Algebra II **Chapter 7 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. $4^{-\frac{1}{2}} = \frac{1}{2}$

$\log_4\left(\frac{1}{2}\right) = -\frac{1}{2}$

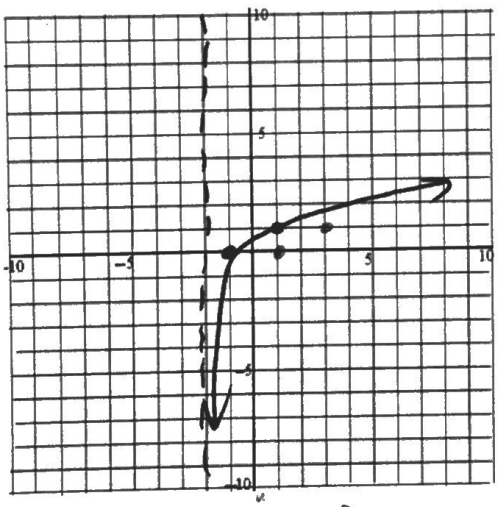
4. $10^4 = 10000$

$\log(10000) = 4$

Graph the function. Then state the domain and range.

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

x	y
1	0
3	1

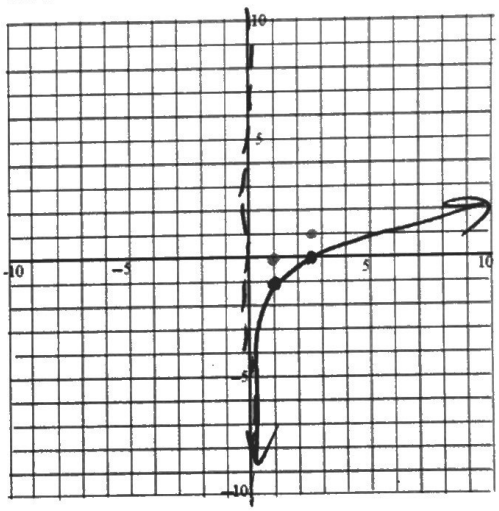


Domain: $(-2, +\infty)$

Range: $(-\infty, +\infty)$

6. $y = \ln x - 1$

x	y
1	0
e	1



Domain: $(0, +\infty)$

Range: $(-\infty, +\infty)$

Find the inverse of the function.

7. $y = e^{x-1} + 3$

$x = e^{y-1} + 3$

$x - 3 = e^{y-1}$

$\ln(x-3) = y - 1$

$y = \ln(x-3) + 1$

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

$x = \log_6(y+2)$

$6^x = y + 2$

$y = 6^x - 2$

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

$x = \log_3(3y) - 5$

$x + 5 = \log_3(3y)$

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

$y = \frac{3^{x+5}}{3}$ or $y = 3^{x+4}$

Evaluate the logarithm. Round your answer to three decimal places if needed.

10. $\log_9 81$ 11. $\log_8 1$ 12. $\log_3 \frac{1}{3}$

2 0 -1

13. $\log_7 12$ 14. $\log_{27} 3$ 15. $\log_{1/3} 0.004$

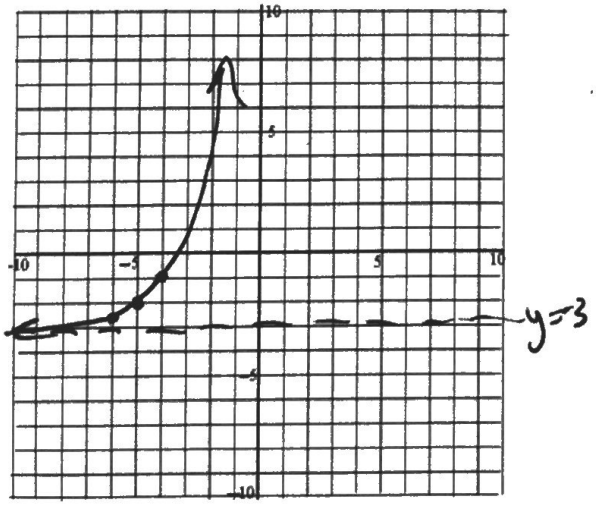
$\frac{\ln(12)}{\ln(7)}$ $\frac{\ln(0.004)}{\ln(\frac{1}{3})}$

1.277 $\frac{1}{3}$ 5.026

Graph the function. Then state the domain and range and whether it's growth or decay.

16. $f(x) = 2^{x+5} - 3$

x	y
-6	-2.5
-5	-2
-4	-1

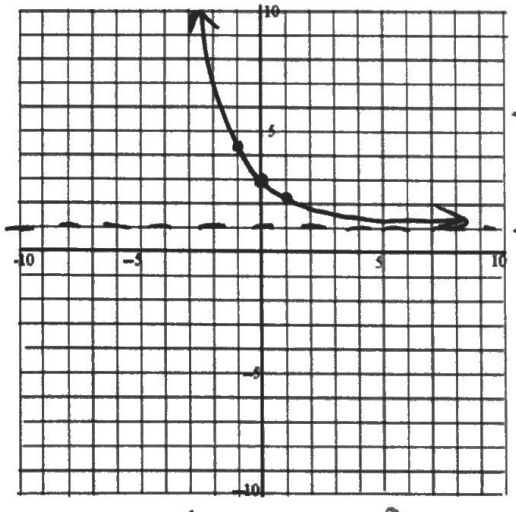


Domain: $(-\infty, +\infty)$

Range: $(-3, +\infty)$

Growth or Decay: growth

17. $y = 2e^{-0.5x} + 1$



x	y
-1	4.297
0	3
1	2.213

Domain: $(-\infty, +\infty)$

Range: $(1, +\infty)$

Growth or Decay: decay

Expand the following expressions.

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

19. $\log_7 x^2y$

20. $\ln\sqrt{xy}$

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

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

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

$2\log_7(x)+\log_7(y)$

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

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

Condense the following expressions.

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

22. $3\log_8 3 - \log_8 x - 2\log_8 9$

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

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

$\log_8\left(\frac{27}{x\ 81}\right)$

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

$\log(4x^3y)$

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

$\ln(2x^2)$

Simplify the following. Do NOT evaluate.

24. $(2e^4)(3e^5)$

25. $(7e^{2x})^3$

26. $\frac{21e^{5x}}{12e^{3x}}$

7^3e^{6x}

$\frac{7}{4}e^{5x-3x}$

$6e^9$

$343e^{6x}$

$\frac{7}{4}e^{2x}$

Solve the following equations. Check for extraneous solutions.

27. $10^{x+2} - 12 = 22$

$10^{x+2} = 34$

$\log(34) = x+2$

$x = \log(34) - 2$

or

$x = -0.469$

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

$2 - x = 5x$

$2 = 6x$

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

29. $9^{2x} = 3^{2x+4}$

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

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

$4x = 2x+4$

$2x = 4$

$x = 2$

30. $\log_2(3x-1) = 7$

$3x-1 = 2^7 = 128$

$3x-1 = 128$

$3x = 129$

$x = 43$

31. $8^{x-1} = \left(\frac{1}{2}\right)^{2x-1}$

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

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

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

$5x = 4$

$x = \frac{4}{5} = 0.8$

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

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

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

$2x^2 - 6x = 36$

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

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

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

$x = 6, -3$