(\frac{1}{2}\right)^{n-1}$; $a_6 = 100$
34. $r = 2$; $a_n = 5(2)^{n-1}$
35. $r = \frac{1}{3}$; $a_n = 243\left(\frac{1}{3}\right)^{n-1}$
36. y-intercept = 500; $r = 1.08$; 8% growth
37. y-intercept = 1200; $r = 0.75$; 25% decay
38. $y = f(x) = (200)(1.5)^x$; at $x = 3$, $y = 675$
39. $y = f(x) = (1000)(0.8)^x$; at $x = 3$, $y = 512$
40. $y = f(x) = (7)(3)^x$

41. $y = f(x) = (-4)\left(\frac{1}{2}\right)^x$
42. $y = f(x) = (18)(3)^{x-2}$; $y = f(x) = (2)(3)^x$
43. $y = f(x) = (16)(2)^{x-3}$; $y = f(x) = (2)(2)^x$; $y = f(x) = (8)(2)^{x-2}$
44. $y = f(x) = (12)\left(\frac{1}{2}\right)^{x-2}$; $y = f(x) = (48)\left(\frac{1}{2}\right)^x$; $y = f(x) = (24)\left(\frac{1}{2}\right)^{x-1}$

Section D - Solving Exponential Equations

45. $x = 7$
46. $x = -3$
47. $x = 3$
48. $x = -3$
49. $x = 2$
50. $x = \frac{7}{3}$
51. $x = 3$
52. $x = 3$
53. $x = 3$
54. $x = 4$
55. $x = 5$
56. $x = 2$