Homework 3.5 Real World Applications of Exponential Functions

$$Growth: y = P(1+r)^t$$

Answer each question with the best answer.

$$Decay: y = P(1-r)^t$$

Given the equation y = 35(0.57)^x

1. Does this equation represent growth or decay?

2. What is the rate of growth or decay?

3. What is the initial value?

4. Evaluate for x = 5

Given the equation y = 225(1.23)^x

5. Does this equation represent growth or decay?

6. What is the rate of growth or decay?

7. What is the initial value?

8. Evaluate for x = 2

Given the equation y = 154(1.06)^x

9. Does this equation represent growth or decay?

10. What is the rate of growth or decay?

11. What is the initial value?

12. Evaluate for x = 7

Ryan is saving for his college tuition. He has $2,550 in a savings account that pays 6.25% annual interest.

13. Write an exponential equation describing this situation.

14. How much money will Ryan have in his account 6 years from now?

*A used car was purchased for $12,329 **this year**. Each year the car's value decreases 8.5%.*

15. Write an exponential equation describing this situation.

16. What will the car be worth in 2020?

Sheryl owns a business. Her first year he made $11,212, each of the following years her profit increased 12%.

17. Write an exponential equation describing the situation.

18. What will she make in 20 years?

Lysa just bought a home. She paid $240,000. She is able to pay 20% of the loan off each year.

19. Write an exponential equation describing the situation.

20. What will she owe in 10 years?

A radioactive material decays at a rate of 40% per hour.

21. If we start with 80 grams of the substance, can you find a formula that models this rate of decay?

22. How much will be remaining at the end of 6 hours?

23. Will we have less than a gram before the end of the day? About how many hours does it take to decay to less than a gram? Explain why?

24. You just won the lotto. You have two options, you can take the full $10,000,000 now or they will pay you 1,000 dollars this year and then double the amount they pay you every year for 10 years. Which way will get you more money? Explain why?

25. You deposit $1500 in an account that pays 5% interest compounded yearly. Find the balance after 6 years.

26. The mice population is 25,000 and is decreasing by 20% each year. Write a model for this situation. What will be the mice population after 3 years?

27. The number of mosquitoes at the beach has tripled every year since 1999. In 1999, there were 2,500 mosquitoes. Write a model for this situation. How many mosquitoes would you predict were at the beach in 2005?

28. Given the exponential model y = 200(.80)^x, tell whether the model represents exponential growth or decay. Then, tell what the growth/decay factor is and the growth/decay percent.

29. I bought a car for $25,000, but its value is depreciating at a rate of 10% per year. How much will my car be worth after 8 years?

3.5 Answers

1 decay 2 0.57 3 35 4 2.105 5 growth 6 1.23 7 225 8 340.403 9 growth 10 1.06 11 154 12 2550(1.065)^x 13 3720.81
15 12329(.915)^x 16 108154.24 17 11212(1.12)^x 18 108154.24 19 240000(.80)^x 20 25769.80 21 80(.6)^x
22 3.732 25 2010.14 26 12800 27 607500 28 decay; decay factor-0.80; decay percentage-80% 29 10761.68