Logarithms Assessment Practice Test

7.3.1: I can explain the relationship between logarithms and exponential functions and fluently translate between the two forms. 7.4.2 I can evaluate logarithms mentally and by using the Change of Base Theorem.

1. Write the equation in logarithmic form. \(2^5 = 32\)

2. Write the equation \(\log_{32} 8 = \frac{3}{5}\) in exponential form.

3. Evaluate \(\log_7 28\). Round your answer to the nearest thousandth.

4. Evaluate \(\log 10^\frac{9}{5}\).

7.5.1/7.6.1: I can solve for an unknown quantity using the definition of a logarithm.

5. What is the solution to \(4^x = 14\) rounded to the nearest hundredth?

6. Solve \(3 \log 2x = 4\). Round to the nearest ten-thousandth.

7. Solve for \(x\). You will need to rewrite this in logarithmic form.
\[e^x = \frac{3}{4}\]

8. \(125^{9x-2} = 150\)

9. Project managers of NASA have determined that an individual’s reaction time \(R\) can be calculated by the formula:
\[R = 0.17 + (0.44 \log N),\]
where \(N\) is the number of choices presented to the individual. Use the formula to determine how many choices would result in a reaction time of 0.80 seconds. Round your answer to the nearest whole number.
10. Solve for \( m \): \( \ln(m + 3) = -\frac{1}{2} \)

11. Solve for \( t \): \( \log_4 t^4 - 1 = -5 \). Round your answer to the nearest hundredth.

**Supplemental:** I can use formulas for common logarithms in real life applications, such as the Richter scale, the pH scale, and the decibel scale.

12. How much money invested at 5% compounded continuously for 3 years will yield $820? Hint: You are looking for “P.”

13. The pH of a liquid is a measure of how acidic or basic it is. The concentration of hydrogen ions in a liquid is labeled \([H^+]\). Use the formula \( \text{pH} = -\log[H^+] \) to answer questions about pH.

Find the pH level, to the nearest tenth, of a liquid with \([H^+] \) about \( 6.5 \times 10^{-3} \).

14. The pH of a juice drink is 2.6. Find the concentration of hydrogen ions in the drink.

**OA.5:** I can identify the translation and compression/reflection of an exponential function or a logarithmic function using Graph Translation Theorem

15. Graph \( y = \log_6 x \) on the coordinate plane. Label the coordinates of three distinct points on the graph.
16. Consider the function $h(x) = e^x$.
   a) What is the domain of $h$?

   b) What is the range of $h$?

   17. Which graph below is of the function $y = \log_2 x - 3$?
   a. 
   b. 
   c. 
   d.
18. Which graph below is of the function \( y = \log(x + 2) - 6 \)?

a. 

b. 

c. 

d.
19. Consider the function \( f(x) = \log_2 x \).

a) Identify the domain of \( f(x) \).

b) Write the equation that represents the inverse of this function.

c) Type II Writing: Is the inverse a function? Justify your answer, using a diagram, table, or definition to help.

d) Identify the domain of the inverse.

7.4.1 I can condense and expand logarithms using properties of logarithms.

Write the expression as a single logarithm.

20. \( 3 \log_b q + 6 \log_b v \)

21. \( \log_3 4 - \log_3 2 \)

Expand the logarithmic expression.

22. \( \log_3 \frac{d}{12} \)

23. \( \log_3 11p^3 \)
Logarithms Assessment Practice Test
Answer Section

1. \( \log_3 32 = 5 \)

2. \( 32^{\frac{3}{5}} = 8 \)
3. 1.712
4. \( \frac{9}{5} = 1.8 \)
5. 1.90
6. 10.7722
7. \(-0.288\)
8. 0.3375
9. 27 choices
10. \( m=-2.39 \)
11. \( t=1/4 \)
12. \$705.78
13. 2.2
14. \( 2.5 \times 10^{-3} \)
15. see graph
16. a) domain is all real numbers
   b) range is all positive real numbers
17. B
18. A
19. see work
20. \( \log_b (q^3 \cdot r^6) \)
21. \( \log_3 2 \)
22. \( \log_3 d - \log_3 12 \)
23. \( \log_3 11 + 3 \log_3 p \)