

Name _____

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

Solve the equation.

- 1) $36^x = 6$ 1) _____
 A) $\left\{\frac{1}{2}\right\}$ B) $\{-2\}$ C) $\{2\}$ D) $\left\{-\frac{1}{2}\right\}$

Solve the problem.

- 2) The growth in population of a city can be seen using the formula $p(t) = 4055e^{0.002t}$, where t is the number of years since 1933. Use this formula to calculate the population in 1943. 2) _____
 A) 12,411 B) 4137 C) 4220 D) 8274

Decide whether the given functions are inverses.

- 3) $f = \{(-1, -5), (0, 3), (3, -1), (7, 9)\}$ 3) _____
 $g = \{(-5, -1), (3, 0), (-1, 3), (9, 7)\}$
 A) Yes B) No

Write in logarithmic form.

- 4) $3^{-3} = \frac{1}{27}$ 4) _____
 A) $\log_{-3} \frac{1}{27} = 3$ B) $\log_3 \frac{1}{27} = -3$ C) $\log_{1/27} 3 = -3$ D) $\log_3 -3 = \frac{1}{27}$

Solve the problem.

- 5) Use the formula $D = 10.0 \log (S/S_0)$, where the loudness of a sound in decibels is determined by S , the number of watt/m² produced by the soundwave, and $S_0 = 1.00 \times 10^{-12}$ watt/m². 5) _____
 What is the intensity in watt/m² of a noise measured at 48 decibels? (Round to the nearest tenth.)
 A) 4.8×10^{-10} watt/m² B) 1.2×10^{14} watt/m²
 C) 6.3×10^{-8} watt/m² D) 6.3×10^{-7} watt/m²

Use a calculator to find the logarithm. Give an approximation to four decimal places.

- 6) $\log 0.00516$ 6) _____
 A) -2.2790 B) -5.2668 C) -2.2874 D) -2.2958

Find the future value.

- 7) \$5481 invested for 4 years at 4% compounded annually 7) _____
 A) \$6430.30 B) \$6421.87 C) \$6426.90 D) \$6411.99

Find the function value. If the result is irrational, round your answer to the nearest thousandth.

- 8) Let $f(x) = 2^x$. Find $f(5)$ 8) _____
 A) 25 B) 64 C) 32 D) 10

Solve the problem.

- 9) The hydrogen potential, pH, of a substance is defined by $\text{pH} = -\log [\text{H}^+]$, where $[\text{H}^+]$ is measured in moles per liter. Find the pH of a sample of lake water whose $[\text{H}^+]$ is 3.05×10^{-9} moles per liter. (Round to the nearest tenth.) 9) _____
- A) 10.1 B) 6.4 C) 7.3 D) 8.5

Write the expression as a sum, difference, or product of logarithms. Assume that all variables represent positive real numbers.

- 10) $\log_2 \left(\frac{x^9 y^3}{2} \right)$ 10) _____
- A) $(\log_2 x)^9 + (\log_2 y)^3 - \log_2 2$
B) $9 \log_2 x + 3 \log_2 y + \log_2 2$
C) _____
D) $(9 \log_2 x)(3 \log_2 y) \div \log_2 2$
E) $9 \log_2 x + 3 \log_2 y - \log_2 2$

Solve the problem.

- 11) How long will it take for \$1300 to grow to \$2300 at an interest rate of 6.4% if the interest is compounded quarterly? Round the number of years to the nearest hundredth. 11) _____
- A) 9.20 B) 35.94 C) 8.99 D) 27.86
- 12) Suppose the number of Quickie hamburgers (in millions) served yearly from 1987 to 2000 can be modeled by $f(x) = 36.6e^{0.18x}$. In this formula $x = 0$ corresponds to 1987 and $x = 13$ corresponds to 2000. Approximate the year when the number served reached 90 million. 12) _____
- A) 1995 B) 5 C) 1992 D) -5

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

- 13) $\frac{3}{4} \log_a(p^2 q^8) - \frac{1}{2} \log_a(p^5 q^2)$ 13) _____
- A) $\log_a(p^4 q^7)$ B) $\log_a \left(\frac{q^5}{p} \right)$
C) $\log_a \left(\frac{3q^6}{2p^3} \right)$ D) $\log_a \left(\frac{3}{4} p^2 q^8 - \frac{1}{2} p^5 q^2 \right)$

Evaluate the logarithm.

- 14) $\log_{10} 0.001$ 14) _____
- A) 0 B) -1 C) 2 D) -3

If f is one-to-one, find an equation for its inverse.

- 15) $f(x) = 8x^2 - 9, x \geq 0$ 15) _____
- A) $f^{-1}(x) = \frac{8}{\sqrt{x+3}}$ B) $f^{-1}(x) = \sqrt{\frac{x+9}{8}}, x \geq -9$
C) $f^{-1}(x) = \sqrt{\frac{8}{x+3}}, x \neq -9$ D) Not a one-to-one function

Write an equivalent expression in exponential form.

16) $\log_{10} 10 = 1$

16) _____

A) $10^1 = 10$

B) $10^{10} = 1$

C) $10^1 = 10$

D) $1^{10} = 10$

Solve the equation. If necessary, round to the nearest thousandth.

17) $3^{x+7} = 7^x$

17) _____

A) {11.006}

B) {7.146}

C) {-9.076}

D) {9.076}

Solve the equation.

18) $\left(\frac{1}{4}\right)^x = 256$

18) _____

A) {-4}

B) $\left\{-\frac{1}{4}\right\}$

C) $\left\{\frac{1}{4}\right\}$

D) {4}

Provide an appropriate response.

19) Given that $f(x) = e^x - 1 + 3$, find $f^{-1}(x)$ and give the domain and range of $f^{-1}(x)$.

19) _____

A) $f^{-1}(x) = \ln(x - 3) + 1$, domain = $(0, \infty)$, range = $(0, \infty)$

B) $f^{-1}(x) = \ln(x - 3) + 1$, domain = $(3, \infty)$, range = $(-\infty, \infty)$

C) $f^{-1}(x) = \ln(x - 1) + 3$, domain = $(-\infty, \infty)$, range = $(-\infty, \infty)$

D) $f^{-1}(x) = \ln(x - 1) + 3$, domain = $(3, \infty)$, range = $(-\infty, \infty)$

Use a calculator to find the logarithm. Give an approximation to four decimal places.

20) $\ln 0.985$

20) _____

A) 0.0066

B) -0.0066

C) -0.0151

D) 0.0151

Evaluate the logarithm.

21) $\log_8 \frac{1}{64}$

21) _____

A) 8

B) 2

C) -2

D) -8

Solve the problem.

22) An earthquake had an intensity $10^{6.5}$ times more powerful than a reference level earthquake, or $10^{6.5} \cdot I_0$. What was the magnitude of this earthquake on the Richter scale? $R = \log_{10}(I/I_0)$.

22) _____

A) 3.5

B) 15

C) 16.5

D) 6.5

Solve the equation. If necessary, round to the nearest thousandth.

23) $16^{3-x} = 29$

23) _____

A) {1.79}

B) {3.82}

C) {1.19}

D) {-1.19}

Evaluate the logarithm.

24) $\log_7 \frac{1}{7}$

24) _____

A) -1

B) 0

C) 7

D) 1

Decide whether or not the functions are inverses of each other.

25) $f(x) = \frac{4+x}{x}$, $g(x) = \frac{4}{x-1}$

25) _____

A) Yes

B) No

Solve the equation.

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

26) _____

A) $\left\{\frac{23}{5}\right\}$

B) $\{129\}$

C) $\{\sqrt{129}\}$

D) $\{\frac{125}{3}\}$

If f is one-to-one, find an equation for its inverse.

27) $f(x) = (x+7)^2$

27) _____

A) $f^{-1}(x) = \sqrt{x-7}$

B) Not a one-to-one function

C) $f^{-1}(x) = \frac{1}{\sqrt{x-7}}$

D) $f^{-1}(x) = \sqrt{x} - 7$

Use the change of base rule to find the logarithm to four decimal places.

28) $\log_4 2$

28) _____

A) -0.5000

B) 2.0000

C) 0.5000

D) 1.0000

Answer Key

Testname: TEST # 4 REVIEW MATH 1314

- 1) A
- 2) B
- 3) A
- 4) B
- 5) C
- 6) C
- 7) D
- 8) C
- 9) D
- 10) E
- 11) C
- 12) C
- 13) B
- 14) D
- 15) B
- 16) A
- 17) D
- 18) A
- 19) B
- 20) C
- 21) C
- 22) D
- 23) A
- 24) A
- 25) A
- 26) C
- 27) B
- 28) C