

Interest Formulas

Simple interest

$$A = P(1 + rt)$$

Compound interest

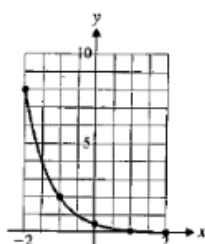
$$A = P\left(1 + \frac{r}{m}\right)^{mt}$$

Continuous compound interest

$$A = Pe^{rt}$$

Answers to Matched Problems

1.



2. (A) 179 bacteria (B) 1,271,659 bacteria

3. 233 mg

4. Purchase price: \$30,363;
value after 10 yr: \$2,864

```

ExpReg
Y=ab^x
a=30363.17638
b=.7896877851

```

5. \$7,841.13

6. (A) \$9,155.23

(B) \$9,156.29

EXERCISE 2-2

A Graph each function in Problems 1–12 over the indicated interval.

1. $y = 5^x; [-2, 2]$

2. $y = 3^x; [-3, 3]$

3. $y = \left(\frac{1}{5}\right)^x = 5^{-x}; [-2, 2]$

4. $y = \left(\frac{1}{3}\right)^x = 3^{-x}; [-3, 3]$

5. $f(x) = -5^x; [-2, 2]$

6. $g(x) = -3^x; [-3, 3]$

7. $y = -e^x; [-3, 3]$

8. $y = -e^x; [-3, 3]$

9. $y = 100e^{0.1x}; [-5, 5]$

10. $y = 10e^{0.2x}; [-10, 10]$

11. $g(t) = 10e^{-0.2t}; [-5, 5]$

12. $f(t) = 100e^{-0.1t}; [-5, 5]$

B In Problems 19–26, describe the transformations that can be used to obtain the graph of g from the graph of f (see Section 1-2).

19. $g(x) = -2^x; f(x) = 2^x$

20. $g(x) = 2^{x-2}; f(x) = 2^x$

21. $g(x) = 3^{x+1}; f(x) = 3^x$

22. $g(x) = -3^x; f(x) = 3^x$

23. $g(x) = e^x + 1; f(x) = e^x$

24. $g(x) = e^x - 2; f(x) = e^x$

25. $g(x) = 2e^{-(x+2)}; f(x) = e^{-x}$

26. $g(x) = 0.5e^{-(x-1)}; f(x) = e^{-x}$

APPLICATIONS

Business & Economics

61. *Finance.* Suppose \$2,500 is invested at 7% compounded quarterly. How much money will be in the account in:
(A) $\frac{1}{2}$ year? (B) 15 years?

Compute answers to the nearest cent.

62. *Finance.* Suppose \$4,000 is invested at 11% compounded weekly. How much money will be in the account in:
(A) $\frac{1}{2}$ year? (B) 10 years?

Compute answers to the nearest cent.

63. *Money growth.* If you invest \$7,500 in an account paying 8.35% compounded continuously, how much money will be in the account at the end of:
(A) 5.5 years? (B) 12 years?

64. *Money growth.* If you invest \$5,250 in an account paying 11.38% compounded continuously, how much money will be in the account at the end of:
(A) 6.25 years? (B) 17 years?

65. *Finance.* A person wishes to have \$15,000 cash for a new car 5 years from now. How much should be placed in an account now, if the account pays 9.75% compounded weekly? Compute the answer to the nearest dollar.

66. *Finance.* A couple just had a baby. How much should they invest now at 8.25% compounded daily in order to have \$40,000 for the child's education 17 years from now? Compute the answer to the nearest dollar.

67. *Money growth.* *Barron's* (a national business and financial weekly) published the following "Top Savings Deposit Yields" for 1 year certificate of deposit accounts:



- (A) Alamo Savings, 8.25% compounded quarterly
(B) Lamar Savings, 8.05% compounded continuously

Compute the value of \$10,000 invested in each account at the end of 1 year.

68. *Money growth.* Refer to Problem 67. In another issue of *Barron's*, $2\frac{1}{2}$ year certificate of deposit accounts included the following:

- (A) Gill Saving, 8.30% compounded continuously
(B) Richardson Savings and Loan, 8.40% compounded quarterly
(C) USA Savings, 8.25% compounded daily

Compute the value of \$1,000 invested in each account at the end of $2\frac{1}{2}$ years.

69. *Present value.* A promissory note will pay \$50,000 at maturity $5\frac{1}{2}$ years from now. How much should you be willing to pay for the note now if money is worth 10% compounded continuously?

70. *Present value.* A promissory note will pay \$30,000 at maturity 10 years from now. How much should you be willing to pay for the note now if money is worth 9% compounded continuously?

71. *Advertising.* A company is trying to introduce a new product to as many people as possible through television advertising in a large metropolitan area with 2 million possible viewers. A model for the number of people N (in millions) who are aware of the product after t days of advertising was found to be

$$N = 2(1 - e^{-0.037t})$$

Graph this function for $0 \leq t \leq 50$. What value does N tend to as t increases without bound?

72. *Learning curve.* People assigned to assemble circuit boards for a computer manufacturing company undergo on-the-job training. From past experience it was found that the learning curve for the average employee is given by

$$N = 40(1 - e^{-0.12t})$$