

$$7. y = -5\left(\frac{1}{3}\right)^x$$

$$8. y = -4(0.25)^{x+1}$$

$$9. y = 5\left(\frac{1}{2}\right)^x + 2$$

10. **RADIOACTIVE DECAY** The amount y (in grams) of a sample of iodine-131 after t days is given by $y = 50(0.92)^t$.
- Identify the initial amount of the substance.
 - What percent of the substance decays each day?

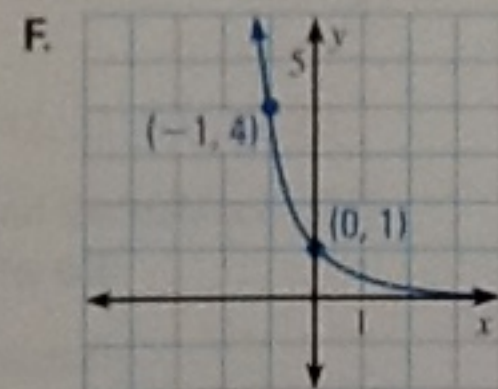
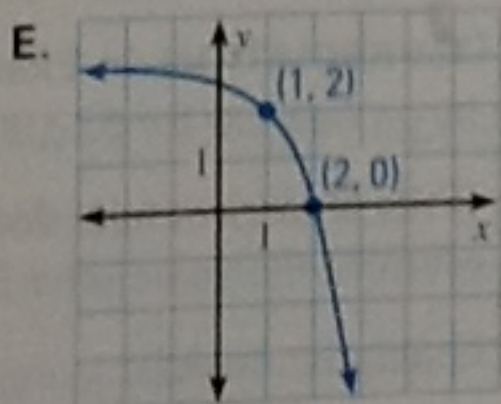
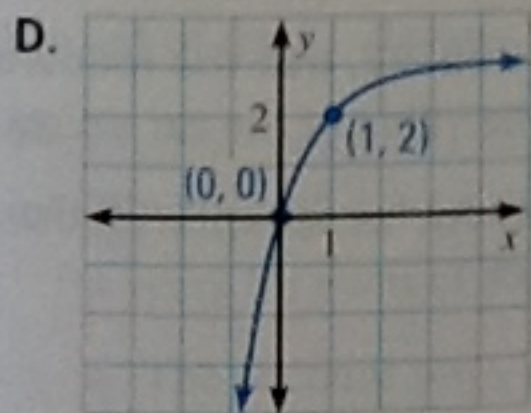
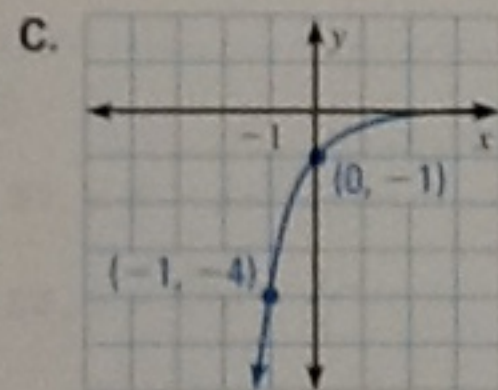
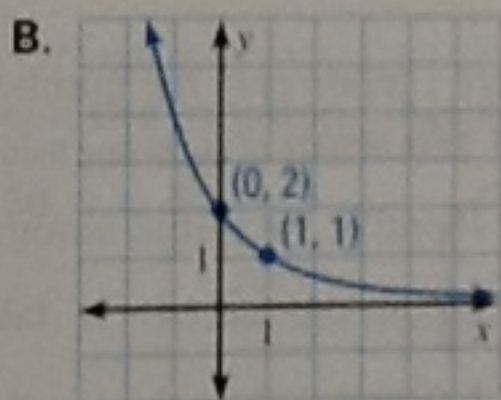
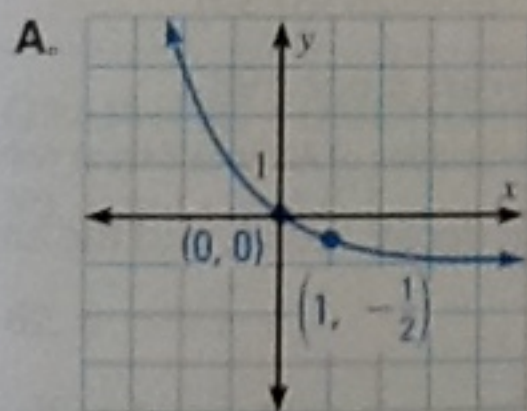
APPLICATIONS

IDENTIFYING FUNCTIONS Tell whether the function represents *exponential growth* or *exponential decay*.

11. $f(x) = 4\left(\frac{3}{8}\right)^x$ 12. $f(x) = 10 \cdot 3^x$ 13. $f(x) = 8 \cdot 7^{-x}$ 14. $f(x) = 8 \cdot 7^x$
15. $f(x) = 5\left(\frac{1}{8}\right)^{-x}$ 16. $f(x) = 3\left(\frac{4}{3}\right)^x$ 17. $f(x) = 8\left(\frac{2}{3}\right)^x$ 18. $f(x) = 5(0.25)^{-x}$

MATCHING GRAPHS Match the function with its graph.

19. $y = (0.25)^x$ 20. $y = -3^{x-1} + 3$ 21. $y = -\left(\frac{1}{3}\right)^{x-1} + 3$
22. $y = \left(\frac{1}{2}\right)^{x-1}$ 23. $y = -(0.25)^x$ 24. $y = (0.5)^x - 1$



GRAPHING FUNCTIONS Graph the function.

25. $y = 3\left(\frac{1}{2}\right)^x$

26. $y = 2\left(\frac{1}{5}\right)^x$

27. $y = -2\left(\frac{1}{4}\right)^x$

28. $y = -5\left(\frac{1}{2}\right)^x$

29. $y = 4\left(\frac{1}{3}\right)^x$

30. $y = 5\left(\frac{1}{4}\right)^x$

31. $y = -3\left(\frac{2}{3}\right)^x$

32. $y = -5(0.75)^x$

33. $y = 3\left(\frac{3}{8}\right)^x$

GRAPHING FUNCTIONS Graph the function. State the domain and range.

34. $y = -\left(\frac{1}{2}\right)^x + 1$

35. $y = \left(\frac{2}{3}\right)^{x-1}$

36. $y = 4\left(\frac{1}{2}\right)^{x+1}$

37. $y = \left(\frac{1}{3}\right)^{x-2}$

38. $y = 2\left(\frac{1}{3}\right)^{x-1}$

39. $y = (0.25)^x + 3$

40. $y = -3\left(\frac{1}{3}\right)^{x-1}$

41. $y = \left(\frac{1}{3}\right)^x - 2$

42. $y = \left(\frac{2}{3}\right)^x - 1$

WRITING MODELS In Exercises 43–45, write an exponential decay model that describes the situation.

43. **STEREO SYSTEM** You buy a stereo system for \$780. Each year t , the value V of the stereo system decreases by 5%.

44. **BEVERAGES** You drink a beverage with 120 milligrams of caffeine. Each hour h , the amount c of caffeine in your system decreases by about 12%.

45. **MEDICINE** An adult takes 400 milligrams of ibuprofen. Each hour h , the amount i of ibuprofen in the person's system decreases by about 29%.

46. **RADIOACTIVE DECAY** One hundred grams of plutonium is stored in a container. The amount P (in grams) of plutonium present after t years can be modeled by this equation:

$$P = 100(0.99997)^t$$

How much plutonium is present after 20,000 years?

- RECORD ALBUMS** In Exercises 47–49, use the following information. The number A (in millions) of record albums sold each year in the United States from 1982 to 1993 can be modeled by

$$A = 265(0.39)^t$$

where t represents the number of years since 1982.

- DATA UPDATE** of Recording Industry Association of America data at www.mcdougallittell.com

47. Identify the initial amount, the decay factor, and the annual percent decrease.

48. Graph the model.

49. Estimate when the number of records sold was 1 million.

- DEPRECIATION** In Exercises 50–52, use the following information.

You buy a new car for \$22,000. The value of the car decreases by 12.5% each year.

50. Write an exponential decay model for the value of the car. Use the model to estimate the value after 3 years.

51. Graph the model.

52. Estimate when the car will have a value of \$8000.

Test
Preparation

★ Challenge

MIXED REVIEW