

Answer Key

Practice A

1. 54.598 2. 0.368 3. 1096.633 4. 1
5. 0.135 6. 1.948 7. 0.607 8. 9.974
9. exponential growth 10. exponential decay
11. exponential growth 12. exponential growth
13. exponential decay 14. exponential decay
15. e^8 16. e^6 17. e^{10} 18. e^3 19. $e^{-5} = \frac{1}{e^5}$
20. $8e^{15}$ 21. A 22. C 23. B 24. \$829.79
25. 273,544

Practice A

For use with pages 480–485

Use a calculator to evaluate the expression. Round the result to three decimal places.

- | | | | |
|-------------|--------------|---------------|--------------|
| 1. e^4 | 2. e^{-1} | 3. e^7 | 4. e^0 |
| 5. e^{-2} | 6. $e^{2/3}$ | 7. $e^{-1/2}$ | 8. $e^{2.3}$ |

Tell whether the function is an example of *exponential growth* or *exponential decay*.

- | | | |
|-----------------------------|----------------------|------------------------|
| 9. $f(x) = e^x$ | 10. $f(x) = e^{-x}$ | 11. $f(x) = 2e^x$ |
| 12. $f(x) = \frac{1}{2}e^x$ | 13. $f(x) = e^{-2x}$ | 14. $f(x) = e^{-1/3x}$ |

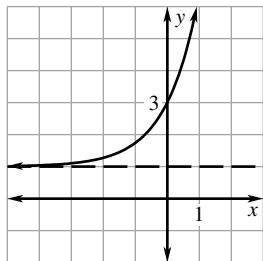
Simplify the expression.

- | | | |
|-----------------------|--------------------------|----------------|
| 15. $e^3 \cdot e^5$ | 16. $e^{-2} \cdot e^8$ | 17. $(e^2)^5$ |
| 18. $\frac{e^8}{e^5}$ | 19. $\frac{e^{-3}}{e^2}$ | 20. $(2e^5)^3$ |

Match the function with its graph.

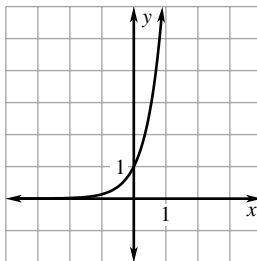
21. $f(x) = 2e^x + 1$

A.



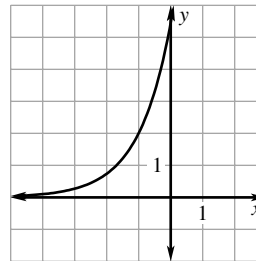
22. $f(x) = 2e^{x+1}$

B.



23. $f(x) = e^{2x}$

C.



24. **Continuous Compounding** You deposit \$725 in an account that pays 4.5% annual interest compounded continuously. What is the balance after 3 years?

25. **Population** The population P of a city can be modeled by $P = 250,000e^{0.01t}$ where t is the number of years since 1990. What was the population in 1999?

Answer Key

Practice B

1. 148.413 2. 0.717 3. 0.247 4. 4.113
 5. exponential growth 6. exponential decay
 7. exponential decay 8. exponential growth
 9. exponential decay 10. exponential growth
 11. $\frac{1}{e^8}$ 12. $3e^4$ 13. $\frac{2}{e}$ 14. $16e^6$ 15. $-12e^3$
 16. $2e^{2x+3}$ 17. $8e^{2x}$ 18. e 19. $\frac{1}{e^x}$

20.

x	-2	-1.5	-1	0
$f(x)$	0.27	0.45	0.74	2

x	1	1.5	2
$f(x)$	5.44	8.96	14.78

21.

x	-2	-1.5	-1	0
$f(x)$	14.78	8.96	5.44	2

x	1	1.5	2
$f(x)$	0.74	0.45	0.27

22.

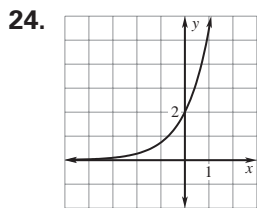
x	-2	-1.5	-1	0
$f(x)$	3.02	3.05	3.14	4

x	1	1.5	2
$f(x)$	10.39	23.09	57.60

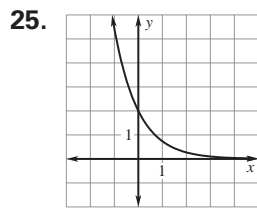
23.

x	-2	-1.5	-1	0
$f(x)$	401.43	88.02	18.09	-1

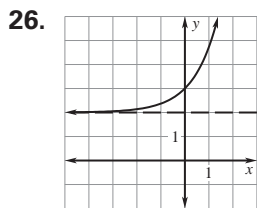
x	1	1.5	2
$f(x)$	-1.95	-1.99	-2.00



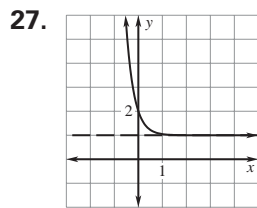
$y = 0$



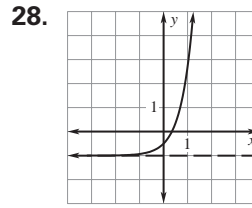
$y = 0$



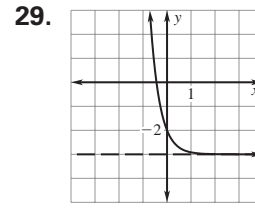
$y = 2$



$y = 1$



$y = -1$



$y = -3$

30. \$1972.34 31. \$1978.47

32. Continuous compounding

Practice B

For use with pages 480–485

Use a calculator to evaluate the expression. Round the result to three decimal places.

1. e^5

2. $e^{-1/3}$

3. $e^{-1.4}$

4. $e^{\sqrt{2}}$

Tell whether the function is an example of *exponential growth* or *exponential decay*.

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

6. $f(x) = e^{-3x}$

7. $f(x) = 2e^{-3x}$

8. $f(x) = \frac{1}{5}e^{5x}$

9. $f(x) = \frac{1}{2}e^{-x}$

10. $f(x) = 4e^{5x}$

Simplify the expression.

11. $(e^4)^{-2}$

12. $\frac{3e^5}{e}$

13. $\left(\frac{e}{2}\right)^{-1}$

14. $(4e^3)^2$

15. $-3e \cdot 4e^2$

16. $2e^x \cdot e^{x+3}$

17. $\sqrt{64e^{4x}}$

18. $e^{2x} \cdot e^{1-2x}$

19. $\frac{e}{e^{x+1}}$

Complete the table of values. Round to two decimal places.

20. $f(x) = 2e^x$

x	-2	-1.5	-1	0	1	1.5	2
$f(x)$							

21. $f(x) = 2e^{-x}$

x	-2	-1.5	-1	0	1	1.5	2
$f(x)$							

22. $f(x) = e^{2x} + 3$

x	-2	-1.5	-1	0	1	1.5	2
$f(x)$							

23. $f(x) = e^{-3x} - 2$

x	-2	-1.5	-1	0	1	1.5	2
$f(x)$							

Graph the function and identify the horizontal asymptote.

24. $f(x) = 2e^x$

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

26. $f(x) = e^x + 2$

27. $f(x) = e^{-3x} + 1$

28. $f(x) = \frac{1}{2}e^{2x} - 1$

29. $f(x) = e^{-2.5x} - 3$

Interest In Exercises 30–32, use the following information.

You deposit \$1200 in an account that pays 5% annual interest. After 10 years, you withdraw the money.

30. Find the balance in the account if the interest was compounded quarterly.

31. Find the balance in the account if the interest was compounded continuously.

32. Which type of compounding yielded the greatest balance?