Algebra II **Sections 7.4-7.6 Review** **Name:** Key **Hr.**____

Rewrite the equation in exponential form.

1. $\log_2 16 = 4$

$2^4 = 16$

2. $\log_3 \frac{1}{9} = -2$

$3^{-2} = \frac{1}{9}$

Rewrite the equation in logarithmic form.

3. $4^{-\frac{1}{2}} = 2$

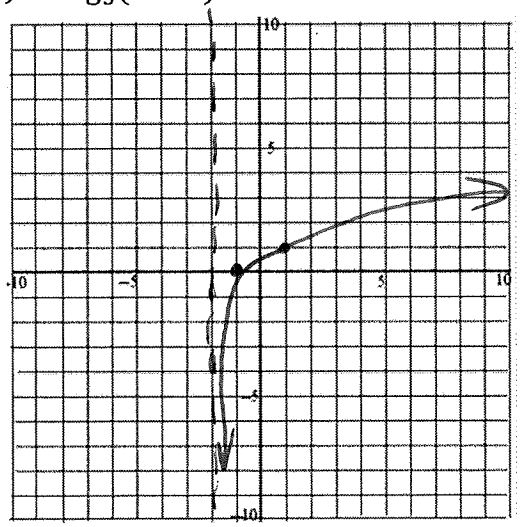
$\log_4 2 = -\frac{1}{2}$

4. $10^4 = 10000$

$\log 10000 = 4$

Graph the function. Then state the domain and range.

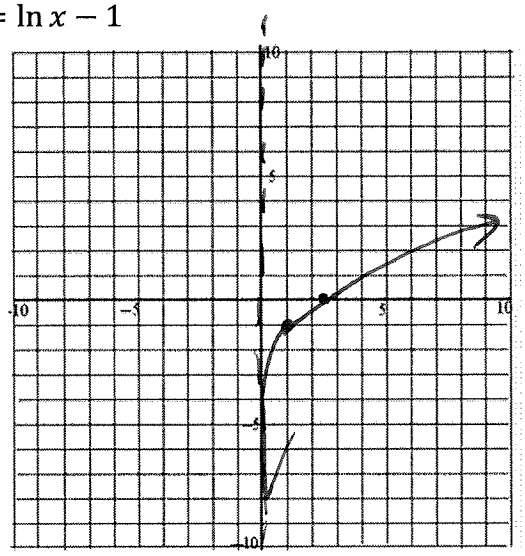
5. $h(x) = \log_3(x + 2)$



Domain: $x > -2$

Range: $\mathbb{R}$

6. $y = \ln x - 1$



Domain: $x > 0$

Range: $\mathbb{R}$

Find the inverse of the function.

7. $y = \ln x$

$x = \ln y$

$e^x = y$

$y = e^x$

8. $y = \log_6(x + 2)$

$x = \log_6(y + 2)$

$y + 2 = 6^x$

$y = 6^x - 2$

9. $y = \log_3 3x - 5$

$x = \log_3 3y - 5$

$x + 5 = \log_3 3y$

$3^{x+5} = 3y$

$y = \frac{1}{3}(3)^{x+5}$

or

$y = 3^{x+4}$

Evaluate the logarithm without using a calculator.

10. $\log_9 81$

2

11. $\log_8 1$

0

12. $\log_3 \frac{1}{3}$

-1

13. $\log_4 2$

$\frac{1}{2}$

14. $\log_{27} 3$

$\frac{1}{3}$

15. $\log_4 4^{\frac{2}{3}}$

$\frac{2}{3}$

Use $\log 4 \approx 0.602$ and $\log 7 \approx 0.845$ to evaluate with following logarithms without a calculator.

16. $\log 28$

$\log(4 \cdot 7)$

$\log 4 + \log 7$

$0.602 + 0.845$

1.447

17. $\log \frac{1}{4}$

$\log 4^{-1}$

$-1 \log 4$

$-1(0.602)$

-0.602

18. $\log \frac{49}{64}$

$\log 49 - \log 64$

$\log 7^2 - \log 4^3$

$2 \log 7 - 3 \log 4$

$2(0.845) - 3(0.602)$

$1.690 - 1.806$

-0.116

Expand the following expressions.

19. $\log \frac{2x}{5}$

$\log 2x - \log 5$

$\log 2 + \log x - \log 5$

$\log 2 + \log x - \log 5$

20. $\log_7 x^2 y$

$\log_7 x^2 + \log_7 y$

$2 \log_7 x + \log_7 y$

$2 \log_7 x + \log_7 y$

21. $\ln \sqrt{xy}$

$\ln (xy)^{\frac{1}{2}}$

$\frac{1}{2} \ln xy$

$\frac{1}{2}(\ln x + \ln y)$

or

$\frac{1}{2} \ln x + \frac{1}{2} \ln y$

Condense the following expressions.

22. $\log 4 + 3\log x + \log y$

$\log 4 + \log x^3 + \log y$

$\log(4x^3y)$

23. $3\log_8 3 - \log_8 x - 2\log_8 9$

$\log_8 3^3 - \log_8 x - \log_8 9^2$

$\log_8\left(\frac{3^3}{x\,9^2}\right) = \log_8\left(\frac{27}{81x}\right)$

$\log_8\left(\frac{1}{3x}\right)$

24. $\ln 6 - \ln 3 + 2\ln x$

$\ln\left(\frac{6}{3}\cdot 2\right)$

$\ln 4$

Use your calculator to evaluate the following logarithms. Round your answer to three decimal places.

25. $\log_7 12$

1.277

26. $\log_5 0.04$

-2

27. $\log_{1/3} 0.004$

5.026

Solve the following equations. Check for extraneous solutions.

28. $10^{x+2} - 12 = 22$

$10^{x+2} = 34$

$\log 34 = x+2$

$x = \log 34 - 2$

or

$x = -0.469$

29. $\log_7(2-x) = \log_7 5x$

$2 - x = 5x$

$2 = 6x$

$\frac{1}{3} = x$

30. $9^{2x} = 3^{2x+4}$

$3^{2(2x)} = 3^{2x+4}$

$3^{4x} = 3^{2x+4}$

$4x = 2x+4$

$2x = 4$

$x = 2$

31. $\log_2(3x-1) = 8$

$2^8 = 3x-1$

$128 = 3x-1$

$129 = 3x$

$43 = x$

32. $8^{x-1} = \left(\frac{1}{2}\right)^{2x-1}$

$2^{3(x-1)} = 2^{-1(2x-1)}$

$2^{3x-3} = 2^{-2x+1}$

$3x-3 = -2x+1$

$5x = 4$

$x = \frac{4}{5}$

33. $\log_6(2x-6) + \log_6 x = 2$

$\log_6((2x-6)(x)) = 2$

$6^2 = (2x-6)(x)$

$36 = 2x^2 - 6x$

$0 = 2x^2 - 6x - 36$

$0 = x^2 - 3x - 18$

$0 = (x-6)(x+3)$

$x = 6 \quad x \neq -3$