Practice 4.2: Creating Exponential Equations A

Use what you know about linear and exponential equations to complete problems 1 and 2.

1. Determine whether each scenario can be modeled by a linear or an exponential equation.
   a. The price of a loaf of bread increases by $0.25 each week.

   b. Each week, a loaf of bread costs twice as much as it did the week before.

2. Determine whether each scenario can be modeled by a linear or an exponential equation.
   a. 10 people leave a football game every minute after the third quarter.

   b. $\frac{1}{4}$ of the people leave a football game every minute after the third quarter.

For problems 3–10, write an equation to model each scenario. Then use the equation to solve the problem.

3. A population of insects doubles every month. If there are 100 insects to start with, how many will there be after 7 months?

4. A type of bacteria in a Petri dish doubles every hour. If there were 1,073,741,824 bacteria after 24 hours, how many were there to start with?

continued

5. A stock loses half its value every week. If the stock was worth $125 starting out, what is it worth after 4 weeks at this rate of decline?

6. A certain tablet computer depreciates (loses its value) at a rate of $\frac{1}{2}$ the original value every 2 years. If you bought a tablet 6 years ago and it's now worth $75, how much did it cost when you bought it?

7. A new car depreciates as soon as you drive it out of the parking lot. A certain car depreciates to half its original value in 4 years. If you bought a car 8 years ago and it is now worth $5,000, how much did you pay for the car originally?

8. The number of dandelions growing on your lawn triples every 3 days. If your lawn started out with 15 dandelions, how many dandelions would you have after 3 weeks?

9. The population of a town is increasing by 2% each year. The current population is 12,000. How many people will there be in 4 years?

10. The population of a city doubles during the workday. At the end of the workday, the population decreases by half. If the population of the city is roughly 4,000,000 people before "rush hour," and the morning rush hour actually lasts 3 hours, what would be the population 12 hours after the start of rush hour if the population continued to double every 3 hours? People leave the city for home at the same rate as they come into the city. If there are 8,000,000 people in the city during the workday, what would be the population 12 hours after the start of the evening rush hour, which lasts 3 hours, if the population continued to be cut in half every 3 hours?