MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Find the accumulated value of an investment of $5000 at 7% ***compounded continuously*** for 6 years.

A) $7709.81 B) $7609.81 C) $7503.65 D) $7100.00

2) Find the accumulated value of an investment of $900 at 12% ***compounded quarterly*** for 2 years.

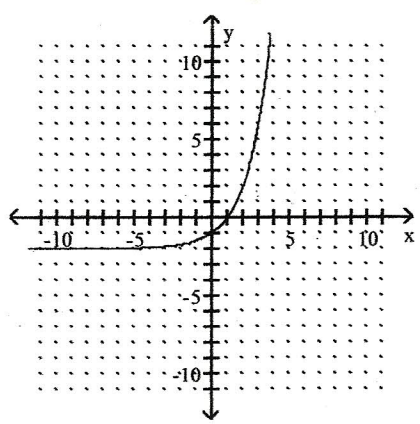
A) $954.81 B) $1128.96 C) $1140.09 D) $1116.00

3) Write the equivalent logarithm form of the equation.

$\sqrt[3]{125} = 5$

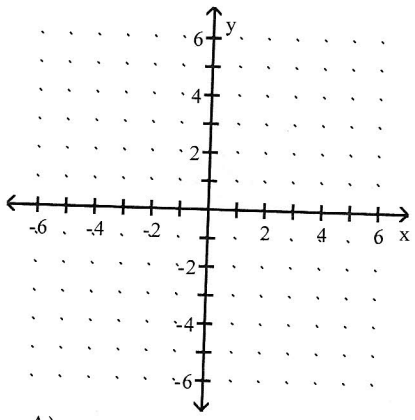
A) $\log_{125} 3 = \frac{1}{5}$ B) $\log_5 125 = \frac{1}{3}$ C) $\log_{125} 5 = \frac{1}{3}$ D) $\log_5 125 = 3$

4) The graph of a function is given. Match the function to the graph.

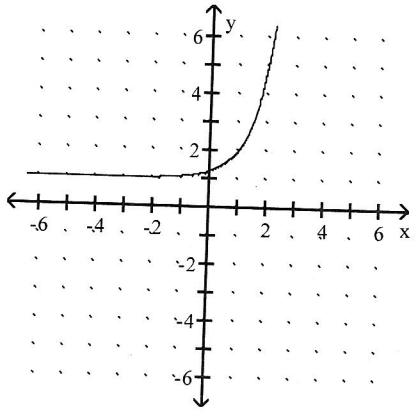


A) $f(x) = 2^x$ B) $f(x) = 2^x - 2$ C) $f(x) = 2^{x-2}$ D) $f(x) = 2^x + 2$

5) Use the graph of $f(x) = 4^x$ to obtain the graph of $g(x) = 4^{x+1} - 1$.



A)



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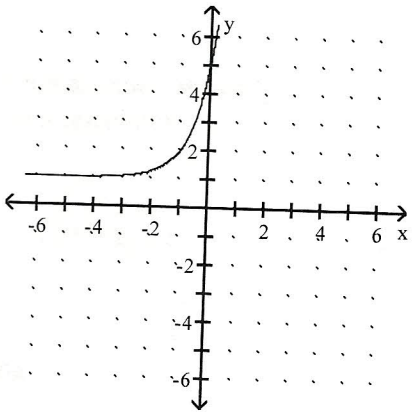

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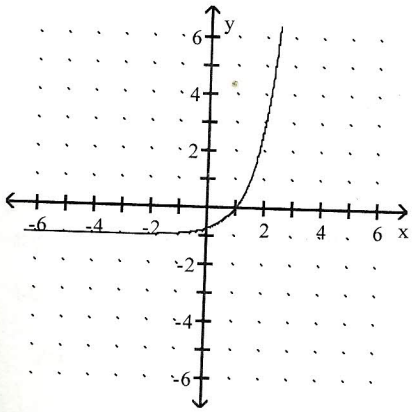
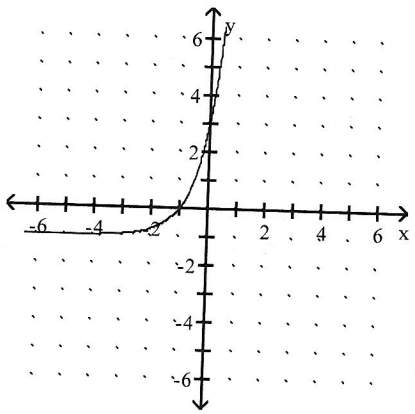


D)

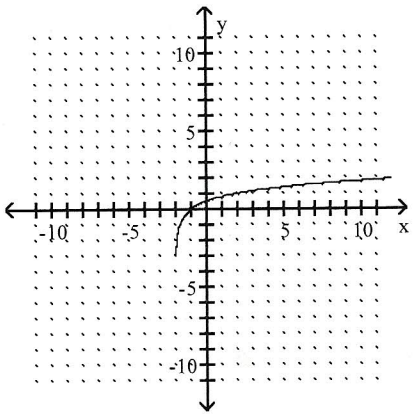


6) Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

$\log_3 (2 \cdot 11)$

A) $\log_3 2 - \log_3 11$ B) $\log_3 2 + \log_3 11$ C) $\log_3 22$ D) $(\log_3 2)(\log_3 11)$

7) The graph of a logarithmic function is given. Select the function for the graph from the options.



A) $f(x) = \log_4 x$ B) $f(x) = \log_4 x + 2$ C) $f(x) = \log_4 (x - 2)$ D) $f(x) = \log_4 (x + 2)$

8) Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

$\log_b (yz^6)$

A) $\log_b y + \log_b 6z$ B) $6 \log_b y + 6 \log_b z$ C) $6 \log_b yz$ D) $\log_b y + 6 \log_b z$

9) Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

$$\log_2 \left(\frac{x^2}{y^6} \right)$$

A) $2 \log_2 x - 6 \log_2 y$ B) $2 \log_2 x + 6 \log_2 y$ C) $\frac{1}{3} \log_2 (\frac{x}{y})$ D) $6 \log_2 y - 2 \log_2 x$

10) Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

$\log_c x + \log_c y$

A) $\log_c x \cdot \log_c y$ B) $\log_c (xy)$ C) $\log_c (x + y)$ D) $\log_c (\frac{x}{y})$

11) Solve the following exponential equation by expressing each side as a power of the same base and then equating exponents.

$$2^{(7 - 3x)} = \frac{1}{4}$$

A) {3} B) $\left\{ \frac{1}{2} \right\}$ C) {1} D) {-3}

12) Solve the following exponential equation by expressing each side as a power of the same base and then equating exponents.

$25^x = \frac{1}{\sqrt{5}}$

A) $\left\{\frac{1}{4}\right\}$ B) $\left\{-\frac{1}{4}\right\}$ C) $\left\{-\frac{1}{2}\right\}$ D) {-2}

13) Solve the equation using natural logarithms and express your answer in terms of natural logarithms.

$4^{x+7} = 5$

A) $\left\{\frac{\ln 5}{\ln 4} - 7\right\}$ B) $\left\{\frac{\ln 4}{\ln 5} + 7\right\}$ C) $\left\{\frac{\ln 4}{\ln 5} + \ln 7\right\}$ D) {ln 5 - ln 4 - ln 7}

14) Solve the equation using natural logarithms, then express your answer as a decimal rounded to two places.

$e^x = 3.7$

A) 0.57 B) 10.06 C) 40.54 D) 1.31

15) Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log_5 (x + 2) = -3$

A) $\left\{-\frac{249}{125}\right\}$ B) $\left\{\frac{251}{125}\right\}$ C) $\left\{-\frac{83}{81}\right\}$ D) $\left\{\frac{251}{243}\right\}$

16) Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log_3 (x - 2) + \log_3 (x - 8) = 3$

A) {-1} B) {11, -1} C) {11} D) {12}

17) Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log 4x = \log 5 + \log (x - 3)$

A) $\left\{-\frac{5}{3}\right\}$ B) $\left\{\frac{2}{3}\right\}$ C) {-15} D) {15}

18) Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log (3 + x) - \log (x - 5) = \log 5$

A) $\left\{\frac{7}{2}\right\}$ B) {7} C) {-7} D) ∅

19) Solve the exponential equation and express answer in terms of natural logarithm.

$4^{x+4} = 5^{2x+5}$

A) $\left\{\frac{5 \ln 5 - 4 \ln 4}{\ln 4 - 2 \ln 5}\right\}$ B) $\left\{\ln\left[\frac{5^5}{4^4} - \frac{4}{5^2}\right]\right\}$ C) {ln 5 - ln 4} D) {7 ln 5 - 5 ln 4}

20) Rewrite the equation in terms of base e. Express the answer in terms of a natural logarithm, and then round to three decimal places.

$y = 4(9)^x$

A) $y = 9e^{x \ln 4}$, $y = 9e^{1.386x}$
B) $y = 4e^{x \ln 9}$, $y = 4e^{2.197x}$
C) $y = 4e^{9x}$, $y = 42.718^{2.197x}$
D) $y = (\ln 4)e^{x \ln 9}$, $y = 1.386e^{2.197x}$

21) Solve the problem.

The half-life of silicon-32 is 710 years. If 60 grams is present now, how much will be present in 800 years? (Round your answer to three decimal places.)

A) 0.024 B) 55.492 C) 27.477 D) 0

22) Solve the problem.

A fossilized leaf contains 13% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half-life of carbon 14.

A) 1123 B) 16,453 C) 20,685 D) 36,015

23) Solve the problem.

An endangered species of fish has a population that is decreasing exponentially ($A = A_0e^{kt}$). The population 5 years ago was 1800. Today, only 800 of the fish are alive. Once the population drops below 100, the situation will be irreversible. When will this happen, according to the model? (Round to the nearest whole year.)

A) 12 years from today
B) 14 years from today
C) 13 years from today
D) 15 years from today

24) Solve the problem.

The logistic growth function $f(t) = \frac{640}{1 + 5.4e^{-0.2t}}$ describes the population of a species of butterflies t months after they are introduced to a non-threatening habitat. How many butterflies were initially introduced to the habitat?

A) 100 butterflies B) 640 butterflies C) 5 butterflies D) 2 butterflies

25) Solve the equation and write exact answer.

$\log_2 x = 5$

A) {25} B) {32} C) {64} D) {10}