Section 3.1 - Exponential Functions and Their Graphs

1. Evaluate the function at the indicated value of x. Round your result to three decimal places if necessary.

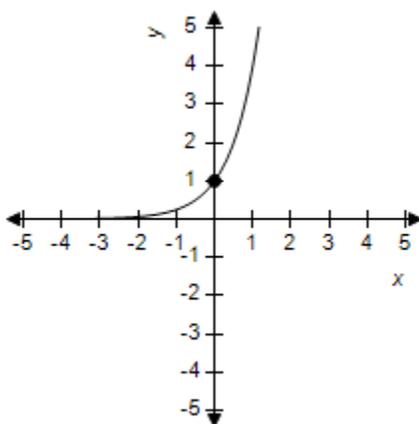*Function*   *Value*
$f(x) = 0.7^x$ $x = 1.7$

  a. -0.545
  b. 1.7
  c. 0.545
  d. 0.7
  e. -1.7

4. Evaluate the function at the indicated value of x. Give your answer in scientific notation to three decimal places if necessary.

Function   *Value*
$f(x) = 200(1.3)^{12x}$ $x = 14$

  a. 2.504×10^2
  b. 4.368×10^4
  c. 3.048×10^{36}
  d. 1.183×10^2
  e. 2.777×10^{21}
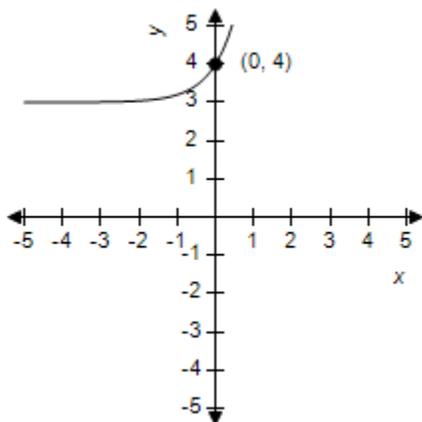
5. Match the graph with its exponential function.

  a. $y = 4^x$
  b. $y = -4^{-x}$
  c. $y = -4^x$

    d. $y = 4^{-x}$

    e. $y = 4x$

6. Match the graph with its exponential function.

    a. $y = 5^{-x} - 3$

    b. $y = -5^x + 3$

    c. $y = 5^x + 3$

    d. $y = 5^x - 3$

    e. $y = -5^x - 3$

8. Use a graphing utility to construct a table of values for the function. Round your answer to two decimal places.

$$f(x) = \left(\frac{1}{5}\right)^x$$

  a.

x	-2	-1	0	1	2
$f(x)$	25.00	−5.00	1.00	0.20	0.04

  b.

x	-2	-1	0	1	2
$f(x)$	25.00	5.00	−1.00	0.20	0.04

  c.

x	-2	-1	0	1	2

$f(x)$	−25.00	5.00	1.00	0.20	0.04

d.

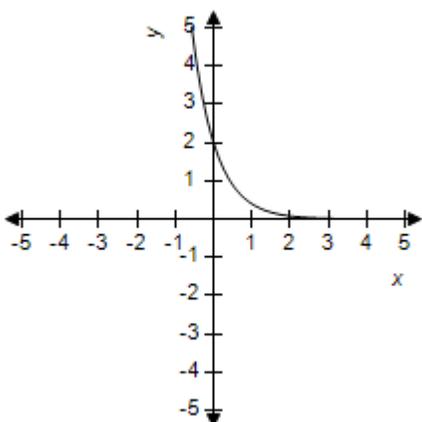| x	-2	-1	0	1	2
$f(x)$	25.00	5.00	1.00	0.20	0.04

e.

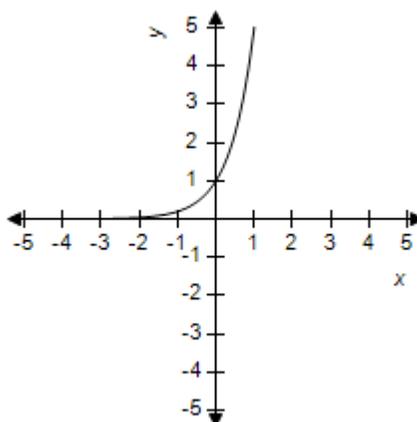| x	-2	-1	0	1	2
$f(x)$	25.00	5.00	1.00	−0.20	−0.04

9. Select the graph of the function.

$$f(x) = \left(\frac{1}{5}\right)^{-x}$$

a.

b.

c.

d.
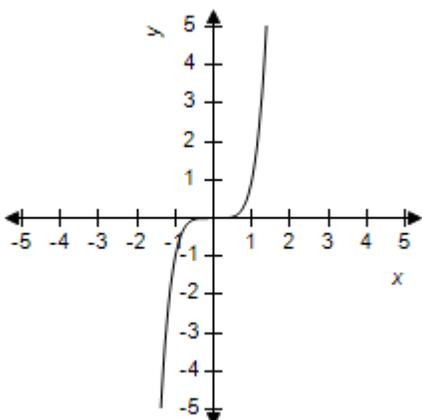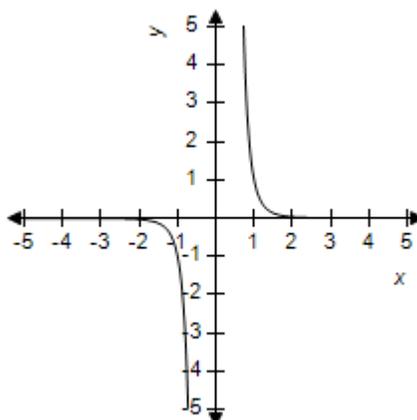
e.
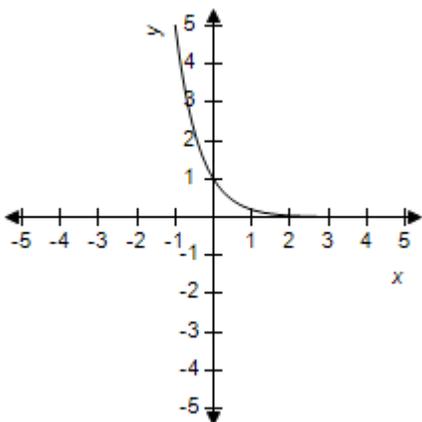
10. Use a graphing utility to construct a table of values for the function. Round your answers to two decimal places.

$f(x) = 4^{-x}$

a.

x	-2	-1	0	1	2
f(x)	16.00	4.00	1.00	0.25	-0.06

b.

x	-2	-1	0	1	2
f(x)	-16.00	4.00	1.00	0.25	0.06

c.

x	-2	-1	0	1	2
f(x)	16.00	-4.00	1.00	0.25	0.06

d.

x	-2	-1	0	1	2
f(x)	16.00	4.00	1.00	-0.25	0.06

e.

x	-2	-1	0	1	2
f(x)	16.00	4.00	1.00	0.25	0.06

13. Use the graph of f to determine the transformation that yields the graph of g.

$f(x) = 4^x, g(x) = 4^x + 9$

    a. Shift the graph of f nine units to the left.
    b. Shift the graph of f nine units upward.

    c. Shift the graph of f nine units to the right.

    d. Shift the graph of f nine units downward.

    e. Both the graphs f and g are same.

14. Use the graph of f to determine the transformation that yields the graph of g.

$$f(x) = 2^x, \quad g(x) = 6 - 2^x$$

    a. Reflect the graph of f in the x-axis and shift six units downward.

    b. Both the graphs f and g are same.

    c. Reflect the graph of f in the y-axis and shift six units upward.

    d. Reflect the graph of f in the x-axis and shift six units upward.

    e. Reflect the graph of f in the y-axis and shift six units downward.

16. Select the graph of the exponential function.

$$f(x) = 2^{-x^2}$$

a.
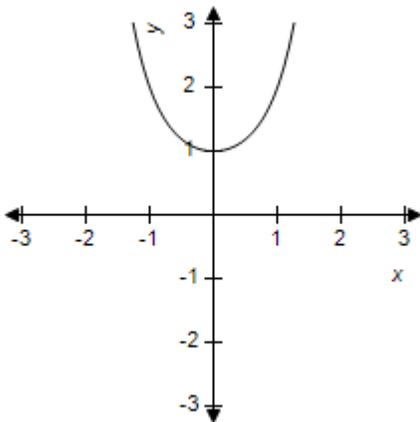
b.
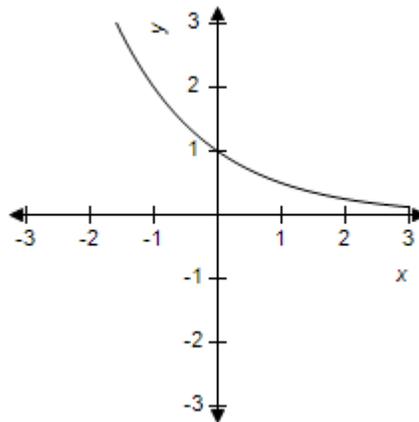
c.

d.
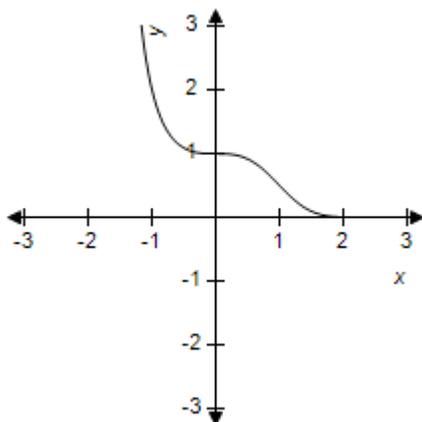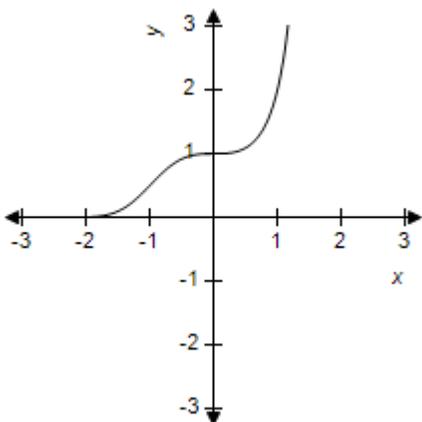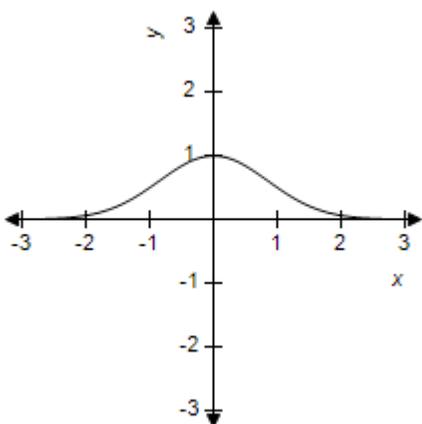
e.

17. Select the graph of the exponential function.

$$f(x) = 2^{-|x|}$$

a.

b.
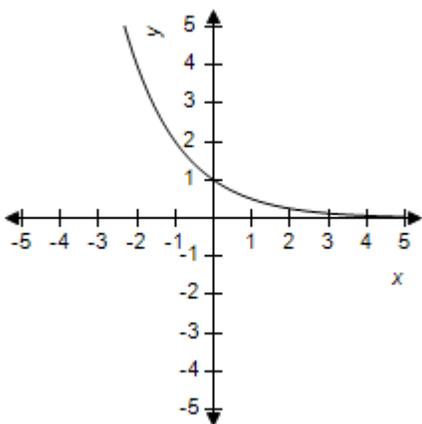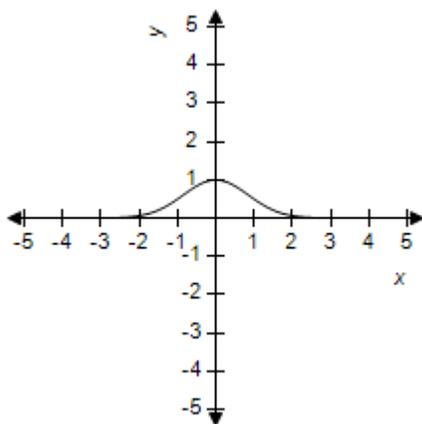
c.
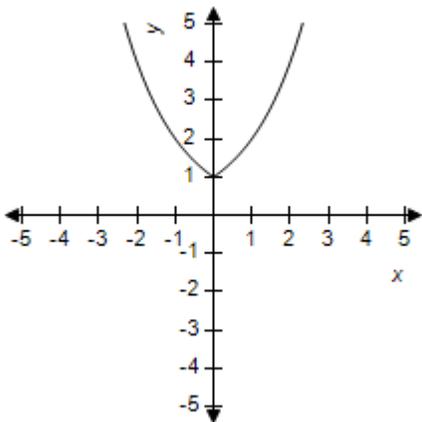
d.
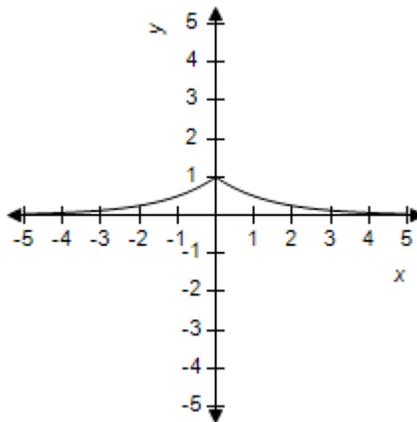
e.
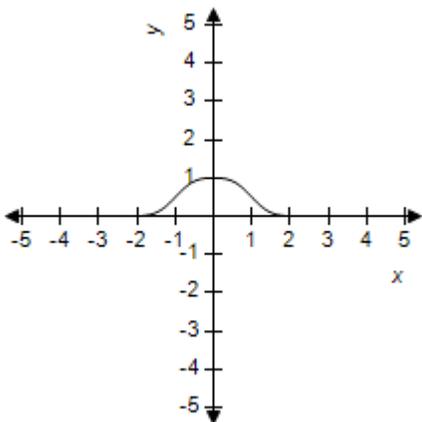
26. Select the graph of the function.
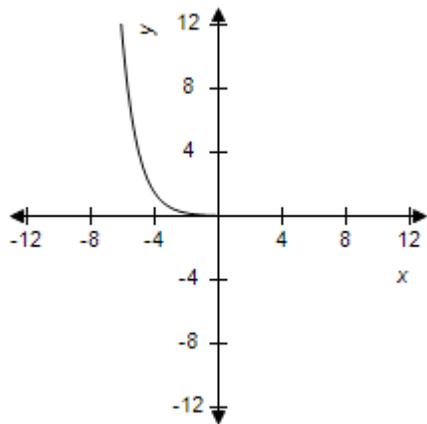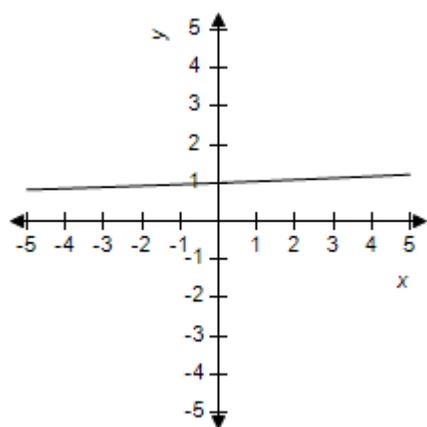
$$f(x) = 4e^{x+5}$$

a.

b.
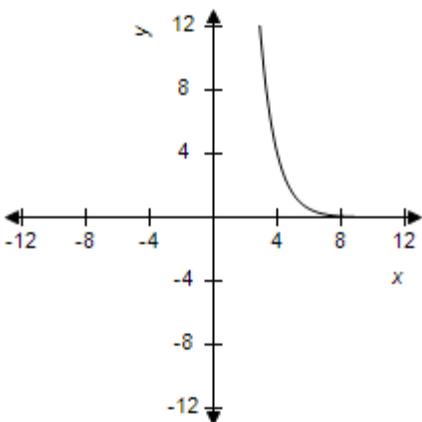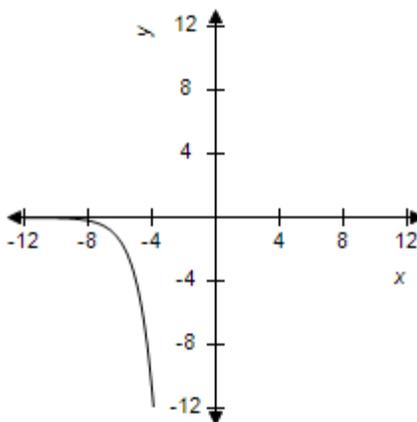
c.
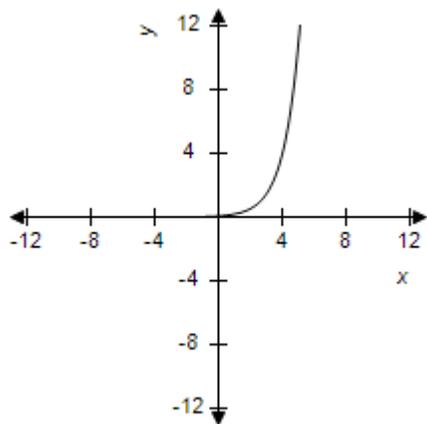
d.
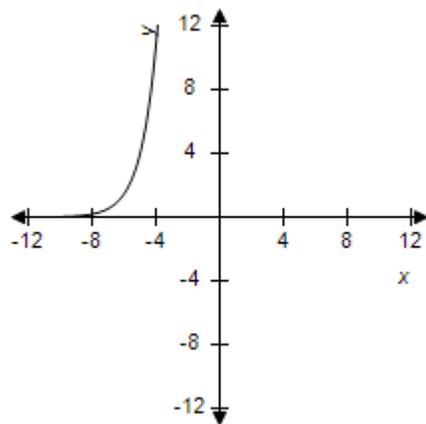
e.

29. Select the graph of the exponential function.

$$y = 1.02^{-2x}$$

a.

b.
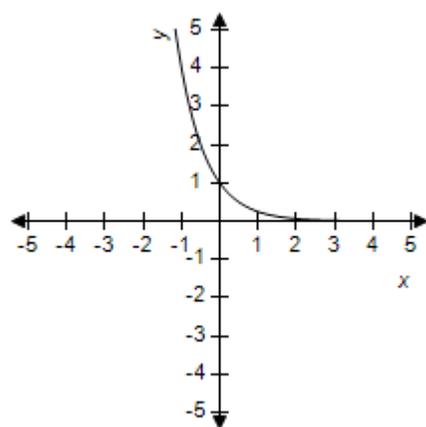
c.
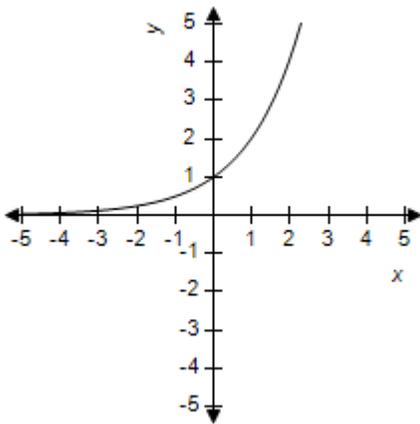
d.
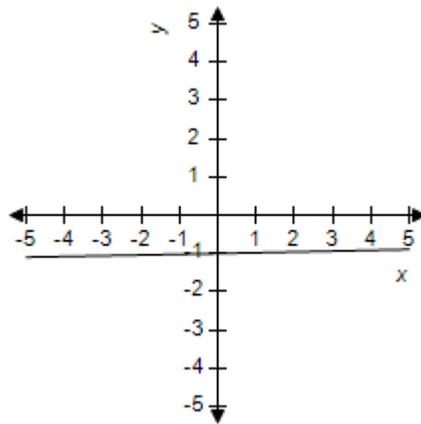
e.

30. Select the graph of the exponential function.
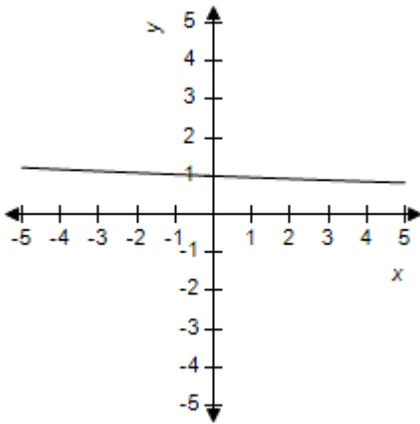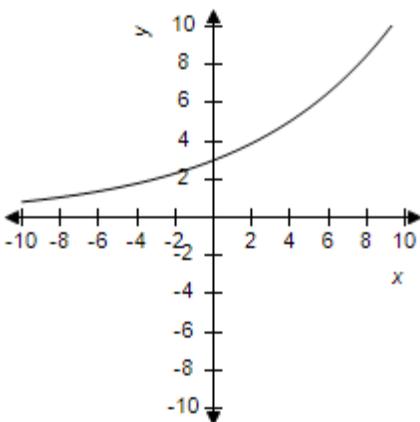
$s(t) = 3e^{0.13t}$

a.

b.
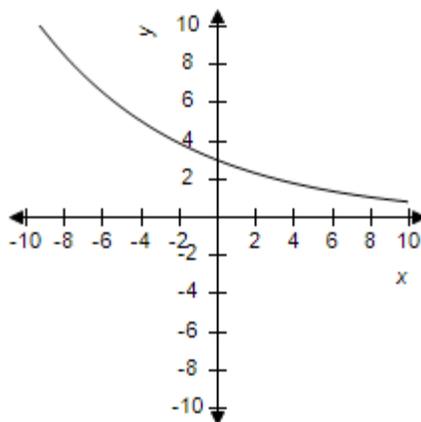
c.

d.

e.

31. Select the graph of the exponential function.

$g(x)=1+e^{-x}$

a.

b.
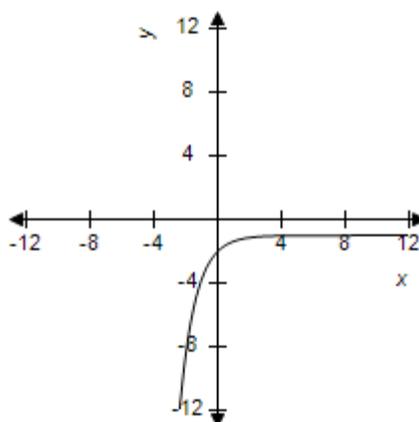
c.
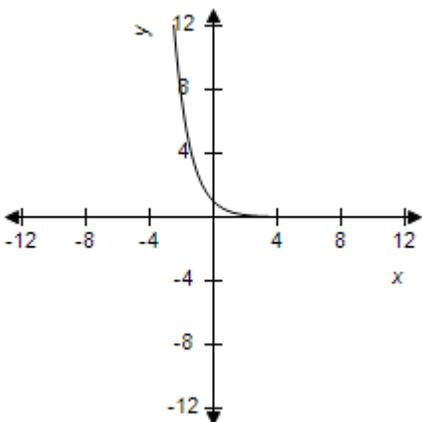
d.
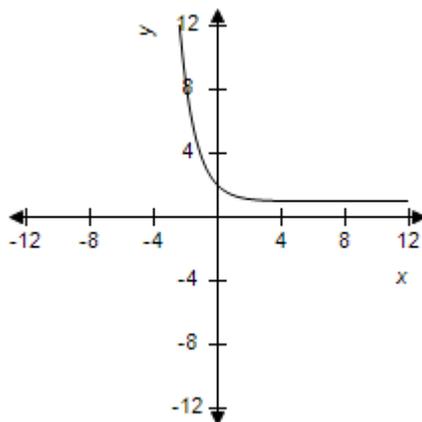
e.

32. Use the One-to-One Property to solve the equation for x.

$5^{x+1}=25$

    a. $x=5$
    b. $x=1$
    c. $x=4$
    d. $x=2$
    e. $x=3$

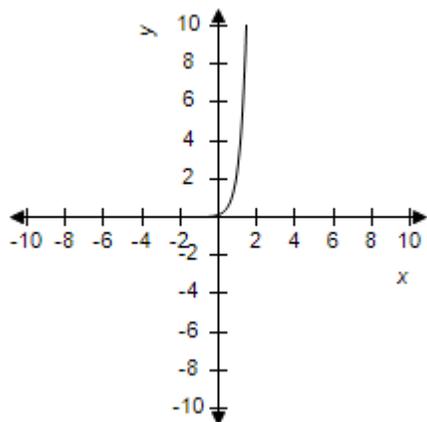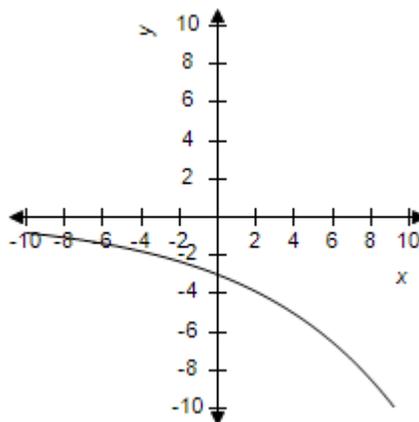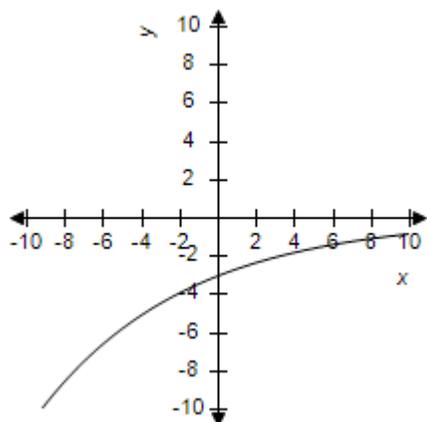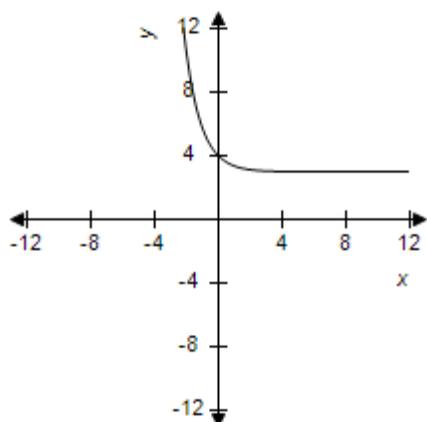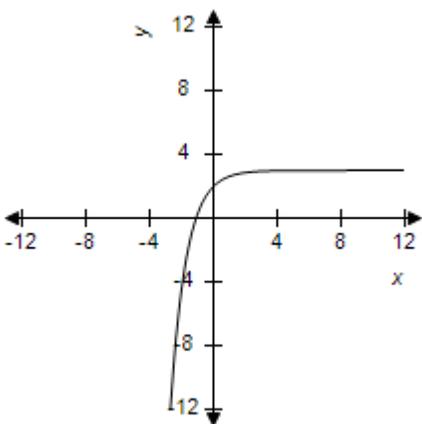33. Use the One-to-One Property to solve the equation for x.

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

Section 3.1 - Exponential Functions and Their Graphs

    a. $x = 3$

    b. $x = -2$

    c. $x = 2$

    d. $x = -3$

    e. $x = 4$

34. Use the One-to-One Property to solve the equation for x.

$$e^{6x+5} = e^6$$

    a. $x = -\dfrac{1}{6}$

    b. $x^2 = 6$

    c. $x = -6$

    d. $x = \dfrac{1}{6}$

    e. $x = 6$

35. Use the One-to-One Property to solve the equation for x.

$$e^{x^2 - 4} = e^{3x}$$

    a. $x = -4$

    b. $x = 3$

    c. $x = 4, -1$

    d. $x = -4, -1$

    e. $x = -4, 1$

37. Let Q represent a mass of radioactive plutonium $\left(^{239}\text{Pu}\right)$ (in grams), whose half life is 24,100 years. The quantity of plutonium present after t years is $Q = 16\left(\dfrac{1}{2}\right)^{t/24,100}$. Determine the quantity present after 67,000 years. Round your answer to one decimal place.

    a. 4.3 g

    b. 3.3 g

    c. 5.3 g

  d. 2.3 g

  e. 6.3 g

42. Evaluate the function $f(x) = 400(1.005)^x$ at $x = 240$. Round the answer to 3 decimal places.

  a. 1,324.082

  b. 1,764.558

  c. 404.010

  d. 96,480.000

  e. 3.310

47. Use the One-to-One Property to solve the following equation for x.
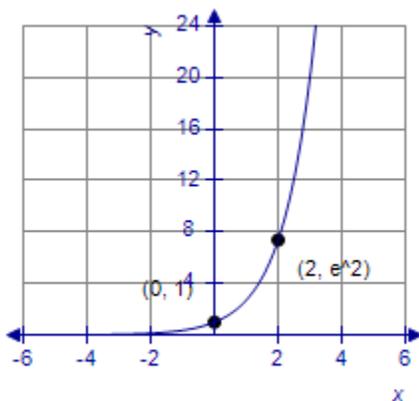
$2^{3x} = 128$

  a. $\dfrac{7}{3}$

  b. $\dfrac{3}{7}$

  c. $\dfrac{128}{3}$

  d. 2

  e. $-\dfrac{64}{3}$

59. Find the value of b that would cause the graph of $y = b^x$ to look like the graph below.
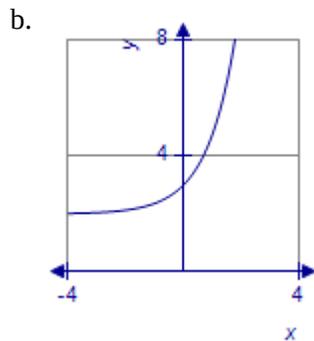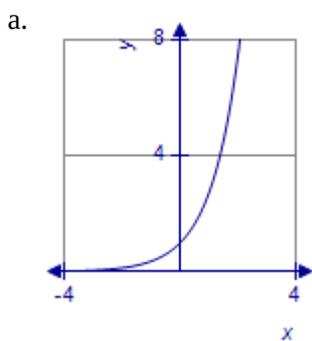
a. $b = \dfrac{1}{e^3}$

b. $b = e^3$

c. $b = e$

d. $b = \dfrac{1}{e}$

e. $b = e^2$

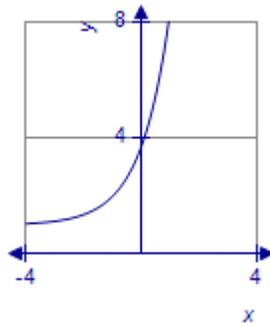60. Graph the function using translations.

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

a.

b.

c.
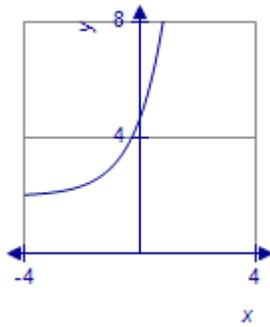
d.

62. Sketch the graph of the function

$$f(x) = 2^{x/2}$$