IM 3 — 7.1 to 7.3 Problem Solving

Name:_____ Per:_____ Date:_____

Show ALL work in the space provided.

Write an exponential function that models the following situations, then solve if necessary.

1. In 1980, wind turbines in Europe generated about 5 gigawatt-hours of energy. Over the next 15 years, the amount of energy increased by about 15% per year.

2. In January, 1993, there were about 1,313,000 Internet hosts. During the next five years, the number of hosts increased by about 100% per year.

3. The tuition for the 2011-2012 school year for the UC was $12,000 and is expected to increase 16% per year. What will tuition be in 2018-2019?

4. There are 20,000 homes in Kerman's sphere of influence. Each year 10% of these homes are disconnected from their septic system. Find the number of homes on a septic system in 5 years.

5. A new computer costs $2,000 and decreases in value 60% each year. What is the value of the computer after 5 years?

6. In 1990 the population of Kerman was 5,000. If the annual rate of increase is about 5%, write an equation that expresses Kerman's population 20 years later.

7. Bacteria in a culture are growing exponentially with time, as shown in the table below.

Bacteria Growth	
Day	**Bacteria**
0	10
1	40
2	160

Write an exponential function to express the number of bacteria, y, present at any time t.

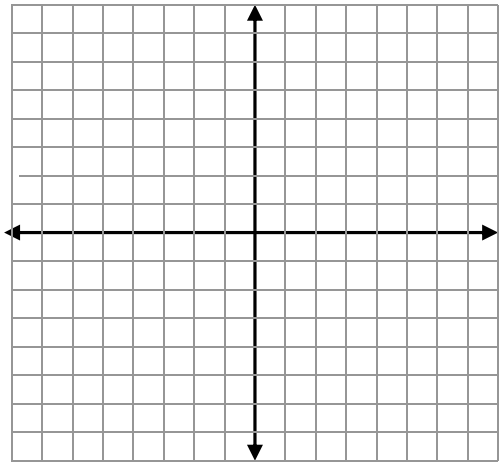
8. A certain radioactive element decays over time according to the equation $y = A\left(\frac{1}{2}\right)^{\frac{t}{500}}$, where A = the number of grams present initially and t = time in years. If 1600 grams were present initially, how many grams will remain after 2000 years?

9. State the domain and range of $y = 2^x$.

10. State the domain and range of $y = 2^x + 3$.

11. Describe the translation of $y = 2^x + 3$ from $y = 2^x$.

12. Graph #9 and #10 on the same grid.

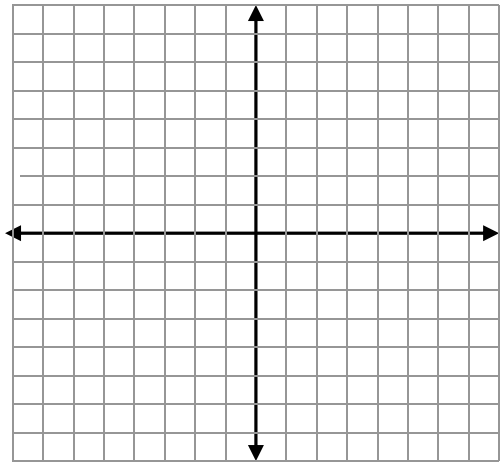


13. State the domain and range of $y = \left(\frac{1}{4}\right)^x$.

14. State the domain and range of $y = \left(\frac{1}{4}\right)^{x+2} - 3$

15. Describe the translation of $y = \left(\frac{1}{4}\right)^{x+2} - 3$ from $y = \left(\frac{1}{4}\right)^x$.

16. Graph #3 and #4 on the same grid.



17. Rewrite $243 = 3^x$ in log form.

18. Rewrite $\log_4 y = 5$ in exponential form.

19. Evaluate $\log_2 64$.

20. Evaluate $\log_e 1$.

21. Evaluate $\log_2 \frac{1}{32}$