

Name: _____

Date: _____

Logarithm Practice

Do Now:

Write the equation in logarithmic form.

1) $\frac{1^{-7}}{2} = d$

Write the equation in exponential form,

2) $\ln 15 = x$

Evaluate each expression. If an equation, solve for x .

3) $\log_2 32 - 10 \log 10$

4) $\log(4x) = 2$

5) $e^{\ln 9x} - \log_6 1 + \log(\ln e^{\frac{1}{100}})$

6) $\log_8(2x + 100) = 3$

Describe how each function is transforming from its parent function.

7) $g(x) = \ln(x - 7) + 10$

8) $h(x) = -\ln(x + 1)$

Completely condense the following logarithm.

9) $\frac{1}{2} \log x + 3 \log y - 5 \log z$

Completely expand the following logarithm.

10) $\ln \sqrt[3]{\frac{4a^2}{b^4}}$

For odd numbered questions, completely expand each of the following logarithmic expressions.

For even numbered questions, simplify each expression into one logarithm.

1) $\log 4x$

2) $\ln d - 4 \ln f$

3) $\log_c \frac{a^b}{c}$

4) $\log_4 2.5 + \log_4 25.6$

5) $\ln \left(\frac{2x}{y^2}\right)^2$

6) $2 \left(\log x + \frac{1}{3} \log y\right)$

7) $\log(10x^7)^2$

8) $\frac{1}{2} \log_x y - \frac{1}{3} \log_x z$

9) $\log_t r^2 \sqrt[3]{t}$

10) $\frac{1}{3} \log(a) - 2 \left(\log b + \frac{1}{7} \log c\right)$

11) $\log(2^5 \sqrt{xy^2})$

12) $\frac{1}{5} [\ln(x-2) + 2 \ln(x)] - 3 \ln(x+7)$

13) $\log \left(\frac{x^2-64}{x-8}\right)$

Evaluate the following without using a calculator.

$$14) x \ln e^7 + \log_2 \frac{1}{8} - 2 \log 10000$$

$$15) \log[\log_6(\ln e^6)]$$

$$16) 10^{\log y} + \log_{64} 2 - y \ln e + \log_{729} 3$$

$$17) \log_7(\ln(\log 10^e))$$

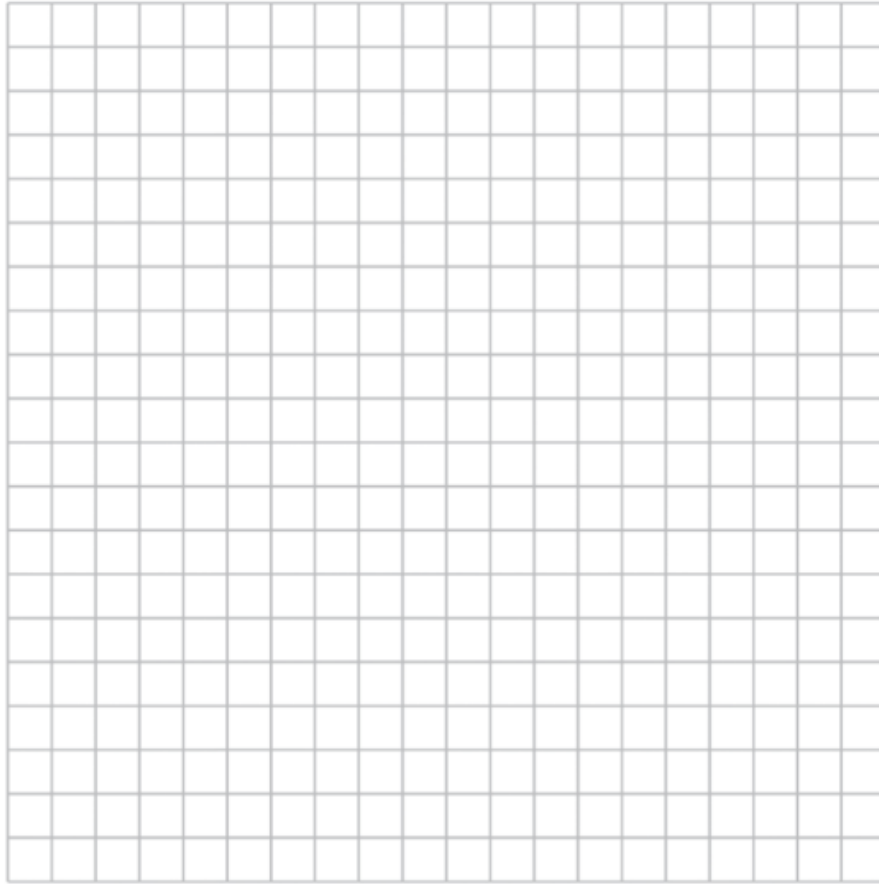
18) If the graph of $y = e^{4x-10}$ is reflected across the line $y = x$, what is the equation of the resulting curve?

Find the solution to each logarithmic equation.

$$19) \log(4x - 24) = 2$$

$$20) \log_3(2x - 127) = 5$$

21) Find the inverse of $y = \left(\frac{1}{2}\right)^x$ and graph it on the set of axes below.



Domain: _____ Range: _____ Asymptote: _____ X-Intercept: _____

End Behavior:

Left-end Behavior -

Right-end Behavior-

As $x \longrightarrow$ _____

As $x \longrightarrow$ _____

$f(x) \longrightarrow$ _____

$f(x) \longrightarrow$ _____

For odd numbered questions, completely expand each of the following logarithmic expressions.

For even numbered questions, completely condense the logarithm.

$$22) \frac{4}{5} \log x^2 - \frac{a}{b} \log y$$

$$23) \ln(\sqrt[4]{a^5 + b^8})$$

$$24) -\ln\left(\frac{1}{D}\right)$$

$$25) \log_3 \sqrt[3]{\frac{x^2 y}{3z^5}}$$

$$26) \frac{1}{4} [\log_2(x-1)^4 + \log_2 x^2] - \log_2(x-1)$$

$$27) \log\left(\frac{6x^2 + 11x - 7}{3x + 7}\right)$$

28) Is the following equation true or false? Justify your answer.

$$\log_a \frac{b}{c} = \frac{\log_a b}{\log_a c}$$

29) Is the following equation true or false? Justify your answer.

$$\ln \sqrt[3]{3} = \frac{\ln 3}{3}$$

Completely simplify the following expression:

30) $10^{2 \log 3x + \frac{1}{2} \log 4x^2}$

31) $x^{\log_x 32y^9 - \log_x 4y^3}$

For odd numbered questions, completely expand each of the following logarithmic expressions.

For even numbered questions, completely condense the logarithm.

$$32) -2 \log \frac{1}{2x} + 2 \log \frac{1}{2x}$$

$$33) \log \sqrt{\frac{(x^2-8)}{(x+1)(x^3-7)^2}}$$

$$34) -4 \log_5 x - 2 \log_4 y + 3 \log_5 z$$

$$35) \log_2 \left(\frac{a(a^2+4)}{\sqrt{a^2+4a+4}} \right)$$

$$36) \frac{1}{a} \ln(b-1)^4 + \frac{1}{c} [\ln d^4 - \ln(f+6)^2]$$

$$37) \ln \frac{e^{x^2}}{x(x-1)}$$

Hey, I can simplify any logarithm you give me!

$$\log_2(\log_4(\ln e^{256}) - \log_{x-1}(\log_{x+1}(x^2 - 1))) + \log_2(\log_{81} 3)$$

Hey, I can completely condense any logarithm you give me!

$$-\frac{1}{2} \log 16 - 3[\log x + 9 \log y] - \frac{1}{3} [3 \log a + 4 \log(y - 1)]$$

Hey, I can completely expand any logarithm you give me!

$$\log\left(\frac{(x^3 - 8)(x^4 - 16)}{(x - 2)^2(\sqrt[3]{y^7}(x^3 + 11)^8)}\right)$$