Name: _____ **Class:** _____ **Date:** _____ **ID: X**

Alg 2 Topic 6.1 to 6.6 Test Practice

____ 1. An initial population of 820 quail increases at an annual rate of 23%. Write an exponential function to model the quail population. What will the approximate population be after 3 years?

a. $f(x) = 820(1.23)^x$; 1526
b. $f(x) = 820(23)^x$; 9,976,940
c. $f(x) = (820 \cdot 0.23)^x$; 6,708,494
d. $f(x) = 820(0.23)^x$; 1526

____ 2. The half-life of a certain radioactive material is 32 days. An initial amount of the material has a mass of 361 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 5 days. Round your answer to the nearest thousandth.

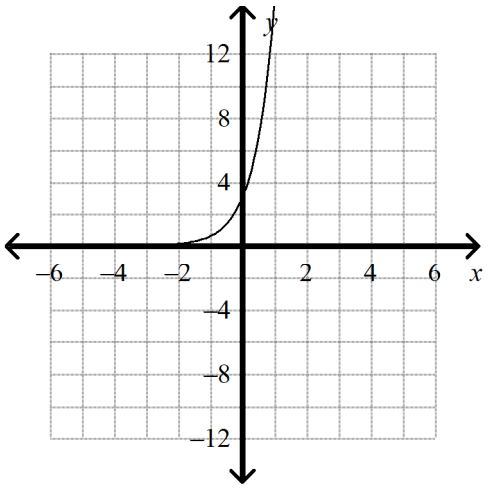
a. $y = 361\left(\frac{1}{2}\right)^{32x}$; 0 kg
b. $y = 361\left(\frac{1}{2}\right)^{\frac{1}{32}x}$; 323.945 kg
c. $y = 2\left(\frac{1}{361}\right)^{\frac{1}{32}x}$; 0.797 kg
d. $y = \frac{1}{2}\left(\frac{1}{361}\right)^{\frac{1}{32}x}$; 0.199 kg

Name: _____ **ID: X**

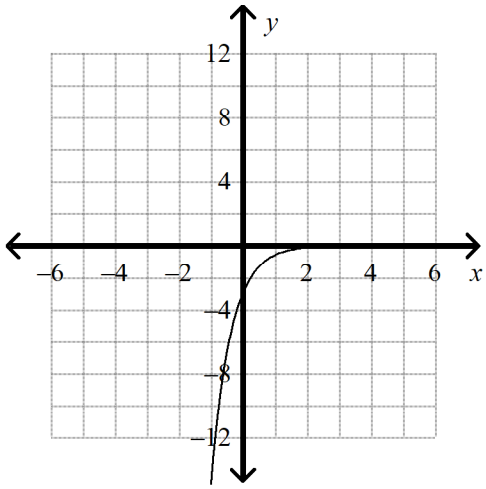
Graph the function.

____ 3. $y = \frac{1}{5}(3)^x$

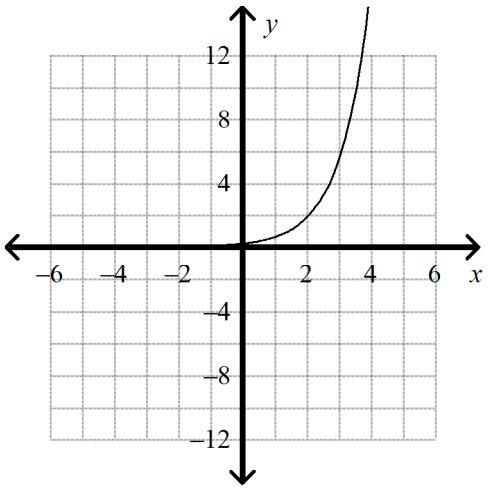
a.



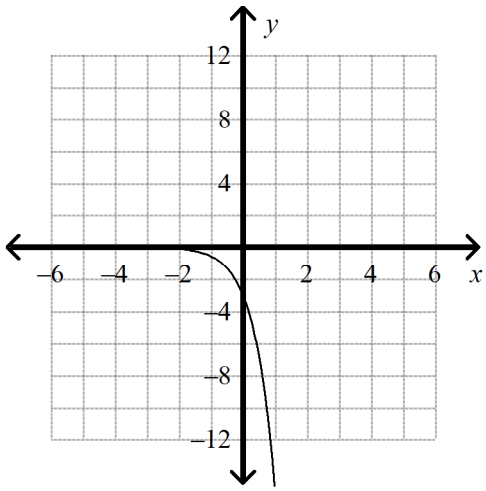
c.



b.



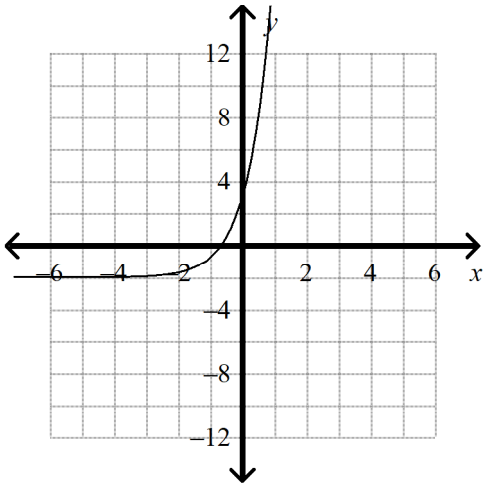
d.



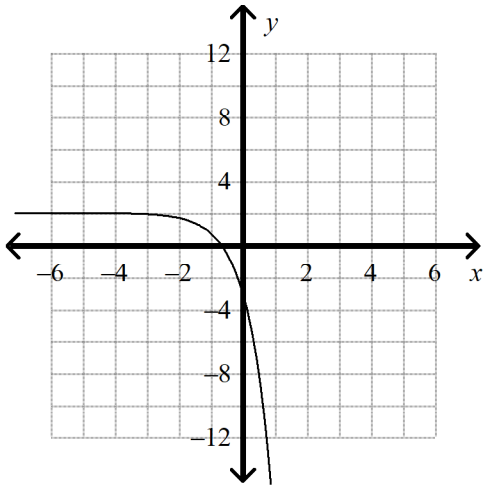
Name: _____ **ID: X**

____ 4. $y = 5\left(\frac{1}{4}\right)^x + 2$

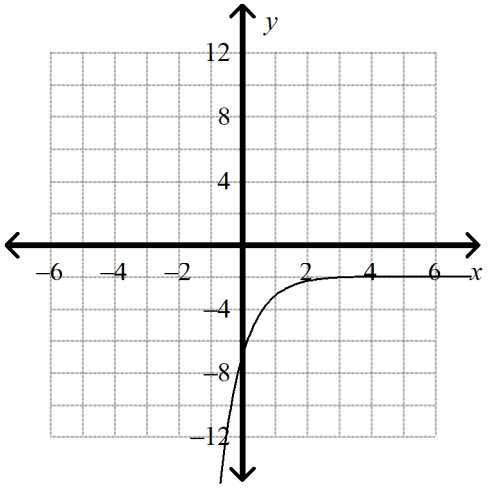
a.



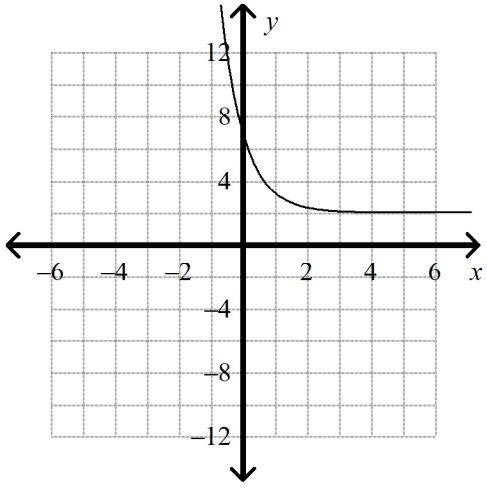
c.



b.



d.



____ 5. You open a savings account and deposit $1,000. After 1 year of earning continuously compounded interest, your balance is $1,018.16. After 2 years, the balance is $1,036.66. Assuming you make no deposits or withdrawals, find the equation for the best-fitting exponential function to represent the balance of the account after *x* years. How much money will be in the account after 10 years?

a. $A = 1000 \cdot e^{1.8}$, $6,049.65

b. $A = 1000 + e^{0.018t}$, $1,001.20

c. $A = 1000 \cdot e^{0.018t}$, $1,197.22

d. $A = 1000 \cdot e^{1.8 * t}$, $1,001.20

____ 6. Suppose you invest $1600 at an annual interest rate of 4.6% compounded continuously. How much will you have in the account after 4 years?

a. $800.26 b. $6,701.28 c. $10,138.07 d. $1,923.23

Write the equation in logarithmic form.

____ 7. $2^5 = 32$

a. $\log 32 = 5 \cdot 2$
c. $\log 32 = 5$
b. $\log_2 32 = 5$
d. $\log_5 32 = 2$

Write the equation in exponential form.

____ 8. $\log_4 \frac{1}{16} = -2$

a. $4^{\frac{1}{2}} = 16$
c. $16^{\frac{1}{2}} = 4$
b. $4^2 = 16$
d. $4^{-2} = \frac{1}{16}$

Evaluate the logarithm.

____ 9. $\log_5 \frac{1}{625}$

a. –3 b. 5 c. –4 d. 4

____ 10. $\log_3 243$

a. 5 b. –5 c. 4 d. 3

Use natural logarithms to solve the equation. Round to the nearest thousandth.

____ 11. $6e^{4x} - 2 = 3$

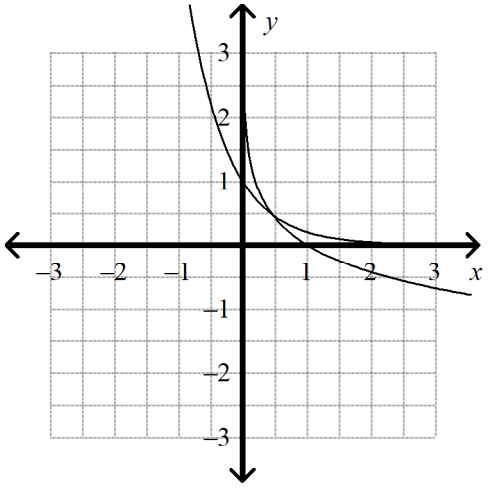
a. –0.448 b. 0.327 c. 0.067 d. –0.046

Name: _____ **ID: X**

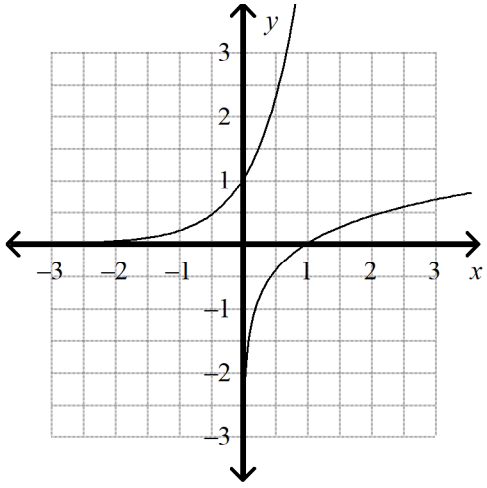
Graph the logarithmic equation.

____ 12. Graph $y = \log_5 x$ and its inverse.

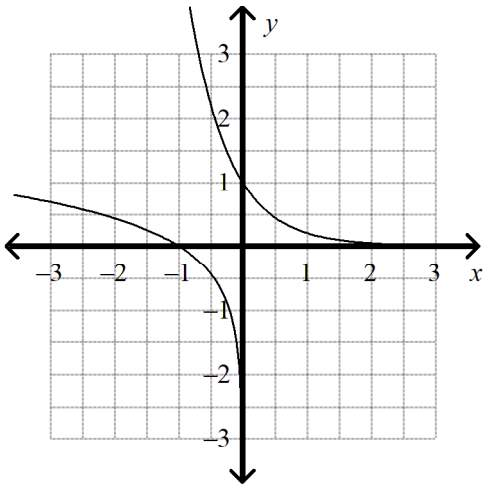
a.



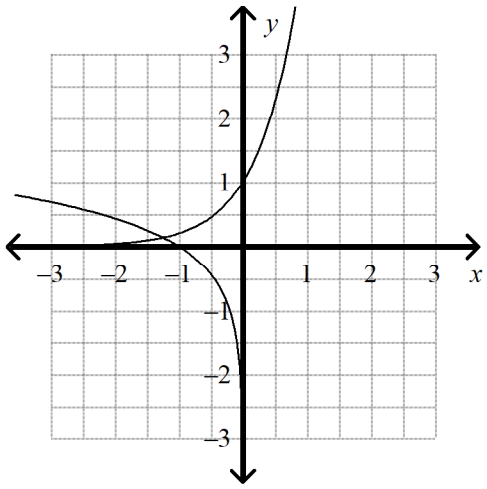
c.



b.



d.



____ 13. A construction explosion has an intensity I of 4.85×10^{-2} W/m^2. Find the loudness of the sound in decibels if $L = 10 \log \frac{I}{I_0}$ and $I_o = 10^{-12}$ W/m^2. Round to the nearest tenth.

a. 146.9 decibels
b. 115.8 decibels
c. 106.9 decibels
d. 48.5 decibels

Expand the logarithmic expression.

____ 14. $\log_3 11p^3$

a. $\log_3 11 \cdot 3 \log_3 p$
b. $\log_3 11 - 3 \log_3 p$
c. $\log_3 11 + 3 \log_3 p$
d. $11 \log_3 p^3$

____ 15. $\log_3 \frac{d}{12}$

a. $\log_3 d - \log_3 12$
c. $\frac{\log_3 d}{\log_3 12}$
b. $-d \log_3 12$
d. $\log_3 12 - \log_3 d$

Write the expression as a single natural logarithm.

____ 16. $3 \ln x - 2 \ln c$

a. $\ln \frac{x^3}{c^2}$
b. $\ln(x^3 + c^2)$
c. $\ln(x^3 - c^2)$
d. $\ln x^3 c^2$

Write the expression as a single logarithm.

____ 17. $3 \log_b q + 6 \log_b v$

a. $\log_b (q^3 v^6)$
c. $(3 + 6) \log_b (q + v)$
b. $\log_b (q v^{3+6})$
d. $\log_b (q^3 + v^6)$

____ 18. $\log_7 50 - \log_7 5$

a. $\log 45$
b. $\log_7 45$
c. $\log_7 10$
d. $\log 10$

____ 19. What is the value of $\log_{81} 3$?

a. 3
c. 4
b. $\frac{1}{4}$
d. $\frac{1}{3}$

____ 20. Use the Change of Base Formula to evaluate $\log_3 91$.

a. 4.106
c. 4.511
b. 1.959
d. 1.504

____ 21. Use the Change of Base Formula to evaluate $\log_7 40$.

a. 0.527
c. 3.689
b. 1.602
d. 1.896

Solve the logarithmic equation. Round to the nearest ten-thousandth if necessary.

____ 22. Solve $\log(4x + 10) = 3$.

a. $-\frac{7}{4}$ b. $\frac{495}{2}$ c. 250 d. 990

____ 23. Solve $\log 5x + \log 14 = 1$. Round to the nearest hundredth if necessary.

a. 28 b. 0.14 c. 3.57 d. 700

Solve the exponential equation.

____ 24. $4^{4x} = 8$

a. $\frac{3}{4}$ b. $\frac{8}{3}$ c. $\frac{3}{8}$ d. 2

____ 25. The sales of lawn mowers t years after a particular model is introduced is given by the function $y = 5500 \ln(9t + 4)$, where y is the number of mowers sold. How many mowers will be sold 4 years after a model is introduced? Round the answer to the nearest whole number.

a. 20,289 mowers
b. 41,709 mowers
c. 8,811 mowers
d. 19,713 mowers

Alg 2 Topic 6.1 to 6.6 Test Practice
Answer Section

1. ANS: A PTS: 1 DIF: L3
   REF: 6-1 Key Features of Exponential Functions
   OBJ: 6-1.1 Interpret key features of exponential functions represented by graphs, tables, and equations.
   NAT: HSA.SSE.A.1.b| HSA.CED.A.2| HSF.IF.C.7.e
   TOP: 6-1 Example 3 Model with Exponential Functions
   KEY: exponential growth | exponential function
2. ANS: B PTS: 1 DIF: L3
   REF: 6-1 Key Features of Exponential Functions
   OBJ: 6-1.1 Interpret key features of exponential functions represented by graphs, tables, and equations.
   NAT: HSA.SSE.A.1.b| HSA.CED.A.2| HSF.IF.C.7| HSF.IF.C.7.e| HSF.IF.C.8| HSF.BF.A.1| HSF.BF.A.1.b
   TOP: 6-1 Example 3 Model with Exponential Functions KEY: exponential function
3. ANS: B PTS: 1 DIF: L2
   REF: 6-1 Key Features of Exponential Functions
   OBJ: 6-1.2 Graph transformations of exponential functions showing intercepts and end behavior.
   NAT: HSA.SSE.A.1.b| HSA.CED.A.2| HSF.IF.C.7| HSF.IF.C.7.e| HSF.IF.C.8| HSF.BF.A.1| HSF.BF.A.1.b
   TOP: 6-1 Example 2 Graph Transformations of Exponential Functions
   KEY: exponential function
4. ANS: D PTS: 1 DIF: L3
   REF: 6-1 Key Features of Exponential Functions
   OBJ: 6-1.2 Graph transformations of exponential functions showing intercepts and end behavior.
   NAT: HSA.SSE.A.1.b| HSA.CED.A.2| HSF.IF.C.7| HSF.IF.C.7.e| HSF.IF.C.8| HSF.BF.A.1| HSF.BF.A.1.b
   TOP: 6-1 Example 2 Graph Transformations of Exponential Functions
   KEY: exponential function
5. ANS: C PTS: 1 DIF: L4 REF: 6-2 Exponential Models
   OBJ: 6-2.2 Interpret the parameters of an exponential function within the context of compound interest problems.
   NAT: HSA.SSE.A.1.b| HSA.CED.A.2| HSF.IF.C.7| HSF.IF.C.7.e| HSF.IF.C.8| HSF.BF.A.1| HSF.BF.A.1.b
   TOP: 6-2 Example 4 Find Continuously Compounded Interest
   KEY: compare properties of two functions | continuously compounded interest
6. ANS: D PTS: 1 DIF: L2 REF: 6-2 Exponential Models
   OBJ: 6-2.2 Interpret the parameters of an exponential function within the context of compound interest problems.
   NAT: HSA.SSE.A.1.b| HSA.CED.A.2| HSF.IF.C.7| HSF.IF.C.7.e| HSF.IF.C.8| HSF.BF.A.1| HSF.BF.A.1.b
   TOP: 6-2 Example 4 Find Continuously Compounded Interest KEY: continuously compounded interest
7. ANS: B PTS: 1 DIF: L2 REF: 6-3 Logarithms
   OBJ: 6-3.1 Understand the inverse relationship between exponents and logarithms.
   NAT: HSA.SSE.A.1.b| HSF.IF.C.7.e| HSF.IF.C.8| HSF.IF.C.9| HSF.BF.B.4.a
   TOP: 6-3 Example 2 Convert Between Exponential and Logarithmic Forms
   KEY: write a function in different but equivalent forms
8. ANS: D PTS: 1 DIF: L4 REF: 6-3 Logarithms
   OBJ: 6-3.1 Understand the inverse relationship between exponents and logarithms.
   NAT: HSA.SSE.A.1.b| HSF.IF.C.7.e| HSF.IF.C.8| HSF.IF.C.9| HSF.BF.B.4.a
   TOP: 6-3 Example 2 Convert Between Exponential and Logarithmic Forms
   KEY: write a function in different but equivalent forms

9. ANS: C PTS: 1 DIF: L3 REF: 6-3 Logarithms
   OBJ: 6-3.3 Evaluate logarithms using technology.
   NAT: HSA.SSE.A.1.b| HSF.IF.C.7.e| HSF.IF.C.8| HSF.IF.C.9| HSF.BF.B.4.a
   TOP: 6-3 Example 3 Evaluate Logarithms KEY: logarithm
10. ANS: A PTS: 1 DIF: L2 REF: 6-3 Logarithms
    OBJ: 6-3.3 Evaluate logarithms using technology.
    NAT: HSA.SSE.A.1.b| HSF.IF.C.7.e| HSF.IF.C.8| HSF.IF.C.9| HSF.BF.B.4.a
    TOP: 6-3 Example 3 Evaluate Logarithms KEY: logarithm
11. ANS: D PTS: 1 DIF: L3 REF: 6-3 Logarithms
    OBJ: 6-3.3 Evaluate logarithms using technology.
    NAT: HSF.BF.B.4.A| HSF.BF.B.5(+)| HSF.LE.A.4
    TOP: 6-3 Example 5 Solve Equations With Logarithms KEY: natural logarithmic function
12. ANS: C PTS: 1 DIF: L4 REF: 6-4 Logarithmic Functions
    OBJ: 6-4.1 Graph logarithmic functions, and interpret their key features.
    NAT: HSA.SSE.A.1.b| HSF.IF.C.7.e| HSF.IF.C.8| HSF.IF.C.9| HSF.BF.B.4.a
    TOP: 6-4 Example 3 Inverses of Exponential and Logarithmic Functions
    KEY: compare properties of two functions| logarithmic function
13. ANS: C PTS: 1 DIF: L3 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.1 Use Properties of Logarithms to rewrite logarithmic expressions.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 4 Apply Properties of Logarithms
14. ANS: C PTS: 1 DIF: L3 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.1 Use Properties of Logarithms to rewrite logarithmic expressions.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 2 Expand Logarithmic Expressions
15. ANS: A PTS: 1 DIF: L2 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.1 Use Properties of Logarithms to rewrite logarithmic expressions.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 2 Expand Logarithmic Expressions
16. ANS: A PTS: 1 DIF: L3 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.1 Use Properties of Logarithms to rewrite logarithmic expressions.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 3 Write Expressions as Single Logarithms KEY: natural logarithmic function
17. ANS: A PTS: 1 DIF: L3 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.1 Use Properties of Logarithms to rewrite logarithmic expressions.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 3 Write Expressions as Single Logarithms
18. ANS: C PTS: 1 DIF: L2 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.1 Use Properties of Logarithms to rewrite logarithmic expressions.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 3 Write Expressions as Single Logarithms
19. ANS: B PTS: 1 DIF: L2 REF: 6-5 Properties of Logarithms
    OBJ: 6-5.2 Use the Change of Base Formula to evaluate logarithmic expressions and solve equations.
    NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
    TOP: 6-5 Example 6 Use the Change of Base Formula KEY: Change of Base Formula

20. ANS: A PTS: 1 DIF: L2 REF: 6-5 Properties of Logarithms
OBJ: 6-5.2 Use the Change of Base Formula to evaluate logarithmic expressions and solve equations.
NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
TOP: 6-5 Example 6 Use the Change of Base Formula KEY: Change of Base Formula

21. ANS: D PTS: 1 DIF: L3 REF: 6-5 Properties of Logarithms
OBJ: 6-5.2 Use the Change of Base Formula to evaluate logarithmic expressions and solve equations.
NAT: HSA.SSE.A.2| HSA.REI.A.1| HSF.LE.A.4
TOP: 6-5 Example 6 Use the Change of Base Formula KEY: Change of Base Formula

22. ANS: B PTS: 1 DIF: L3
REF: 6-6 Exponential and Logarithmic Equations
OBJ: 6-6.2 Solve exponential and logarithmic equations. NAT: HSA.REI.A.11
TOP: 6-6 Example 5 Solve Logarithmic Equations KEY: logarithmic equation

23. ANS: B PTS: 1 DIF: L3
REF: 6-6 Exponential and Logarithmic Equations
OBJ: 6-6.2 Solve exponential and logarithmic equations. NAT: HSA.REI.A.11
TOP: 6-6 Example 5 Solve Logarithmic Equations KEY: logarithmic equation

24. ANS: C PTS: 1 DIF: L2
REF: 6-6 Exponential and Logarithmic Equations
OBJ: 6-6.2 Solve exponential and logarithmic equations. NAT: HSA.REI.A.11
TOP: 6-6 Example 1 Solve Exponential Equations Using a Common Base
KEY: exponential equation

25. ANS: A PTS: 1 DIF: L3
REF: 6-6 Exponential and Logarithmic Equations
OBJ: 6-6.2 Solve exponential and logarithmic equations.
NAT: HSA.SSE.A.2| HSA.CED.A.1| HSA.REI.A.1| HSF.LE.A.4
TOP: 6-6 Example 5 Solve Logarithmic Equations KEY: natural logarithmic function