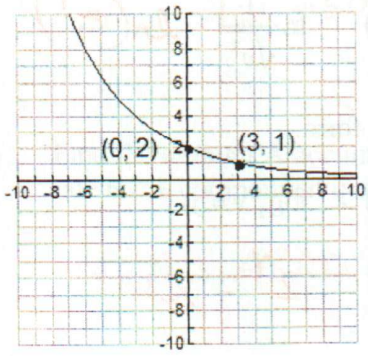
NAME Key

Exp/Log Review

1) Determine the exponential function whose graph is shown in the figure.



$y = ae^{bx}$

$2 = ae^{b(0)}$

$a = 2$

$1 = 2e^{3b}$

$\frac{1}{2} = e^{3b}$

$b = -.23$

$y = 2e^{-.23x}$

Exercises 3 and 4: Graph the following:

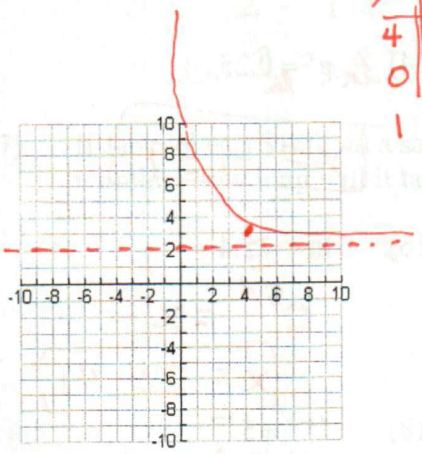
3) $y = e^{4-x} + 2$

x	
4	3
0	≈ 57
1	

D: all ℝ

R: $y > 2$

asymp: $y = 2$



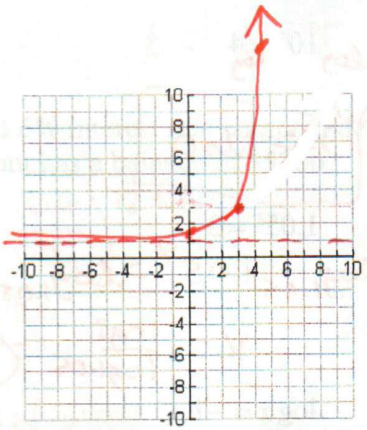
4) $y = 2(5^{x-3}) + 1$

D: all ℝ

R: $y > 1$

asymp $y = 1$

x	
3	3
0	1.016
4	11



Exercises 5 and 6: Graph the following:

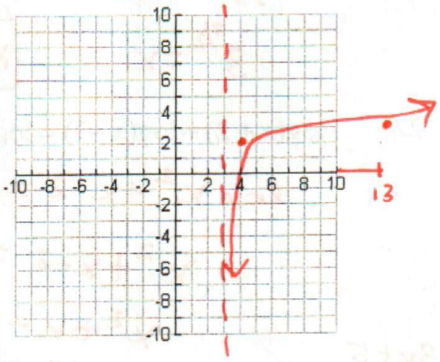
5) $y = \log(x - 3) + 2$

D: $x > 3$

R: all ℝ

asymp $x = 3$

x	
4	2



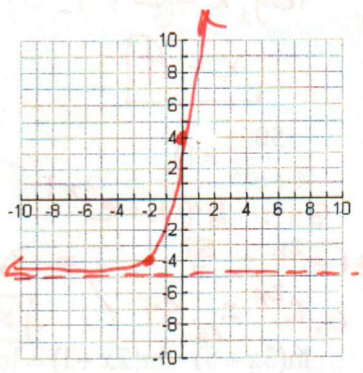
6) $y = 3^{x+2} - 5$

D: all ℝ

R: $y > -5$

asymp $y = -5$

-2	-4



Exercises 7 – 10: Evaluate the logarithmic expression without using a calculator.

7) $\log_2 32$ 5

8) $\log_3 81$ 4

9) $\log \sqrt[3]{10}$ $\frac{1}{3}$

10) $\ln \frac{1}{\sqrt{e^7}}$ $\ln(e^7)^{-1/2} = -\frac{7}{2}$

Exercises 11 – 12: Rewrite the equation in exponential form.

11) $\log_3 x = 5$

$3^5 = x$

$x = 243$

12) $\log_2 x = y$

$2^y = x$

Exercises 13 - 23: Solve the equation.

13) $\log 10^x = \log 4$

$x = .60$

14) $\ln e^x = \ln 0.25$

$x = -1.39$

15) $1.05^x = 3$

$\log_{1.05} 1.05^x = \log_{1.05} 3$

$x = \frac{\log 3}{\log 1.05} = 22.5$

16) $\ln x = 5.4$

$e^{5.4} = x$

$x = 221.41$

17) $\log x = -7$

$10^{-7} = x$

18) $3^{x-3} = 5$

$\log_3 3^{x-3} = \log_3 5$

$x - 3 = \frac{\log 5}{\log 3}$ $x = 4.46$

19) $3\log_2 x + 1 = 7$

$\log_2 x = 2$

$x = 4$

20) $2\log_3 x - 3 = 4$

$\log_3 x = \frac{7}{2}$

$3^{7/2} = x$ $x = 46.77$

21) $\frac{50}{4 + e^{2x}} = 11$

$50 = 11(4 + e^{2x})$

$4 + e^{2x} = \frac{50}{11}$

$\ln e^{2x} = \ln .54$ $2x = -.61$

$x = -.30$

22) $\log(x+2) + \log(x-1) = \log 4$

$\log x^2 + x - 2 = \log 4$

$x^2 + x - 2 = 4$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = -3, 2$

23) $\ln(3x+5) - \ln(2x+1) = \ln 4$

$\ln \frac{3x+5}{2x-1} = \ln 4$

$\frac{3x+5}{2x+1} = 4$ $8x + 4 = 3x + 5$

$5x = 1$

$x = \frac{1}{5}$

Applications:

24) Find the amount A accumulated after investing \$450 for 3 years at an interest rate of 4.6% compounded annually.

$A = 450\left(1 + \frac{.046}{1}\right)^{3.1} = \$515$

25) Find the amount A accumulated after investing \$4800 for 17 years at an interest rate 6.2% compouned quarterly.

$A = 4800\left(1 + \frac{.062}{4}\right)^{4.17} = \$13660.81$

26) How long would it take for your investment to double if it is compounded continuously at 8.5% interest rate?

$2 = 1e^{.085t}$

$\ln 2 = \ln e^{.085t}$

$.69 = .085t$

$t = 8.15 \text{ yr}$

27) If Jane invests \$1500 in a savings account with a 6% interest rate compounded monthly, how long will it take until Jane's amount has a balance of \$5200?

$5200 = 1500\left(1 + \frac{.06}{12}\right)^{12t}$

$3.47 = (1.005)^{12t}$

$\log_{1.005} 3.47 = 12t$

$12t = 249.15$

$t = 20.79 \text{ yr}$