Consider the graph of \( y = 3e^x \).

(a) Write the equation of the graph that results from shifting 6 units to the left.

(b) Write the equation of the graph that results from reflecting about the \( x \)-axis.

(c) Write the equation of the graph that results from reflecting about the \( y \)-axis.

2.

Find the domain of the function \( f(x) = \frac{3}{1 + e^x} \).

a. \( x \in (0, \infty) \)

b. \( x \in (-3, \infty) \)

c. \( x \in (-\infty, \infty) \)

d. \( x \in (-\infty, 0) \)

e. \( x \in (-\infty, -3) \)

3.

Find the exponential function \( f(x) = Ca^x \) whose graph is given.
4. Find the exponential function $f(x) = Ca^x$ whose graph is given.

a. $f(x) = 4 \cdot 6^x$
b. $f(x) = 6 \cdot 4^x$
c. $f(x) = 3 \cdot 2^x$
d. $f(x) = 6^x$
e. $f(x) = 2 \cdot 3^x$
5. Under ideal conditions a certain bacteria population is known to triple every 4 hours. Suppose that there are initially 150 bacteria. What is the size of the population after 20 hours?

bacteria

6. A function is given by a table of values. Determine whether it is one-to-one.

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
</table>
7. If \( f \) is a one-to-one function such that \( f(6) = 1 \), what is \( f^{-1}(1) \)?

\[ f^{-1}(1) = \] __________

8. If \( f \) is a one-to-one function such that \( f(7) = 3 \), what is \( f^{-1}(3) \)?

a. 9  
b. 8  
c. 7  
d. 6  
e. 5

9. Find a formula for the inverse of the function \( f(x) = \frac{9x - 1}{2x + 9} \).

a. \[ f^{-1}(x) = \frac{9x - 1}{9 + 2x} \]

b. \[ f^{-1}(x) = \frac{9x - 1}{2x - 9} \]

c. \[ f^{-1}(x) = \frac{9x + 1}{9 - 2x} \]

d. \[ f^{-1}(x) = \frac{9x - 1}{9 - 2x} \]

e. \[ f^{-1}(x) = \frac{9x + 1}{9 + 2x} \]
Find a formula for the inverse of the function \( f(x) = 9x^3 + 2 \).

11.

Given the graph of \( f(x) \) below, which of the following is the graph of \( f^{-1}(x) \)?
c. $y$ vs. $x$

d. $y$ vs. $x$
12.

Express \(2 \ln 9 - \ln 3\) as a single logarithm.

a. \(\ln 27\)

b. \(\ln 43\)

c. \(\ln 35\)

d. \(\ln 39\)

e. \(\ln 31\)

13.

If a bacteria population starts with 100 bacteria and doubles every two hours, then the number of bacteria after \(t\) hours is \(n = f(t) = 100 \cdot 2^{t/2}\).

Find the inverse of this function.

a. \(t = f^{-1}(n) = 2 \log_2(100n)\)

b. \(t = f^{-1}(n) = 2 \ln \frac{n}{100}\)

c. \(t = f^{-1}(n) = 2 \log_2 \frac{n}{100}\)
d. \( t = f^{-1}(n) = 2 \ln(100n) \)
e. \( t = f^{-1}(n) = 2 \log_2 n \)

14.
Solve each equation for \( x \).
(a) \( 2 \ln x = 9 \)
(b) \( e^{-x} = \frac{1}{11} \)

15.
Solve the equation \( e^{-x} = 12 \) for \( x \).

a. \( x = e^{12} \)
b. \( x = \log_{12} 12 \)
c. \( x = \ln 12 \)
d. \( x = -\ln 12 \)
e. \( x = -\log_{10} 12 \)

16.
Find the exact value of each expression.

(a) \( \tan^{-1}(1) \)
(b) \( \arcsin\left(-\frac{1}{\sqrt{2}}\right) \)

17.
Simplify the expression \( \cot\left(\cos^{-1}x\right) \).

a. \( \frac{x}{\sqrt{1 - x^2}} \)
b. \[ \frac{\sqrt{1 - x^2}}{\sqrt{1 + x^2}} \]

c. \[ \frac{\sqrt{1 + x^2}}{\sqrt{1 - x^2}} \]

d. \[ x \sqrt{1 - x^2} \]

e. \[ \frac{x}{\sqrt{1 + x^2}} \]