Unit 4 Comprehensive Review - Version 2 - Answer Key

Section A - Geometric Sequences and Growth/Decay

1. $r = 4$; next terms: $512,\ 2048,\ 8192$
2. $r = \frac{1}{3}$; next terms: $3,\ 1,\ \frac{1}{3}$
3. Yes; $r = -\frac{1}{2}$.
4. No; the consecutive ratios are not constant.
5. $3,\ -6,\ 12,\ -24,\ 48$
6. $625,\ 125,\ 25,\ 5,\ 1$
7. $a_7 = 1458$
8. $a_6 = 3$
9. value = 405
10. $r = 1.5$; value = 162
11. $r = 0.75$; value = 1080
12. $r = \frac{1}{2}$; value = 50

Section B - Recursive Formulas

13. $a_1 = 4, \quad a_n = 5a_{n-1}$
14. $a_1 = 162, \quad a_n = \frac{1}{3}a_{n-1}$
15. $a_1 = 3, \quad a_n = -2a_{n-1}$
16. $2,\ 8,\ 32,\ 128,\ 512,\ 2048$
17. $125,\ 25,\ 5,\ 1,\ \frac{1}{5}$
18. $6,\ -18,\ 54,\ -162,\ 486$
19. $r = 3$; $a_1 = 8, \quad a_n = 3a_{n-1}$
20. $r = \frac{1}{4}$; $a_1 = 6400, \quad a_n = \frac{1}{4}a_{n-1}$
21. $a_1 = 40, \quad a_n = 1.5a_{n-1}$
22. $a_1 = 3200, \quad a_n = 0.75a_{n-1}$
23. $a_1 = 7, \quad a_n = 4a_{n-1}$
24. $r = \frac{1}{5}$; terms: $125,\ 25,\ 5,\ 1,\ \frac{1}{5}$

Section C - Explicit Formulas and Exponential Models

25. $a_n = 3(3)^{n-1}$
26. $a_n = 1024\left(\frac{1}{4}\right)^{n-1}$
27. $a_n = 6(-2)^{n-1}$
28. $a_n = 4(5)^{n-1}$
29. $a_n = 128\left(\frac{1}{2}\right)^{n-1}$
30. $a_1 = 9, \quad a_n = 4a_{n-1}$
31. $a_1 = 81, \quad a_n = -\frac{1}{3}a_{n-1}$
32. $r = 4$; $a_n = 5(4)^{n-1}$; $a_6 = 5120$
33. $r = \frac{1}{3}$; $a_n = 729\left(\frac{1}{3}\right)^{n-1}$; $a_6 = 3$
34. $r = 2$; $a_n = 3(2)^{n-1}$
35. $r = \frac{1}{2}$; $a_n = 64\left(\frac{1}{2}\right)^{n-1}$
36. y-intercept = 800; $r = 1.15$; 15% growth
37. y-intercept = 600; $r = 0.6$; 40% decay
38. $y = f(x) = (128)(1.25)^x$; at $x = 3$, $y = 250$
39. $y = f(x) = (2000)(0.75)^x$; at $x = 2$, $y = 1125$
40. $y = f(x) = (5)(4)^x$

41. $y = f(x) = (-6)\left(\frac{2}{3}\right)^x$
42. $y = f(x) = (20)\left(\frac{1}{2}\right)^{x-1}$; $y = f(x) = (40)\left(\frac{1}{2}\right)^x$
43. $y = f(x) = (81)(3)^{x-4}$; $y = f(x) = (1)(3)^x$; $y = f(x) = (27)(3)^{x-3}$
44. $y = f(x) = (24)(2)^{x-3}$; $y = f(x) = (3)(2)^x$; $y = f(x) = (12)(2)^{x-2}$

Section D - Solving Exponential Equations

45. $x = 5$
46. $x = -5$
47. $x = 5$
48. $x = -4$
49. $x = 2$
50. $x = \frac{5}{3}$
51. $x = 3$
52. $x = 3$
53. $x = 3$
54. $x = 6$
55. $x = 3$
56. $x = 3$