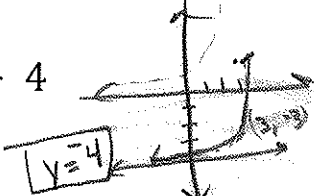
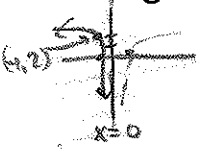

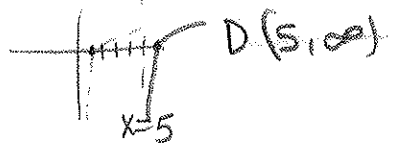


<p>1. Determine the exponential function with the initial value = 15, increasing at a rate of 9% per year.</p> <p>$y = 15(1.09)^x$</p>	<p>2. Without a graphing calculator, graph the exponential function</p> <p>$y = 4^{x-3} - 4$</p> 	<p>3. The number of bacteria, B, in a petri dish culture after t hours is given by</p> <p>$y_1 = B = 100e^{0.693t}$</p> <p>When will the number of bacteria = 200?</p> <p>$y_2 =$ 1 hour</p>
<p>4. Without the use of a graphing calculator, sketch the graph of $y = \ln(-x) + 2$.</p> 	<p>5. Without the use of a graphing calculator, sketch the graph of $y = -\log(x + 2)$.</p> 	<p>6. Evaluate the log without using a calculator:</p> <p>$\log_3(81) = x$</p> <p>$3^x = 81 \quad 3^x = 3^4$</p> <p>x = 4</p>
<p>7. Determine if the given function represents an exponential <u>growth</u> or decay and describe the end behavior</p> <p>$f(x) = \frac{1}{2}^{-x}$ $f(x) = 2^x$</p> <p>lim for $x \rightarrow \infty$ growth \neq lim for $x \rightarrow -\infty$ $= 0$</p>	<p>8. State the domain of the function</p> <p>$f(x) = \log(x - 5)$</p> 	<p>9. Evaluate the log without using a calculator:</p> <p>$10^{\log 14} = x$</p> <p>$x = 14$</p>

<p>10. Expand the log by using the product rule: $\log(9xy n^3)$</p> <p>$2\log 3 + \log x + \log y + 3\log n$</p>	<p>11. Expand the log by using the product rule: $\log((9x)(x-2))$</p> <p>$2\log 3 + \log x + \log(x-2)$</p>	<p>12. Condense the following into a single logarithm: $\frac{2 \ln x + \ln 5}{\ln 5x^2}$</p>
<p>13. Condense the following into a single logarithm: $\frac{1}{2} \ln x - \ln(x-4)$</p> <p>$\ln \frac{\sqrt{x}}{x-4}$</p>	<p>14. Use the change-of-base formula to evaluate: $\log_4(32)$</p> <p>$\frac{\log 32}{\log 4} = x$ $x=2.5$</p>	<p>15. Use the power rule to re-write the following: $\log_3(x)^2$</p> <p>$2 \log_3 x$</p>
<p>16. Solve the equation: $20 \left(\frac{1}{2}\right)^{\frac{x}{3}} = 500$</p> <p>$x = -13.9316$</p> <p>$\left(\frac{1}{2}\right)^{\frac{x}{3}} = 25$</p> <p>$\frac{x}{3} = \frac{\log 25}{\log \frac{1}{2}}$</p>	<p>17. Solve the equation: ?</p> <p>$\ln(3x-2) + \ln(x-1) = 2\ln(x)$</p> <p>$(3x-2)(x-1) = x^2$</p> <p>$3x^2 - 5x + 2 = x^2$</p> <p>$2x^2 - 5x + 2 = 0$</p> <p>$(2x-1)(x-2) = 0$</p> <p>$x = \frac{1}{2}, 2$</p>	<p>18. Solve the equation:</p> <p>$80e^{0.045x} = 240$</p> <p>$e^{0.045x} = 3$</p> <p>$\ln 3 = 0.045x$</p> <p>$24.4136 = x$</p>

$$③ 100 = 65 + 235e^{-kt}$$

$$\frac{35}{235} = e^{-t(\ln \frac{55}{235} / -20)}$$

$$\ln \frac{35}{235} / -\ln \frac{55}{235} / 20$$

$$① T_0 = 300$$

$$T_m = 65$$

$$T_0 - T_m = 235$$

$$② T(t) = T_m + (T_0 - T_m)e^{-kt}$$

$$120 = 65 + 235e^{-20k}$$

$$\frac{55}{235} = e^{-20k}$$

$$\ln \frac{55}{235} / -20$$

$$k = .0726$$

19. Solve the equation:

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

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

$$10^{-2} = x + 2$$

$$\frac{1}{100} - 2 = x$$

$$\boxed{-1.99 = x}$$

20. Solve the equation:

$$4 \log(x + 2) + 1 = 5$$

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

$$10^1 = x + 2$$

$$\boxed{8 = x}$$

21. Solve the equation:

$$\log(x + 2) = 4$$

$$10^4 = x + 2$$

$$10000 - 2 = x$$

$$\boxed{9998 = x}$$

22. Solve the equation:

$$\log_3(x)^2 = 4$$

$$3^4 = x^2$$

$$\sqrt{81} = x$$

$$\boxed{9 = x}$$

23. Solve the equation: $-\frac{x}{4} = 1$

$$3 \cdot \left(\frac{-x}{4}\right) = \frac{15}{3}$$

$$-\frac{3x}{4} = 5$$

$$\boxed{x = -\frac{20}{3}}$$

24. An apple pie is removed from an oven at 350°F and cools to 120°F after 20 min in a room at 65°F . How long will it take the pie to cool to 90°F ?

25. Suppose Mr. Rick invests \$5000 at 7% interest compounded annually. Find the value of his investment 10 years later.

$$A = P(1+r)^n$$

$$5000(1+.07)^{10}$$

$$\boxed{\$9,835.76}$$

26. Macie has \$800 to invest at 8% annual interest compounded monthly. How long will it take for her investment to grow to \$3000?

$$A = P\left(1 + \frac{r}{k}\right)^{kt}$$

$$3000 = 800\left(1 + \frac{.08}{12}\right)^{12t}$$

27. Audrey has \$600 to invest. What annual interest rate compounded quarterly is required to double her money in 10 years?

$$A = P\left(1 + \frac{r}{k}\right)^{kt}$$

$$2 = \left(1 + \frac{r}{4}\right)^{40}$$

CAT Chapter 3 Review showdown Activity

$$\ln \frac{3000}{800} / \ln \left(1 + \frac{.08}{12}\right) / 12$$

$$\boxed{t = 16.58 \text{ yrs}}$$

$$16 \text{ yrs } 7 \text{ months}$$

$$2 = \left(1 + \frac{r}{4}\right)^{40}$$

$$\left(\sqrt[40]{2} - 1\right) = r$$

$$\frac{6.992}{1770} = r$$