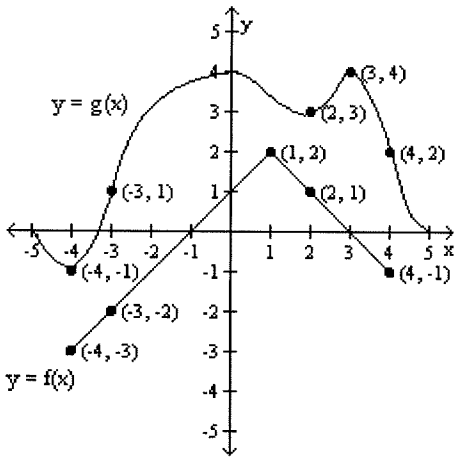
Review #3
Name_____

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

Evaluate the expression using the values given in the table.

1) 1) _____



f(g(−3))

A) 1 B) 0 C) 2 D) −3

For the given functions f and g, find the requested composite function value.

2) $f(x) = 4x + 2$, $g(x) = 4x^2 + 1$; Find $(f \circ f)(3)$. 2) _____

A) 150 B) 58 C) 785 D) 5477

For the given functions f and g, find the requested composite function.

3) $f(x) = 6x + 11$, $g(x) = 2x - 1$; Find $(f \circ g)(x)$. 3) _____

A) $12x + 17$ B) $12x + 21$ C) $12x + 10$ D) $12x + 5$

Find the domain of the composite function $f \circ g$.

4) $f(x) = 4x + 4$; $g(x) = x + 5$ 4) _____

A) $\{x \mid x \neq -6\}$ B) $\{x \mid x \neq 6\}$

C) $\{x \mid x \text{ is any real number}\}$ D) $\{x \mid x \neq -5, x \neq -1\}$

5) $f(x) = \dfrac{x}{x+6}$; $g(x) = \dfrac{6}{x+1}$ 5) _____

A) $\{x \mid x \text{ is any real number}\}$ B) $\{x \mid x \neq -1, x \neq -2\}$

C) $\{x \mid x \neq -1, x \neq -6\}$ D) $\{x \mid x \neq 0, x \neq -1, x \neq -2\}$

6) $f(x) = \sqrt{x-2}$; $g(x) = \dfrac{2}{x-10}$ 6) _____

A) $\{x \mid x \neq 10, x \neq 2\}$ B) $\{x \mid x \text{ is any real number}\}$

C) $\{x \mid x \geq 2, x \neq 10\}$ D) $\{x \mid 10 < x \leq 11\}$

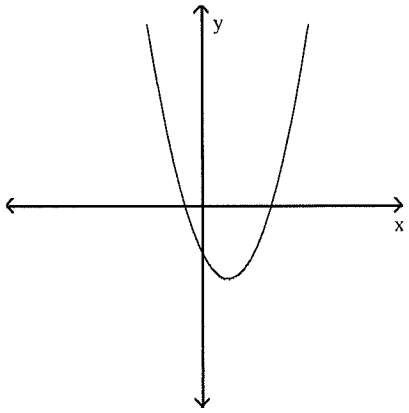
Indicate whether the function is one-to-one.

7) {(−7, 11), (−14, 11), (−16, 14)} 7) _____

A) Yes B) No

Use the horizontal line test to determine whether the function is one-to-one.

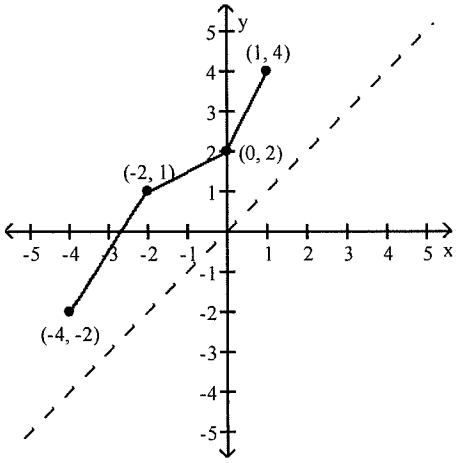
8) 8) _____



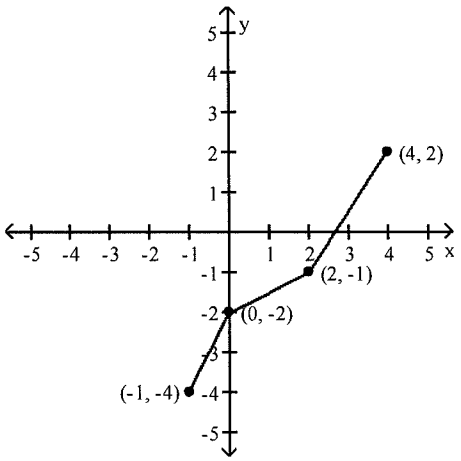
A) Yes B) No

The graph of a one-to-one function is given. Draw the graph of the inverse function f^{-1}. For convenience, the graph of y = x is also give.

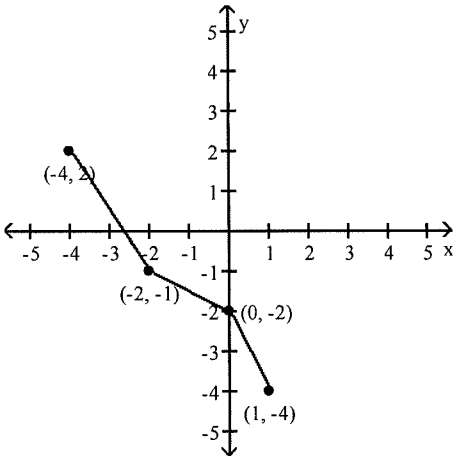
9) 9) _____



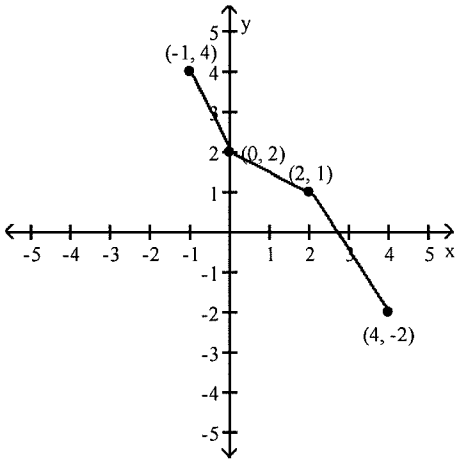
A)



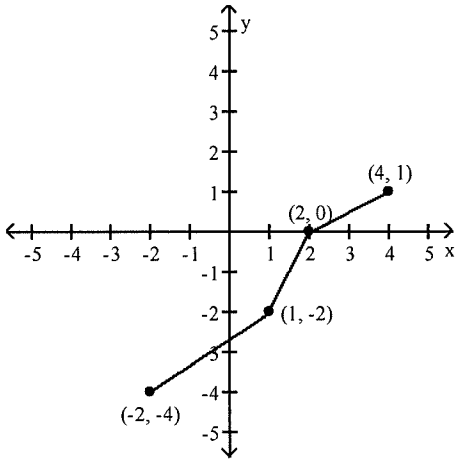
B)



C)



D)



The function f is one-to-one. Find its inverse.

10) $f(x) = 7x + 8$ 10) _____

A) $f^{-1}(x) = \frac{x - 8}{7}$ B) $f^{-1}(x) = \frac{x + 8}{7}$ C) $f^{-1}(x) = -\frac{x + 7}{8}$ D) $f(x) = \frac{x - 8}{7}$

11) $f(x) = \frac{8}{x}$ 11) _____

A) $f^{-1}(x) = 8x$ B) $f^{-1}(x) = \frac{x}{8}$ C) $f^{-1}(x) = \frac{8}{x}$ D) $f^{-1}(x) = -8x$

12) $f(x) = \frac{4}{3x + 5}$ 12) _____

A) $f^{-1}(x) = \frac{5}{3} - \frac{4}{3x}$ B) $f^{-1}(x) = \frac{4}{3x} - \frac{5}{3}$

C) $f^{-1}(x) = \frac{3x + 5}{4}$ D) $f^{-1}(x) = \frac{4}{3y} - \frac{5}{3}$

Find the inverse function of f. State the domain and range of f.

13) $f(x) = \frac{3x - 2}{x + 5}$ 13) _____

A) $f^{-1}(x) = \frac{5x + 2}{3 - x}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq 3\}$

B) $f^{-1}(x) = \frac{5x + 2}{3 + x}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq -3\}$

C) $f^{-1}(x) = \frac{3x + 2}{x - 5}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq 5\}$

D) $f^{-1}(x) = \frac{x + 5}{3x - 2}$; domain of f: $\{x \mid x \neq -5\}$; range of f: $\{y \mid y \neq \frac{2}{3}\}$

Determine whether the given function is exponential or not. If it is exponential, identify the value of the base a.

14) _____ 14) _____

x	H(x)
-1	$\frac{9}{2}$
0	1
1	$\frac{2}{9}$
2	$\frac{4}{81}$
3	$\frac{8}{729}$

A) Exponential; $a = \frac{9}{2}$

B) Exponential; $a = 2$

C) Exponential; $a = \frac{2}{9}$

D) Not exponential

Solve the problem.

15) The function $f(x) = 700(0.5)^{x/70}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. Find the amount of radioactive material in the vault after 50 years. Round to the nearest whole number. 15) _____

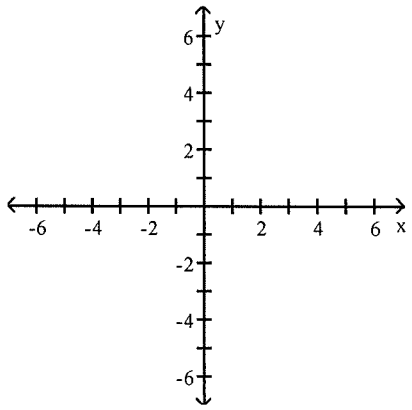
A) 250 pounds B) 490 pounds C) 265 pounds D) 427 pounds

16) If $3^x = 6$, what does 3^{-2x} equal? 16) _____

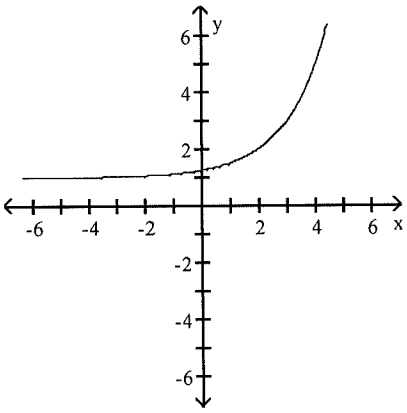
A) $\frac{1}{36}$ B) $\frac{1}{12}$ C) 36 D) -36

Graph the function.

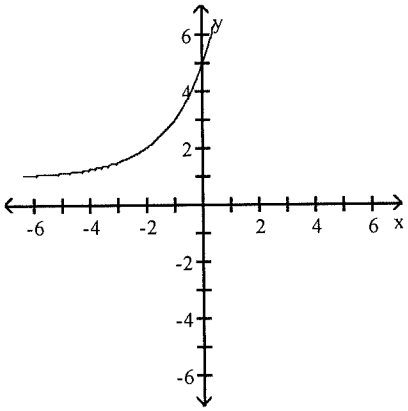
17) $f(x) = 2^{(x+2)} - 1$ 17) _____



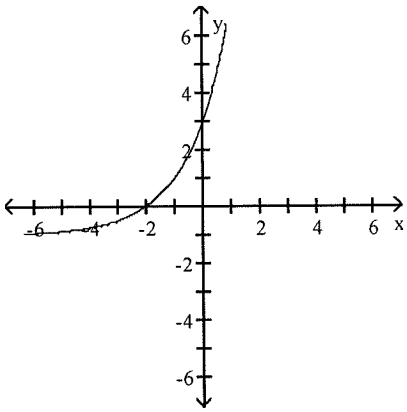
A)



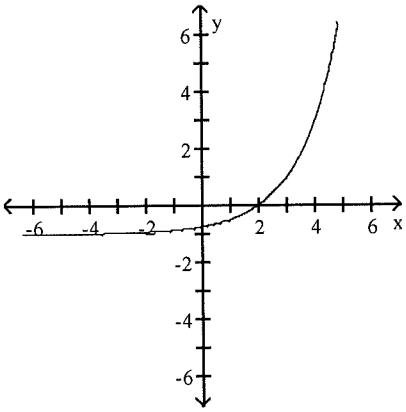
B)



C)



D)



Solve the equation.

18) $2^{1 + 2x} = 8$ 18) _____

A) {2} B) {4} C) {1} D) {−1}

19) $3^x = \frac{1}{81}$ 19) _____

A) {4} B) $\left\{\frac{1}{4}\right\}$ C) $\left\{\frac{1}{27}\right\}$ D) {−4}

20) $9^{2x} \cdot 27^{(3 - x)} = \frac{1}{9}$ 20) _____

A) {−11} B) {−8}

C) {10} D) $\left\{\frac{9 + \sqrt{87}}{6}, \frac{9 - \sqrt{87}}{6}\right\}$

21) $27^{3x + 2} = 9^{2x}$ 21) _____

A) $\left\{-\frac{6}{5}\right\}$ B) $\left\{\frac{5}{6}\right\}$ C) $\left\{-\frac{5}{6}\right\}$ D) $\left\{\frac{6}{5}\right\}$

22) $e^{2x-1} = (e^3)^{-x}$ 22) _____

A) $\left\{\frac{1}{5}\right\}$ B) $\{0\}$ C) $\{-1\}$ D) $\left\{\frac{4}{3}\right\}$

Change the exponential expression to an equivalent expression involving a logarithm.

23) $4^{5/2} = 32$ 23) _____

A) $\log_4 32 = \frac{5}{2}$ B) $\log_5 4 = \frac{5}{2}$ C) $\frac{\log_2 32}{\log_5 4} = 4$ D) $\log_{32} 4 = \frac{5}{2}$

Find the exact value of the logarithmic expression.

24) $\log_7 \frac{1}{49}$ 24) _____

A) 7 B) −2 C) 2 D) −7

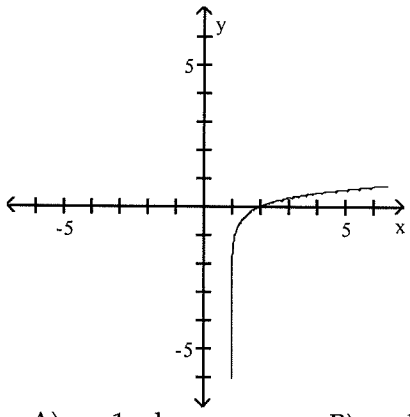
Find the domain of the function.

25) $f(x) = \ln(2 - x)$ 25) _____

A) $(-\infty, -2)$ B) $(-2, \infty)$ C) $(-\infty, 2)$ D) $(2, \infty)$

The graph of a logarithmic function is shown. Select the function which matches the graph.

26) 26) _____



A) $y = 1 - \log x$ B) $y = \log(1 - x)$ C) $y = \log(x - 1)$ D) $y = \log x - 1$

Solve the equation.

27) $\log_3 x = 2$ 27) _____

A) $\{8\}$ B) $\{5\}$ C) $\{9\}$ D) $\{6\}$

28) $\log_2 (x + 4) = 3$ 28) _____

A) $\{13\}$ B) $\{5\}$ C) $\{4\}$ D) $\{12\}$

29) $\log_6 (x^2 - x) = 1$ 29) _____

A) $\{2, 3\}$ B) $\{1, 6\}$ C) $\{-2, 3\}$ D) $\{-2, -3\}$

30) $8 + 5 \ln x = 15$ 30) _____

A) $\left\{\ln\left(\frac{7}{5}\right)\right\}$ B) $\{e^{7/5}\}$ C) $\left\{\frac{7}{5 \ln 1}\right\}$ D) $\left\{\frac{e^7}{5}\right\}$

Use the properties of logarithms to find the exact value of the expression. Do not use a calculator.

31) $\ln e^{\sqrt{2}}$ 31) _____

A) e B) 2 C) $\sqrt{2}$ D) 4

32) $\log_5 14 \cdot \log_{14} 125$ 32) _____

A) 14 B) 125 C) 5 D) 3

33) $10^{\log 10 - \log 2}$ 33) _____

A) 100,000 B) log 8 C) 5 D) 10

Write as the sum and/or difference of logarithms. Express powers as factors.

34) $\log_2 \frac{17\sqrt{m}}{n}$ 34) _____

A) $\log_2 n - \log_2 17 - \frac{1}{2} \log_2 m$

B) $\log_2 17 \cdot \frac{1}{2} \log_2 m \div \log_2 n$

C) $\log_2 (17\sqrt{m}) - \log_2 n$

D) $\log_2 17 + \frac{1}{2} \log_2 m - \log_2 n$

35) $\log_{19} \frac{\sqrt[7]{20}}{y^2 x}$ 35) _____

A) $\frac{1}{7} \log_{19} 20 - 2 \log_{19} y - \log_{19} x$

B) $\log_{19} 20 - \log_{19} y - \log_{19} x$

C) $\frac{1}{7} \log_{19} 20 - 2 \log_{19} y - 2 \log_{19} x$

D) $7 \log_{19} 20 - 2 \log_{19} y - \log_{19} 7$

Express as a single logarithm.

36) $6\ln (x - 3) - 5 \ln x$ 36) _____

A) $\ln x^5(x - 3)^6$ B) $\ln \frac{6(x - 3)}{5x}$ C) $\ln \frac{(x - 3)^6}{x^5}$ D) $\ln 30x(x - 3)$

37) $\frac{1}{2}(\log_3 (x - 5) - \log_3 x)$ 37) _____

A) $\log_3 \frac{\sqrt{x - 5}}{x}$ B) $\log_3 \frac{x - 5}{\sqrt{x}}$ C) $\log_3 \sqrt{\frac{x - 5}{2x}}$ D) $\log_3 \sqrt{\frac{x - 5}{x}}$

Solve the equation.

38) $\log_4 (x + 1) = 3$ 38) _____

A) {65} B) {80} C) {82} D) {63}

39) $\log (x + 5) = \log (5x - 3)$ 39) _____

A) {2} B) $\left\{\frac{2}{2}\right\}$ C) {−2} D) $\left\{\frac{4}{3}\right\}$

40) $\log(5 + x) - \log(x - 3) = \log 5$ 40) _____

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

41) $\log_3(x + 1) + \log_3(x - 5) = 3$ 41) _____

A) $\{-4\}$ B) $\{8, -4\}$ C) $\{8\}$ D) $\{9\}$

Find the amount that results from the investment.

42) $14,000 invested at 12% compounded semiannually after a period of 9 years 42) _____

A) $37,698.82 B) $38,823.10 C) $39,960.75 D) $25,960.75

Solve the problem.

43) If Emery has $1800 to invest at 9% per year compounded monthly, how long will it be before he has $3000? If the compounding is continuous, how long will it be? (Round your answers to three decimal places.) 43) _____

A) 69.897 yr, 5.898 yr B) 5.697 yr, 5.676 yr

C) 2.916 yr, 0.568 yr D) 0.494 yr, 0.473 yr

Find the effective rate of interest.

44) 14% compounded continuously 44) _____

A) 14.451% B) 14.089% C) 15.027% D) 14.374%

Solve the problem.

45) What principal invested at 6%, compounded continuously for 3 years, will yield $1500? Round the answer to two decimal places. 45) _____

A) $1252.91 B) $1522.91 C) $837.25 D) $651.45

Solve the problem. Round your answer to three decimals.

46) How long will it take for an investment to double in value if it earns 4.25% compounded continuously? 46) _____

A) 16.309 yr B) 25.85 yr C) 8.155 yr D) 17.715 yr

Solve the problem.

47) How long does it take $1125 to triple if it is invested at 7% interest, compounded quarterly? Round your answer to the nearest tenth. 47) _____

A) 15.8 mo B) 18.1 mo C) 15.8 yr D) 18.1 yr

48) The size P of a small herbivore population at time t (in years) obeys the function $P(t) = 700e^{0.24t}$ if they have enough food and the predator population stays constant. After how many years will the population reach 3500? 48) _____

A) 10.87 yr B) 33.07 yr C) 13.88 yr D) 6.71 yr

49) The half-life of silicon-32 is 710 years. If 70 grams is present now, how much will be present in 400 years? (Round your answer to three decimal places.) 49) _____

A) 1.41 B) 67.319 C) 47.37 D) 0

50) The function $A = A_0e^{-0.01155x}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 800 pounds of the material are initially put into the vault, how many pounds will be left after 180 years? 50) _____

A) 133 lb B) 100 lb C) 1200 lb D) 635 lb

Answer Key
Testname: UNTITLED1

1) C
2) B
3) D
4) C
5) B
6) D
7) B
8) B
9) D
10) A
11) C
12) B
13) A
14) C
15) D
16) A
17) C
18) C
19) D
20) A
21) A
22) A
23) A
24) B
25) C
26) C
27) C
28) C
29) C
30) B
31) C
32) D
33) C
34) D
35) A
36) C
37) D
38) D
39) A
40) C
41) C
42) C
43) B
44) C
45) A
46) A
47) C
48) D
49) C

50) B