Name:_____ Date:_____

Logarithms Practice

Do Now: Solve the following equations.

1) $\log(3d) + \log(2d - 2) = \log(3d^2 + 2d - 4)$

2) $\log_3(x^4 + 51x^2 - 27) - \log_3(2x^2 + 1) = 3$

Solve the following equations.

1) $\log(x-2)-\log(x+2)=\log(x-1)-\log(x+7)$

2) $\ln(2x^2)+\ln(x^2+10)=\ln(3x^4+27x^2-8)$

3) $\log_2(x-9)+\log_2(x+5)=7$

4) $\log(x^4+100x^2-156)-\log(x^2+1)=2$

5) Solve for t in the equation $A = P\left(1 + \frac{r}{n}\right)^{nt}$.

6) If $a > 1$, sketch the following graphs WITHOUT A CALCULATOR:

a) $f(x) = \log_a x$

b) $f(x) = \log_{\frac{1}{a}} x$

Domain: _____

Range: _____

Asymptote: _____

X-Intercept: _____

Left-end Behavior:

Right-end Behavior:

Domain: _____

Range: _____

Asymptote: _____

X-Intercept: _____

Left-end Behavior:

Right-end Behavior:

7) Given the exponential function, $7^{9x-1} = 10^{x} + 7$, how does taking the logarithm of each side of the equation allow you to find the solution? Use complete sentences.

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8) Pierson invests $10,000 in a savings account that is compounded continuously using the equation $A = 10{,}000e^{0.05t}$, where A is the amount of money Pierson has in his savings account after t years. Pierson will not make any more deposits or withdrawals.

a) What is the amount of money in Pierson's savings account after 18 years? (Round to the nearest cent)

b) How many years will it take Pierson to save $15,000? (Round to the nearest day)

Solve the following equations.

9) $e^{7x-5} + 2 = 7{,}456$

10) $5^{3x-5} = 15^{x+10}$

Solve the following equations.

11) $\log_2(2x^2 + 3x + 40) - \log_2(2x^2 + x) = 2$

12) $\log(h + 5) + \log(h - 2) = \log(-5h + 10)$

13) $\ln(x^3 + 64) - \ln(x^2 - 4x + 16) = \ln(2x)$

14) $\log(x + 1) + \log(x + 7) = \log(x^3 - 5x^2 + 19x + 1)$

Evaluate the following without using a calculator.

15) $8\log_{\frac{1}{2}} 8 - 10^{\log 4} + \ln e^{-2} + 9\log_{343} 7$

16) $\ln[\log_2(\log \frac{1}{10000})]$

Find the inverse of the following functions.

17) $y = \frac{3}{4}^{0.54x+9.73}$.

18) $y = 13^{2-x}$.

19) Describe how $f(x) = \log x$ changes to form each of the following equations:

a) $g(x) = -\log(x-7)$

b) $h(x) = \log(x+2) - 9$

c) $j(x) = -\log(x-1) + 1$

Rewrite each of the following logarithms using the Change of Base Formula, then round to the nearest thousandth.

20) $\log_4 8$

21) $\log_{456} 120$

22) $\log_{\frac{1}{2}} \frac{1}{3}$

Solve the following equations.

23) $\log_2(x) + \log_2(x^2 + 8x - 4) = 5$

24) $\log_2(x^3 - 1) - \log_2(x^2 + 5) = \log_2(x - 1)$

25) $\log_{\frac{1}{12}}(2x) + \log_{\frac{1}{12}}(x^3 - 1.5x^2 - 28x + 90) = -2$