

Name: _____

1. Graph $y = 4^x$ and $y = \log_4 x$ by hand on the same set of axes. Make a t-table, plot the points and connect them with a smooth curves.

2. Consider the function $y = f(x) = 4^{-2x+8} - 5$. Put the equation into standard form

$(\pm \frac{x-h}{a} \text{ and } \pm \frac{y-k}{b} \text{ form})$, then specify the transformations (reflection, stretch, etc.)

used to transform $y = 4^x$ to the given function. Next, perform the transformations to obtain the graph of the given function. Finally, check your work with the graphing calculator.

3. Calculate the value of $\left(1 + \frac{1}{n}\right)^n$ for $n = 1, 10, 100, 1000, 10,000, 100,000, 1,000,000$. Write a sentence connecting the real number "e" with the expression $\left(1 + \frac{1}{n}\right)^n$.

4. Solve the two problems below to find which one yields the most money.

- Find the amount A if $P = \$3,000$ is invested at 5.40% interest for 6 years compounded monthly.
- Find the amount A if $P = \$3,000$ is invested at 5.36% interest for 6 years compounded continuously.

5. Given the logarithmic expression $y = \log_3 81$, write what it "means" in exponential form and find the value of y .
6. Simplify these to a number.
- a. $\log_8 8^{120}$
 - b. $e^{\ln 40}$
 - c. $\ln e^{10,000}$
7. Solve this logarithmic equation. $\log_6(x + 15) = \log_6(4x)$. Check your answer(s)
8. Evaluate $\ln 80 + \log 80$ with the calculator.

9. Consider the function $y = f(x) = 3 \log_4(x-2) + 5$. Put the equation into standard form

$(\pm \frac{x-h}{a} \text{ and } \pm \frac{y-k}{b} \text{ form})$, then specify the transformations (reflection, stretching,

to transform $y = \log_3 x$ to the given function. Next, perform the transformations to obtain the graph of the given function. Finally, check your work with the graphing calculator.

10. Rewrite (expand) this expression without using roots and exponents . $\log_4 \frac{16x^8}{5\sqrt{x+3}}$

Hint: End up with 3 logs.

11. Rewrite (contract) this expression to one logarithm. $\log_4 30 + \frac{3}{5} \log_4 (x+2) - 4 \log_4 (x-5)$

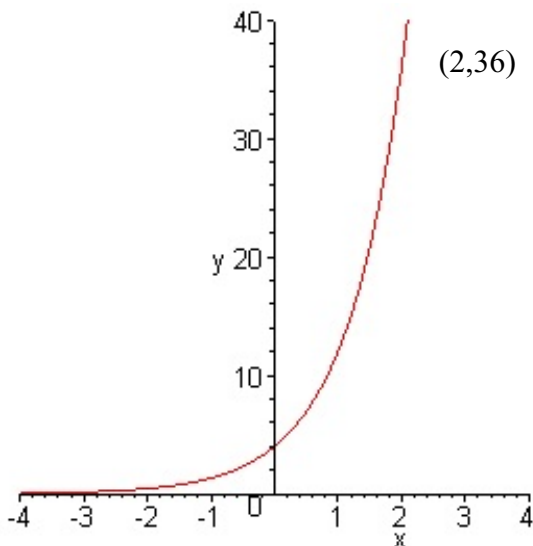
12. Solve this exponential equation by rewriting the bases as a power of 2. $4^{3x-1} = 32^{2x+10}$

13. Solve this exponential equation with different bases. $4^{2x+3} = 7^{x-2}$ Take the natural logarithm of both sides as your first step.

14. Find the value of $y = \log_5 888$ by converting it to natural logarithms and using the calculator.

15. Solve this logarithmic equation. $\log_2(x+12) + \log_2(x-2) = 5$. Be sure to check both answers!

16. Find the exponential function of the form $y = f(x) = C a^x$ whose graph is given below. (The graph passes through the points $(0,4)$ and $(2,36)$.)



17. In an environment with abundant resources, a population $P(t)$ of rabbits is given by the formula $P(t) = 400 \cdot 2^{1.8t}$, where t is time in years.
- Find the initial number of rabbits.
 - Find the number of rabbits in three years.
 - Solve the equation above for t .
 - Find the time when the rabbit population is 2000.

18. Suppose the amount $A(t)$ (in grams) of a certain radioactive substance is given by $A(t) = 30e^{-0.06t}$, where t is given in years.
- a) Find the initial amount A .
 - b) Find the amount left after 10 years.
 - c) Solve the given equation for t .
 - d) Find the time when the amount is half of the original. (This time is called the half life of the substance.