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Math Assignment 4

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1 Chapter 4

Page 263 Question 7 A population numbers 11,000 organisms initially and grows by 8.5 percent each year. Write an exponential model for the population.

$$F(X) = AB^X$$
$$F(X) = 11000(1 + -R)$$
$$F(X) = 11000(1.085)^X$$

Summary:this problem was not too bad. This whole unit is relatively new so I needed to learn the basics but right now it is pretty simple.

Page 264 Question 13 Write an exponential function for a function that passes through (0,6) and (3,750)

$$F(0) = AB^0$$
$$A = 6$$
$$750 = 6B^3$$
$$125 = B^3$$
$$B = 5$$

$$F(X) = 6(5)^X$$

Summary: this problem was not too difficult I just worked backwards in the equation to solve for B, nothing too fancy.

Page 276 Question 23 find long run behavior for the following function
$F(X) = -5(4^X) - 1$
$X \to \infty F(X) \to$-∞
X$\to$-$\infty F(X) \to$-1

Summary: This question was not too bad, the hardest part was just getting the technology to work. I knew that the graph would face down because X is negative. I knew it would approach negative one because that is what the last term tells us on this type of graph.

Page 276 Question 25 find long run behavior for the following function

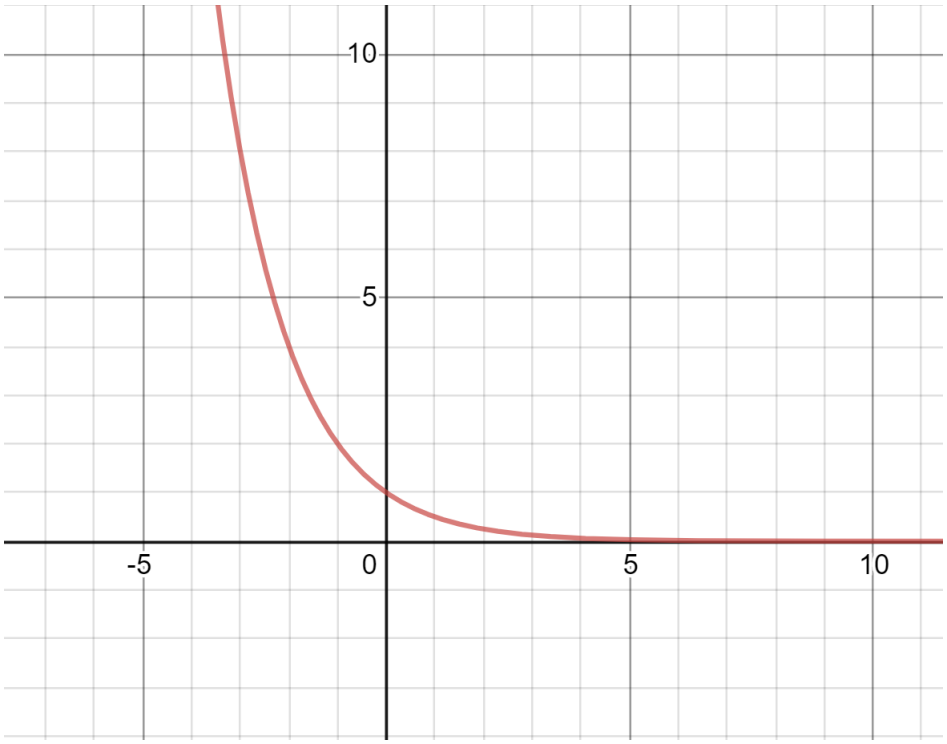
$$F(X) = 3(1/2)^X - 2$$

X$\to\infty$ F(X)$\to\infty$
X$\to$-∞ $F(X) \to$-2

Summary: This problem was not too hard either, I got used to the technology and the way to solve was the same as the last problem so I did not have too much trouble.

Page 275 Question 11 Sketch a graph for each of the following

$$F(X) = 2^{-}X$$



Summary: This was not too hard just a matter of knowing how to graph it.

Page 275 Question 17 Starting with $F(X) = 4^X$ find a formula for the following transformations
Shifting F(X) up 4 units

$$F(X) = 4^X + 4$$

Summary: This problem was pretty easy because transforming a graph will usually work the same way with most graphs. For example, Shifting an absolute value function up four would just be adding plus four to the end of the equation, and it was the same for this function.

Page 264 Question 27 A car was valued at 38,000 in the year 2003. The value depreciated to 11,000 by the year 2009. Assume that the car value continues to drop by the same percentage. What was the value in the year 2013?

$$F(X) = AB^X$$

$$F(X) = 38000(B^X)$$

$$F(X) = 38000(.81333)^X$$

$$4813.55$$

The car will cost 4813.55 dollars in 2013

Summary: This was a bit more tricky but overall it was just reworking the equation to get to a specific order and I did not have too much trouble.

Page 287 Question 1 Rewrite each Equation in exponential form

$$Log4_q = m$$

$$4^m = q$$

Summary: This problem was not too hard once i figured out exactly what a log was.

Page 287 Question 9 Rewrite each equation in logarithmic form

$$4^X = Y$$

$$Log4_Y = X$$

Summary: This question was easy especially after the last one it was just doing the opposite of what I did last time.

Page 287 question 17 Solve for X

$$Log3_X = 2$$

$$Log3_9 = 2$$

Summary: This problem was easy as it was just basically finding what exponent worked in the equations.

Page 287 Question 41 Solve each equation for the variable

$$5^X = 14$$

$$Log5_14 = X$$

$$X = 1.64$$

Summary: This problem was easy it was like the last two, I just had to rework the equation and then solve for X.

Page 287 Question 43 Solve each equation for the variable

$$7^X = 1/15$$

$$log7_1/15 = X$$

$$X = -1.39$$

Summary: This question was also pretty easy, just keep working through the original equation and then solving it for X.

Page 288 Question 65 The population of Kenya was 39.8 million in 2009 and has been growing by about 2.6 percent each year. If this trend continues, when will the population exceed 45 million?

$$F(X) = AB^X$$

$$F(X) = 39.8E^6(1.026)^X$$

$$45E^6 = 39.8E^6(1.026)^X$$

$$X = 4.78404$$

Summary: This question was a little trickier than the last because it was a word problem so I had to set everything up, but once I got everything organized, I knew how to solve so I just plugged in and solved.

Page 298 Question 1 simplify to a single logarithm using logarithm properties

$$log3_2 8 - log3_7$$

$$log3_7/28$$

Summary: This problem was easy but since it was new material I needed to watch a lesson on how to get the correct solution.

Page 298 Question 17 Use logarithm properties to expand each expression

$$log[(X^1 5 * Y^1 3)/Z^1 9]$$

$$log1_X^1 5 + log1_Y^1 3 - log1_Z^1 9$$

Summary: I did not struggle with this but it take me a while to get started in a way. I had to really think back on the last problem to make sure I was doing it correctly.

Page 299 Question 27 Solve each equation for the variable

$$4^4X - 7 = 3^9X - 6$$

$$(4X - 7)log4 = (9X - 6)log3$$

$$4X * log4 - 7 * log4 = 9X * log3 - 6 * log3$$

$$9X * log3 - 4X * log4 - 6 * log3 = -7 * log4$$

$$9x * log3 - 4x * log4 - 6 * log3 = -7 * log4$$

$$9x * log3 - 4x * log4 - 6x * log3 = -7 * log4$$

$$x(9 * log3 - 4 * log4 = 6 * log3 - 7 * log4$$

$$x = (6 * log3 - 7 * log4)/(9 * log3 - 4 * log4)$$

Summary: This question was hard. I had a little idea on what to do but for the most part I was lost. I watched three videos to get it down and eventually I got and I did it right and double checked with the solutions manual.

Page 306 question 1 for each function find the domain and the vertical asymptote

$$F(X) = logx - 5$$

vertical asymptote is 5
domain is anything greater than 5

Summary: This problem was not too hard. I remembered how to do this from last unit.

Page 306 Question 2 find the domain and vertical asymptotes

$$F(X) == logx - 2$$

Vertical asymptote is 2 domain is anything greater than 2

Summary: did not have any problems with this

Page 306 question 3 find domain and vertical asymptotes

$$F(X) = log3 - x$$

vertical asymptotes X=3 domain is anything less than 3

Summary: No problem on this one

Page 306 question 6 find domain and vertical asymptotes

$$F(X) = log2x + 5$$

veritcal asymptote is -5/2 domain is anything greater than -5/2

Summary: no problem

Page 322 Question 1 You go to the doctor and he injects you with 13 milligrams of radioactive dye. After 12 minutes, 4.75 milligrams of dye remain in your system. To leave the doctor's office, you must pass through a radiation detector without sounding the alarm. If the detector will sound the alarm whenever more than 2 milligrams of the dye are in your system, how long will your visit to the doctor take, assuming you were given the dye as soon as you arrived and the amount of dye decays exponentially?

$$M(T) = AB^T$$

$$M(T) = 13B^T$$

$$4.75 = 13B^12$$

$$4.75/13 = B^12$$

$$B = (4.75/13)^1/12 = 0.9195$$

$$M(T) = 13(0.9257)^T$$

$$2 = 13(0.9195)^T$$
$$2/13 = (0.9195)^T$$
$$log2/13 = log(0.9195)^T$$
$$log2/13 = Tlog(0.9195)$$
$$T = (log2/13)/(log0.9195) = 22.3$$
$$22.3Mins$$

Summary: I did not have a lot of problems because we went over this in class before I did this section so I had a very good understanding of how to start before this.

Page 322 question 3 The half-life of Radium-226 is 1590 years. If a sample initially contains 200 mg, how many milligrams will remain after 1000 years?

$$0.5A = AB^1590$$
$$0.5 = B^1590$$
$$B = (0.5)(1/1590)$$
$$B = 0.999564$$

$$H(1000) = 200(0.99564)^1000$$
$$H = 129.3$$

Summary: Once again I did not have too much trouble with this

Page 322 question 5 The half-life of Erbium-165 is 10.4 hours. After 24 hours a sample still contains 2 mg. What was the initial mass of the sample, and how much will remain after another 3 days?

$$0.5A = AB^1 0.42$$

$$0.5 = B^1 0.4$$

$$B = (0.5)^1/10.4$$

$$B = 0.935524$$

$$2 = A(0.935524)^2 4$$

$$2 = A(0.201983)$$

$$A = 9.901810(0.0935524^9 6) H(96) = 0.016481$$

$$H996) = 9.901810(0935524^9 6)$$

$$H(96) = 0.016481$$

Summary: This question was not too difficult but keeping track was a little tough just because of how the numbers were.