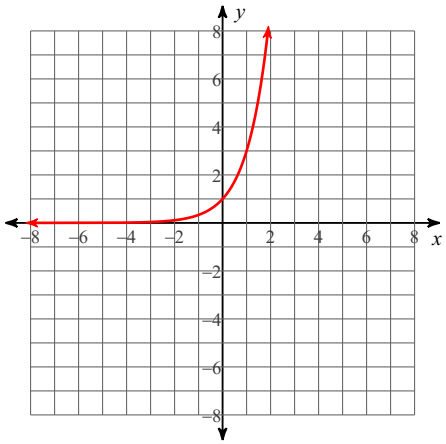
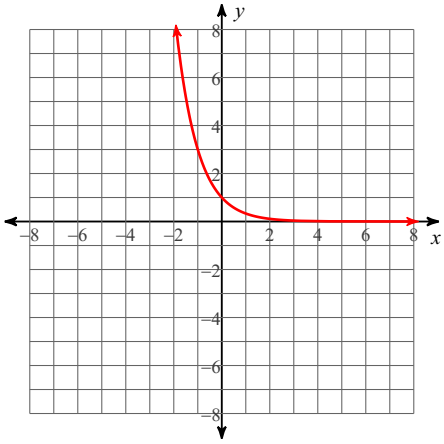
Log Test Review - Graphing Problems

Date_____ Period____

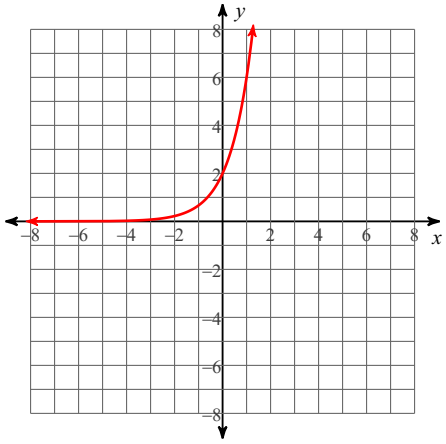
1) $y = 3^x$



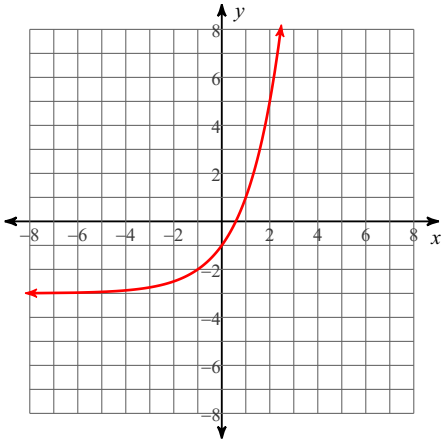
2) $y = \left(\frac{1}{3}\right)^x$



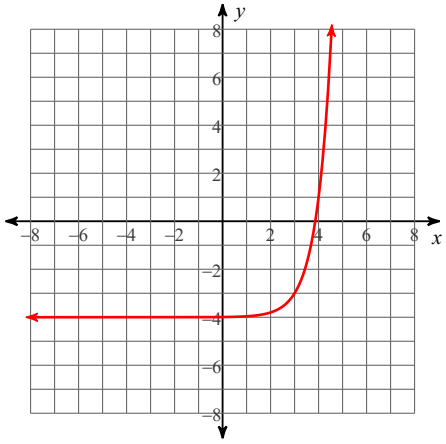
3) $y = 2 \cdot 3^x$



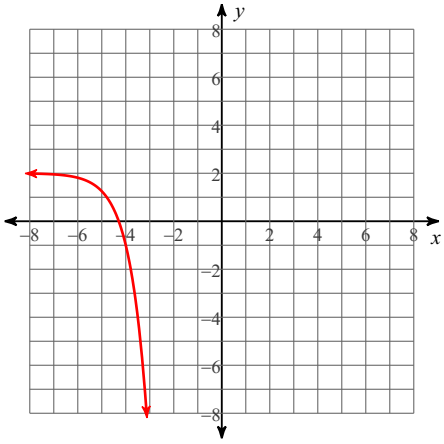
4) $y = 2^{x+1} - 3$



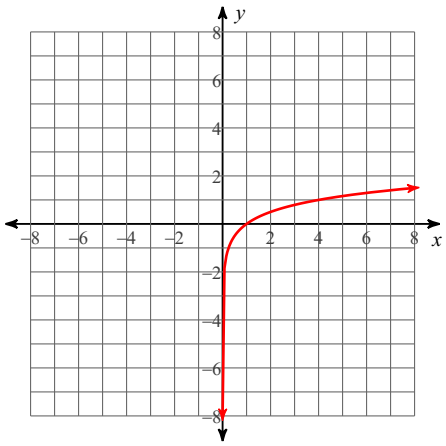
5) $y = 5^{x-3} - 4$



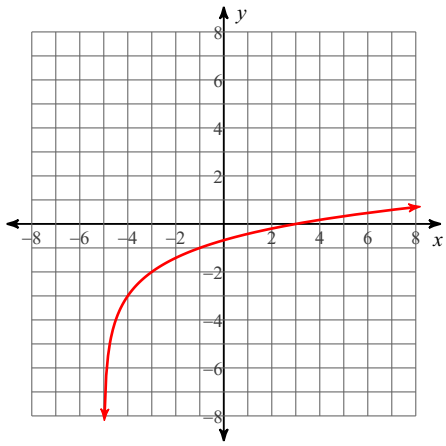
6) $y = -3 \cdot 4^{x+4} + 2$



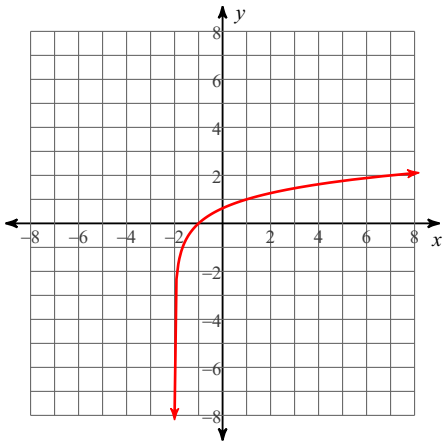
7) $y = \log_4 x$



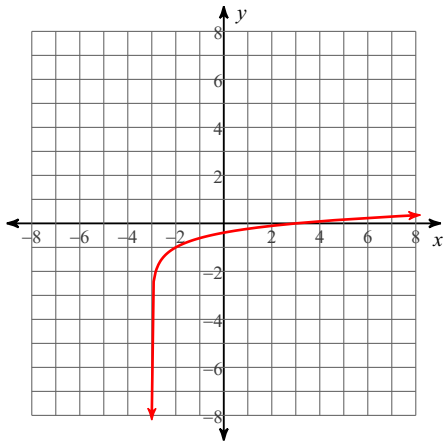
8) $y = \log_2 (x + 5) - 3$



9) $y = \log_3 (x + 2)$



10) $y = \log_6 (x + 3) - 1$



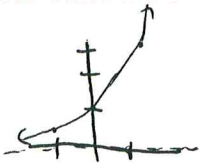
NAME _____ DATE _____ PD _____

ALGEBRA II HONORS Chapter 7 Review

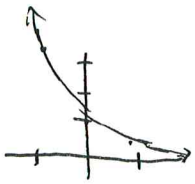
Graph each function. State the domain and range of each function.

D: ℝ
R: y > 0

1) $y = 3^x$



2) $y = \left(\frac{1}{3}\right)^x$

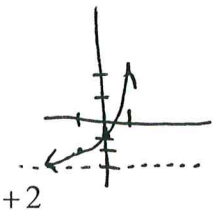


D: ℝ
R: y > 0

D: ℝ
R: y > 0

3) $y = 2(3)^x$

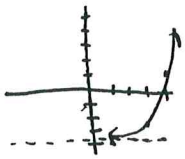
4) $y = 2^{x+1} - 3$



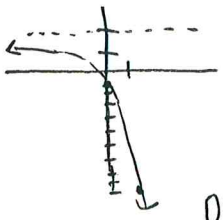
D: ℝ
R: y > -3

D: ℝ
R: y > -4

5) $y = 5^{x-3} - 4$



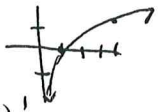
6) $y = -3(4)^{x+4} + 2$



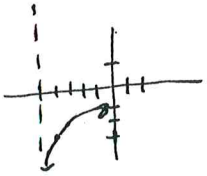
D: ℝ
R: y < 2

D: x > 0
R: ℝ

7) $y = \log_4 x$



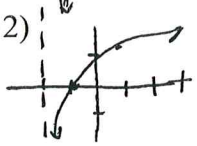
8) $y = \log_2(x+5) - 3$



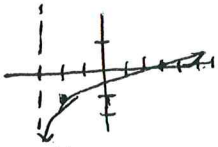
D: x > -5
R: ℝ

D: x > -2
R: ℝ

9) $y = \log_3(x+2)$



10) $y = \log_6(x+3) - 1$



D: x > -3
R: ℝ

Write each logarithm in exponential form.

11) $\log_2 8 = 3$ $2^3 = 8$

12) $\log 100 = 2$ $10^2 = 100$

13) $\ln x = y$ $e^y = x$

14) $\log_4 \frac{1}{16} = -2$ $4^{-2} = \frac{1}{16}$

Write each exponential function in logarithmic form.

15) $10^{-1} = \frac{1}{10}$ $\log\left(\frac{1}{10}\right) = -1$

16) $e^x = y$ $\ln y = x$

17) $8^{\frac{1}{3}} = 2$ $\log_8 2 = \frac{1}{3}$

18) $6^2 = 36$ $\log_6 36 = 2$

Evaluate each expression.

19) $\log_2 16 = 4$

20) $\log_8 2 = \frac{1}{3}$

21) $\log_2 \frac{1}{4} = -2$

22) $\log 10 = 1$

23) $\log_3 9 = 2$

24) $\log_{64} 2 = \frac{1}{6}$

25) $\log_9 \frac{1}{81} = -2$

26) $\ln e^{10} = 10$

27) $\log_5 5^{12} = 12$

28) $\ln e = 1$

29) $\ln 1 = 0$

30) $\log_3 1 = 0$

31) $\log_2 16 - \log_2 4$ $= 2$

32) $\log_8 2 + \log_8 32 = 2$

$\frac{1}{3}\log a + \frac{1}{3}\log b - \frac{1}{3}\log c$

Expand each logarithm.

33) $\log_6\left(\frac{xy^3}{\sqrt{z}}\right)$ $\log_6 x + 3\log_6 y - \frac{1}{2}\log_6 z$

34) $\ln\left(\frac{2x}{y^3 z}\right)^2$ $\ln 4 + 2\ln x - 6\ln y - 2\ln z$

35) $\log\sqrt[3]{\frac{ab}{c}}$

36) $\log_{12}\left(\frac{4x}{z^5}\right)$ $\log_{12} 4 + \log_{12} x - 5\log_{12} z$

Condense each expression into a single logarithm.

37) $\ln 6 + \ln x - \ln y$ $\ln\left(\frac{6x}{y}\right)$

38) $\log x - \frac{1}{2}\log y - \frac{1}{2}\log z$ $\log\left(\frac{x}{\sqrt{yz}}\right)$

39) $\log(x+1) - \log(x-2)$ $\log\left(\frac{x+1}{x-2}\right)$

40) $\log_7 x + \log_7(x-3)$ $\log_7(x^2 - 3x)$

Solve each equation without using a calculator.

41) $2^{2x+1} = 16$ $x = 3/2$

41) $9^{x-1} = \frac{1}{27}$ $x = -1/2$

41) $27^{x-2} = \frac{1}{81^{x+2}}$ $x = -2/7$

42) $4^{-3} = 8^{2x}$ $x = -1$

43) $\log_2 2x = 4$ $x = 8$

44) $\log(x-1) = 2$ $x = 101$

45) $2\log_3(x-1) - 6 = -2$ $x = 10$

46) $\log_2(2x-1) = \log_2(x+3)$ $x = 4$

47) $\log_7(x^2-3) = \log_7(2x)$ $x = 3$ ~~$x = -1$~~

48) $\log 5 - \log 2x = 1$ $x = 1/4$

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

50) $\log_2 x + \log_2(x+2) = 3$ ~~$x = -4$~~ $x = 2$

#51-66 requires the use of a calculator. Round all answers to the nearest thousandths.

Solve each equation.

51) $4^x = 20$ $x = 2.161$

52) $2(3)^x - 1 = 6$ $x = 1.140$

53) $5^{3x+1} - 6 = 5$ $x = .162$

54) $-3 \cdot 6^{x+1} - 2 = -6$ $x = -.839$

55) $e^x = 10$ $x = 2.303$

56) $-4e^{4x+1} + 5 = -12$ $x = .112$

57) $\ln(x-1) = 4$ $x = 55.598$

58) $2\ln(2x-3) + 4 = 2$ $x = 11.543$

Name:_____Date:_____Pd.: _____

Algebra II – Mr. Allen-Black Using Logs to solve exponential equations.

1) Ice cubes decay at a rate of 1% per minute. If I have 6 ounces of ice cubes in my Pepsi,

a) Write an equation expressing how much ice is left after n hours.

$I(n) = 6\,(0.99)^{60n}$

b) How many ounces of ice cubes will be left after 1 hour?

3.28 oz.

c) How long will it take to have 1 ounce of ice left?

178.28 minutes (2.97 hours)

2) In the movie, Back to the Future, Doc Brown needed to get Plutonium in order to power his DeLorean. When Doc Brown put the 120 grams of Plutonium into the car, he didn't realize that it would decay at a rate of 35% an hour.

a) Write an equation to express how much Plutonium will remain after N hours.

$P(n) = 120(0.65)^{n}$

b) How many grams would be left after 4 hours?

21.42 grams

c) How long will it take for there to be only 50 grams of Plutonium?

2.03 hours

3) A long, long, time ago, in a galaxy far, far, away, a scientist came across some radioactive material. After further investigation, said scientist realized that this radioactive material was Kryptonite. Kryptonite decays at a rate of 1% an hour. The scientist wants to know how long it would take for the 100 grams Kryptonite to disappear.

a) Write an equation to express how much Kryptonite would be left after N hours.

$U(n) = 100(0.99)^{n}$

b) How many grams would be left after 48 hours?

61.73 grams

c) If it is determined that it would take over 7 grams of Kryptonite to cause Superman's death, how long would it take before he could play with the Kryptonite without dying?

264.59 hours

4) At the birth of her son, Mrs. Needham invested $10,000 into a bank account. This bank account has an annual interest rate of 6% (APR), and is compounded monthly.

a) Write an equation to express how much money will be in the account after "n" years.

$F(n) = 10{,}000\left(1 + \frac{.06}{12}\right)^{12n}$

b) How much will be in her son's account after 18 years?

$29367.66

c) How long would it take for the account to hit $15,000?

6.775 years (6 years and 10 months)

5) At the birth of her second son, Mrs. Needham invested $7,000 into a bank account. This bank account has an annual interest rate of 4.5%, and is compounded continuously.

a) Write an equation to express how much money will be in the account after "n" years.

$F(n) = 7{,}000\ e^{(0.045)(n)}$

b) How much will be in her son's account after 8 years?

$10,033.31

c) How long will it take for the account to hit $8,000?

2.97 years

6) In the small city of Allentown, there are approximately 2,000,000 people. This is such a cool city, that many people are moving there. The population is growing at a rate of 12% a year.

a) Write an equation expressing the population of Allentown in N years.

$A(n) = 2m(1.12)^n$

b) How many people will be living in Allentown in 2 years?

2.5088 million or 2,508,800

c) How long would it take for Allentown to reach 2,500,000 people?

1.97 years

7) The mold in Ms. LeClair's classroom is growing at a rate of .05% per week. There is currently 40 milligrams of mold in the classroom.

a) Write an equation to show the amount of mold in N weeks.

$M(n) = 40\ (1.0005)^n$

b) How much mold will be in Ms. LeClair's room in 20 weeks?

40.40 milligrams

c) How long would it take for there to be 48 milligrams of mold?

364.73 weeks (about 7 years!)

8) A radioactive isotope is decaying at a rate of 9% every hour. Currently there are 1500 grams of the substance.

a) Write an equation that will represent the number of grams after *n* hours.

$A(n) = 1{,}500\ (0.91)^n$

b) Find the number of grams after 1 day.

155.99 grams

c) When will you have 10 grams left?

53.13 hours