9.1 Exponential Growth and Decay

State whether the formula models growth or decay.

1. $y = 3^x$

2. $y = 0.25^x$

3. $f(x) = (1.01)^{2x}$

4. $f(x) = 6(5)^x$

5. $f(x) = 0.033^x$

6. $f(x) = 2\left(\frac{1}{4}\right)^x$

Write an exponential model (equation) for each situation.

7. 5% growth, initial 64

8. 12% decay, initial 84

9. 30% growth, initial 458

10. 98% decay, initial 785

11. 85% growth, initial 318

12. 2.5% decay, initial 100

13. 1% decay, initial 216

14. 300% growth, initial 53

15. Tripling, initial 56

16. Halving, initial 948

Write an equation and answer the question(s) for the following contextual situations:

17. E. coli bacteria double in population every thirty minutes, the initial population is 85.

    What's the population of bacteria after three hours? After one day?

18. You decide to borrow money from a local bank. You take out a loan for $5,000 with a rate of 4.5% per month.

    How much will you owe on the loan after 4 months? After 10 months?

19. You buy a boat for $12,500. The boat's value depreciates by 7% a year.

    How much will the boat be worth in 5 years? In 17?

20. There has been an increase of people moving away from Red Falls, Mass, population 937. Every year the population diminishes by 4.5%.

    How many residents are left after three years? How many residents are left after 22 years?