Answer Key

Lesson 1: Creating Exponential Equations

Pre-Assessment, p. U4-1

1. b
2. d
3. a
4. c
5. b

Warm-Up 4.1.1, p. U4-6

Inequality: $70x + 100 > 500$
Solution: $x > 5$
School started more than 5 months ago.

Practice 4.1.1 A: Creating Exponential Equations in One Variable, p. U4-21

1. a. linear; b. exponential
2. a. linear; b. exponential
3. $y = 100(2)^7$; 12,800 insects
4. $1{,}073{,}741{,}824 = a(2)^{24}$; 64 bacteria
5. $y = 125(0.5)^4$; \$7.81
6. $75 = a(0.5)^3$; \$600
7. $5000 = a(0.5)^2$; \$20,000
8. $y = 15(3)^7$; 32,805 dandelions
9. $y = 12{,}000(1.02)^4$; about 12,990 people
10. $y = 4(2)^4$; 64,000,000 people if rush hour continued in the morning, and $y = 8(0.5)^4$; 500,000 people if rush hour continued in the evening

Practice 4.1.1 B: Creating Exponential Equations in One Variable, p. U4-23

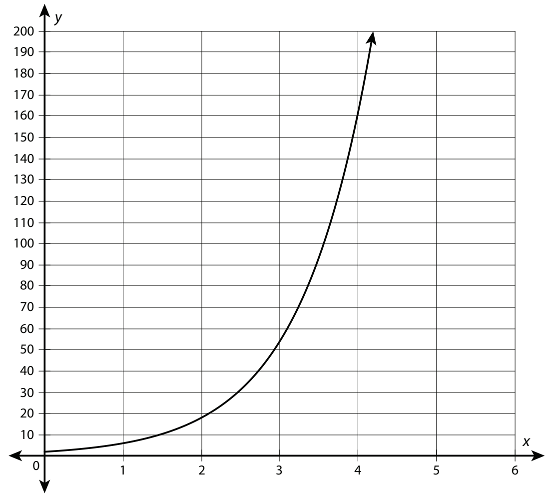
1. a. linear; b. exponential
2. a. linear; b. exponential
3. a. exponential; b. linear
4. $1920 = a(2)^6$; 30 bacteria
5. $4800 = a(2)^3$; \$600
6. $y = 24(3)^4$; 1,944 insects
7. $y = 100(0.5)^8$; 0.39 grams
8. $8 = a(0.5)^3$; 64 teams
9. $y = 63{,}000(1.01)^4$; about 65,559 people
10. $y = 3000(0.99)^5$; about 2,853 people and $y = 3000(0.99)^{10}$; about 2,714 people

Warm-Up 4.1.2, p. U4-25

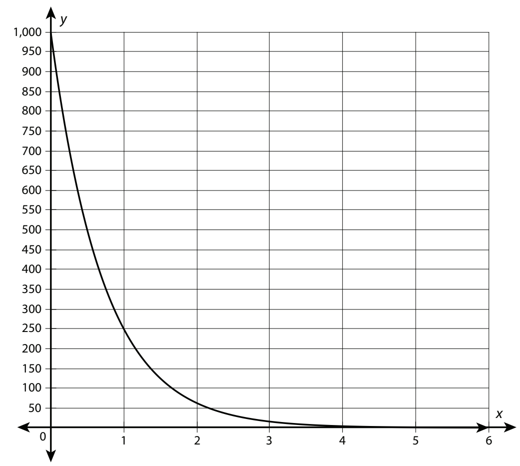
1. $y = 128(0.5)^5$
2. $y = 4$ grams

Practice 4.1.2 A: Creating and Graphing Exponential Equations in Two Variables, p. U4-44

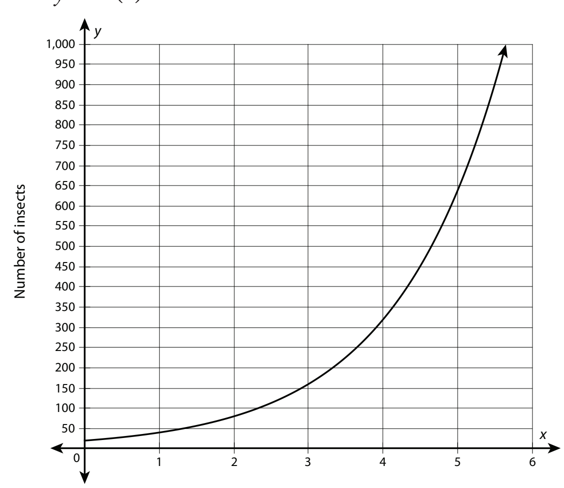
1.



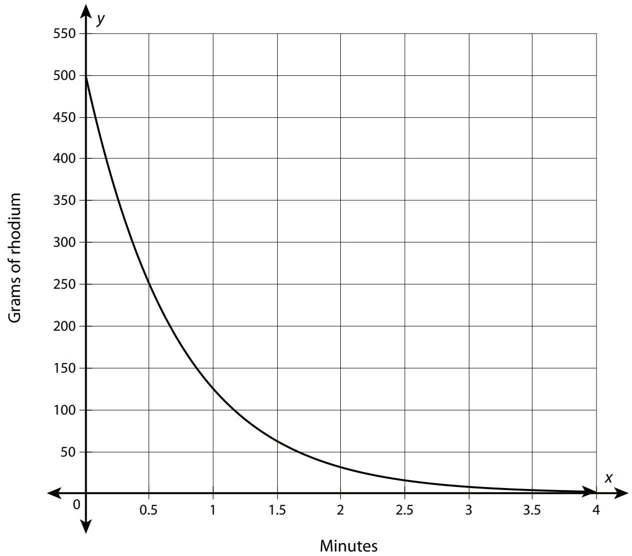
2.



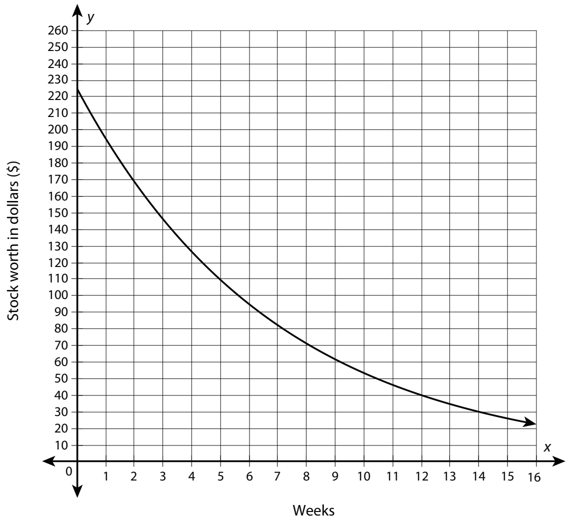
3. $y = 20(2)^x$



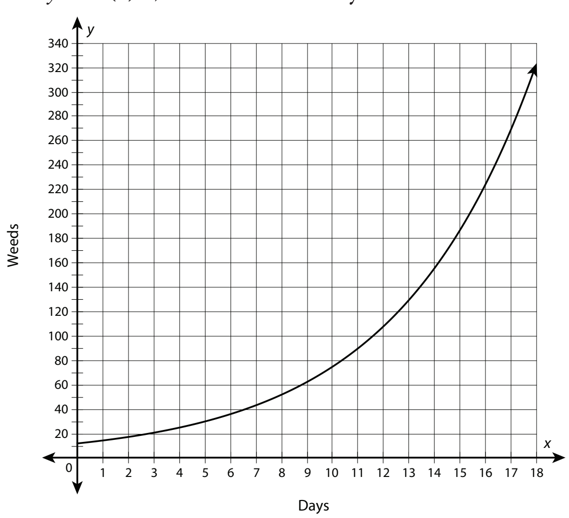
4. $y = 500(0.5)^{2x}$, for which x is in minutes



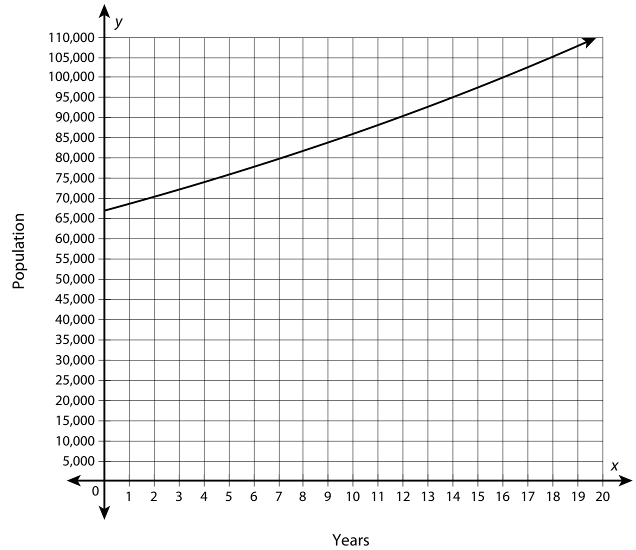
5. $y = 225(0.75)^{x/2}$, for which x is in weeks



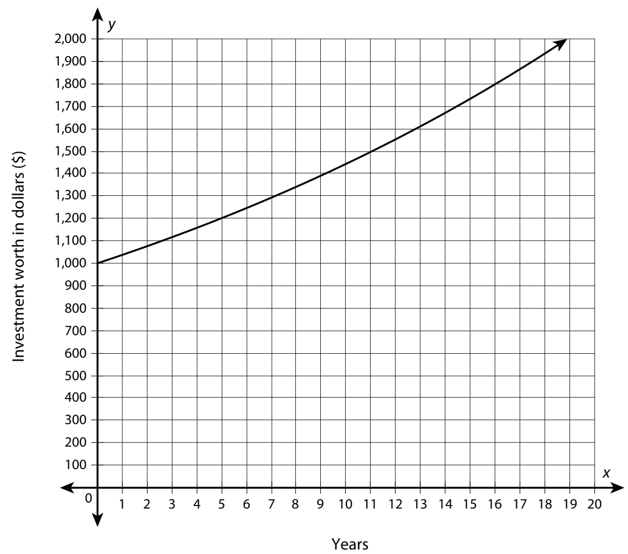
6. $y = 12(3)^{x/6}$, for which x is in days



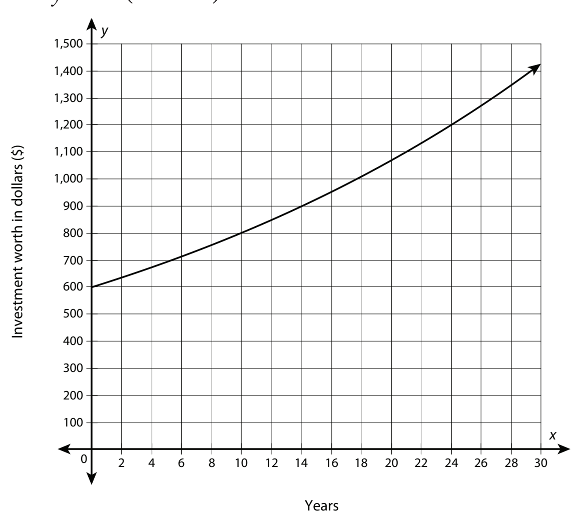
7. $y = 67{,}000(1.025)^{x}$



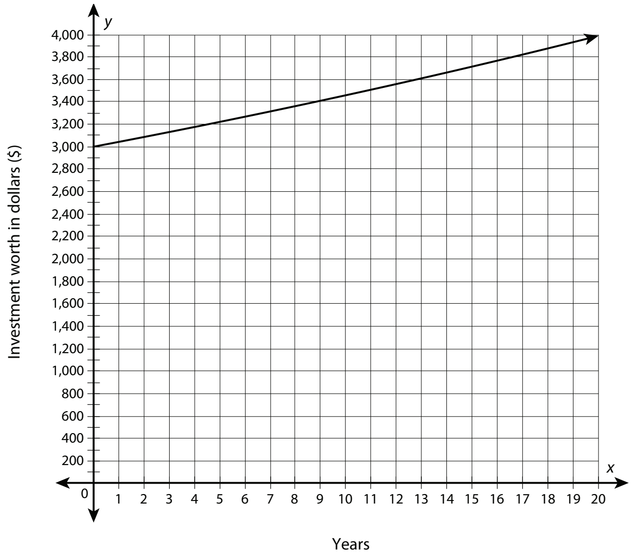
8. $y = 1000(1.0185)^{2x}$



9. $y = 600(1.00725)^{4x}$

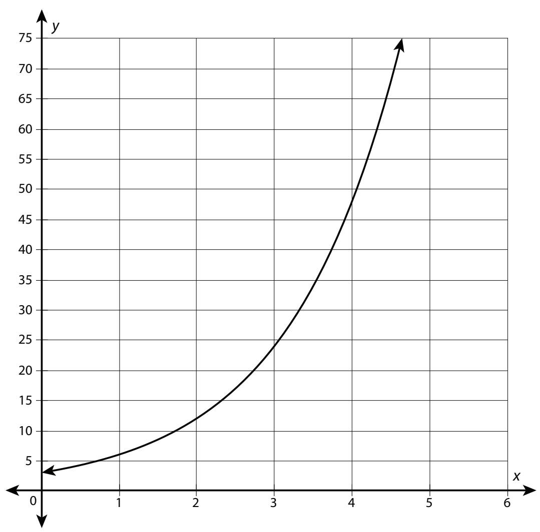


10. $y = 3000(1.00027)^{52x}$

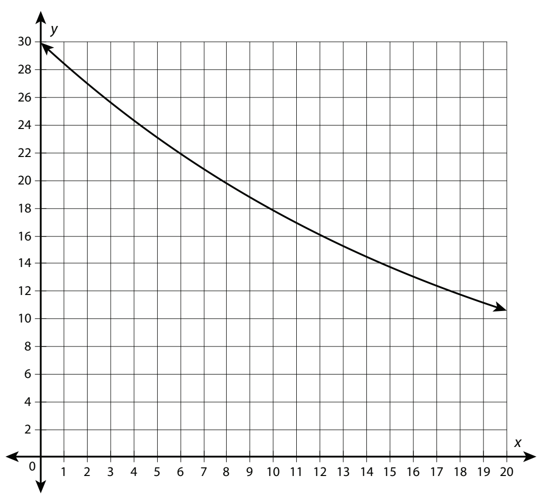


Practice 4.1.2 B: Creating and Graphing Exponential Equations in Two Variables, p. U4-45

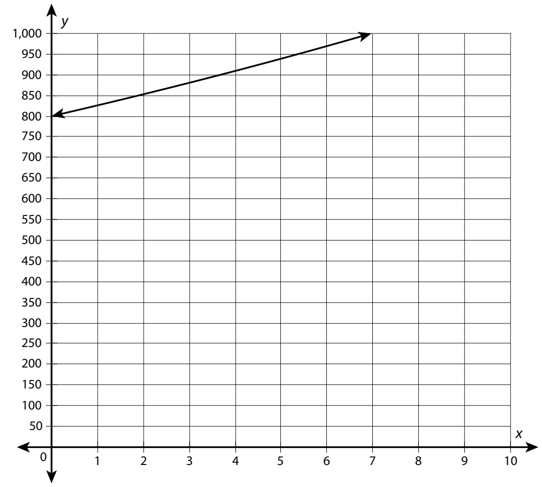
1.



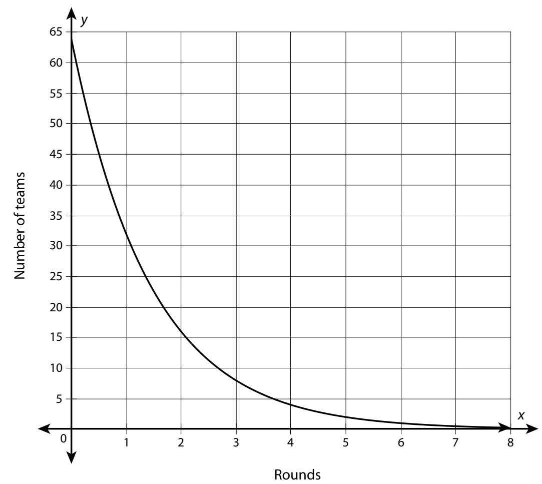
2.



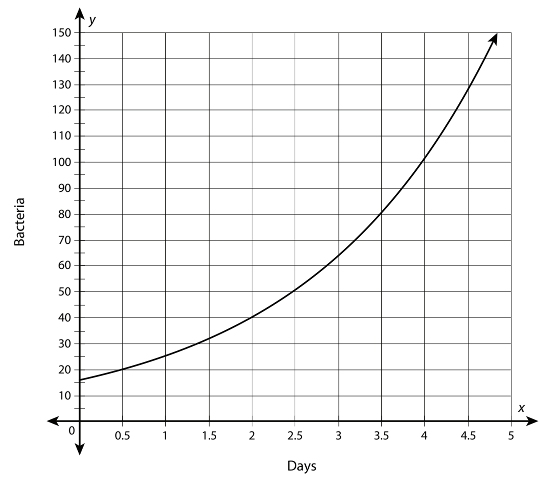
3.



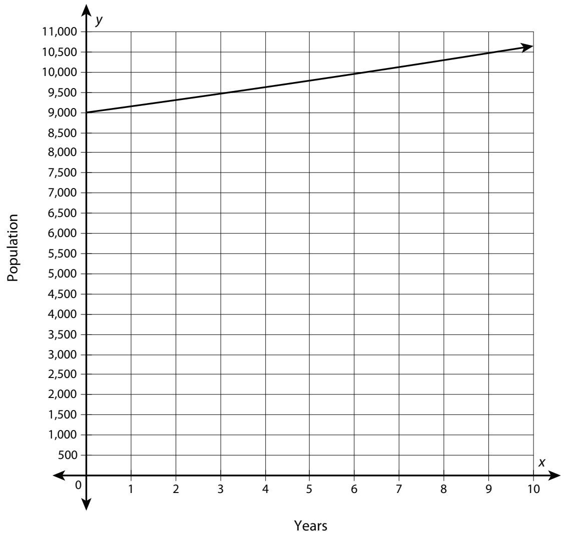
4. $y = 64(0.5)^x$



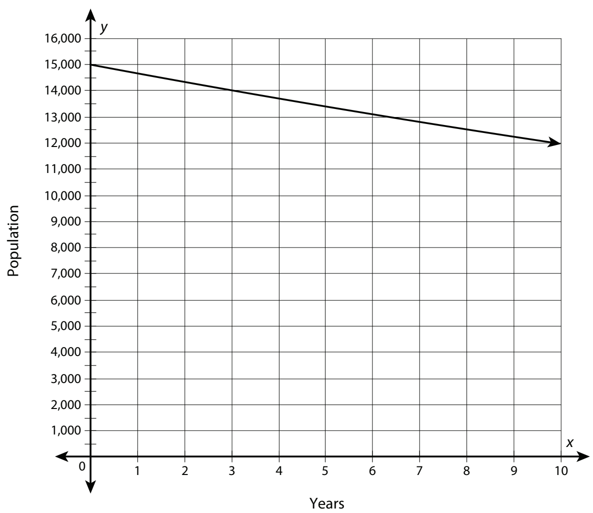
5. $y = 16(2)^{24x/36} = 16(2)^{2x/3}$, for which x is in days



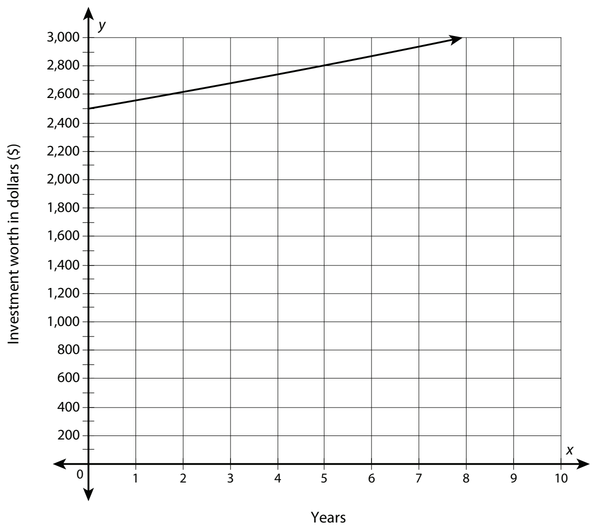
6. $y = 9000(1.017)^{x}$



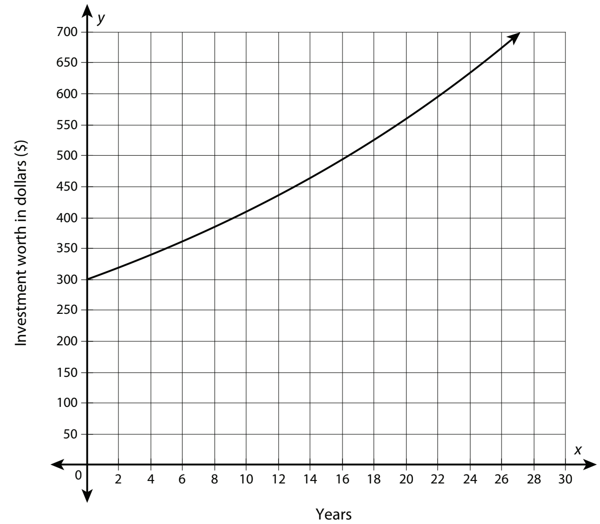
7. $y = 15{,}000(0.978)^{x}$



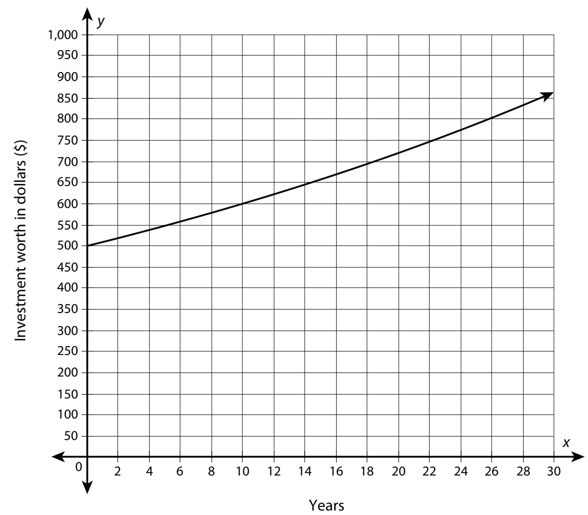
8. $y = 2500(1.00192)^{12x}$



9. $y = 300(1.0006)^{52x}$



10. $y = 500(1.00005)^{365x}$



Progress Assessment, p. U4-46

1. d
2. c
3. d
4. a
5. a
6. d
7. b
8. b
9. a
10. a
11. The first investment equation is $y = 500 + 0.03(500)x$. The second investment equation is $y = 500(1 + 0.03/4)^{4x} = 500(1.0075)^{4x}$. The first investment has a linear rate of growth, while the second equation has an exponential rate of growth. Since the second equation has the variable in the exponent, the investment should grow more quickly, but the rate is very small, 3%. Graphing the equations illustrates the growth.

    From the graph, the investments are about the same for the first 3 years, but after the fourth year the second investment starts to take off and grow much more rapidly. If this is going to be a long-term investment, then the better choice is the second investment option that compounds quarterly. If it will be a short-term investment (less than 3 years), then the two options are about the same.