Algebra 2 Name: _____
Chapter 3 Review Block: _____

WITHOUT A CALCULATOR

For questions 1 and 2, write your answer as a power of 2.

1. $2^3 \cdot 16$

2. $64 \cdot 8$

For questions 3 and 4, evaluate when $x = 4$.

3. $12\left(2^x\right)$

4. $1024\left(\frac{1}{2}\right)^x$

For questions 5 – 16, simplify using the properties of exponents.

5. 3^{-4}

6. 13^0

7. $27^{2/3}$

8. $36^{-3/2}$

9. $16^{-3/4}$

10. $49^{1/4} \cdot 49^{1/4}$

11. $2^{5/2} \cdot 2^{1/2}$

12. $\frac{9^{5/2}}{9^2}$

13. $8^{2/3} \cdot 8^{-2/3}$

14. $\frac{25^{7/4}}{25^{5/4}}$

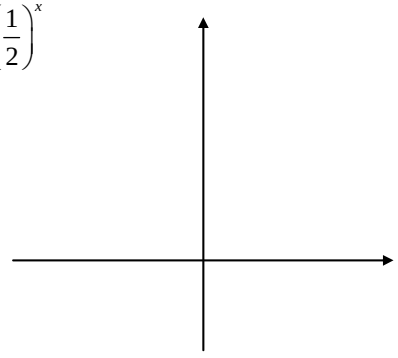
15. $\left(9^6\right)^{1/3}$

16. $\left(64^{1/2}\right)^{4/3}$

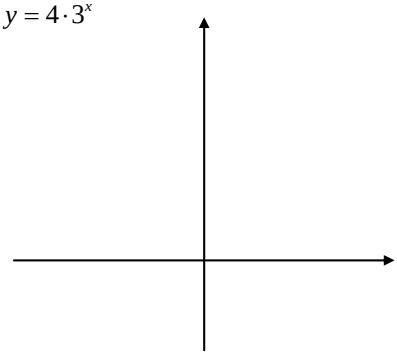
For questions 17 and 18, do the following <u>3</u> things:

a) Find the *y* – intercept of the graph.
b) Tell whether the graph represents exponential growth or exponential decay.
c) Sketch the graphs. LABEL at least 2 points.

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



18. $y = 4 \cdot 3^x$



For questions 19 and 20, write an exponential equation to model each situation.

19. You purchased a painting for $1300. It has been increasing in value by 5% each year.

20. Your car was worth $34,000 when it was purchased new. It has been decreasing in value by 18% each year.

CALCULATOR ALLOWED

You may use your calculator to ANSWER each question, but you MUST SHOW what you did on the calculator to arrive at your solution.

1. Coca-Cola has been increasing its sales in Colorado by 6% per year. In 2000, there were $327,000 in sales.

a) Write an exponential equation to model this situation. Let $t = 0$ be 2000.

b) Use the equation in part *a* to estimate the amount of sales in 1995 and 2010. Round your answer to the nearest dollar.

2. A certain pain relieving medication is eliminated from the bloodstream at the rate of about 7.5% per hour in adults. The original dosage of the medication is 60 mg.

a) Write an exponential equation for the amount of medication that remains in the bloodstream after *x* hours.

b) How much is left in your body after 10 hours?

c) How many hours will it take for half the medication to be eliminated? Explain how you arrived at this answer.

d) Write the equation of the form $y = a\left(\frac{1}{2}\right)^{x/h}$ for the amount remaining after *x* hours.

For questions 3 – 7, use the table below which shows the amount of the US national debt per US citizen.

Year	1980	1981	1982	1983	1984	1985	1986
Debt per Citizen	$3985	$4338	$4918	$5870	$6640	$7598	$8774

3. Find the average growth rate for the debt. Round your answer to 3 decimal places.

4. Write an exponential equation that models the growth of the debt as a function of the number of years after 1980.

5. Use the equation you found in question 5 to predict the debt in 1995.

6. Use the equation you found in question 5 to predict the debt in 1975.

7. Use the equation you found in question 5 to predict when the debt will reach $120,000 per citizen.

For questions 8 - 10, use the equations $B = P\left(1+\frac{r}{n}\right)^{nt}$ and $B = Pe^{rt}$.

8. You invested $1500 into a bank account that promises to give you 5% interest compounded monthly. How much is in your account after 2 years?

9. How long will it be until your money doubles?

10. Suppose your bank decides to change to a rate of 4.5% interest compounded continuously. How much is in your account after 3 years?

11. 100 mg of Neptunium-236 decays radioactively according to the equation $y = 100e^{-0.0308x}$ where x is in hours.

a. Use a graphing calculator to graph this function.

b. Write an equation in the form $y = ab^x$.

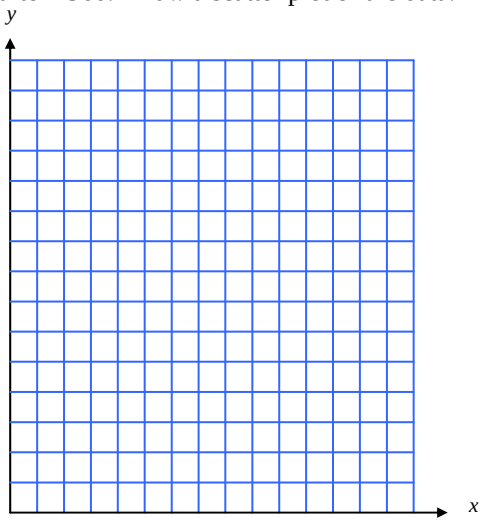
c. Calculate how many hours it takes for the Neptunium-236 to be reduced by half.

d. Write an equation in the form $y = a(1/2)^{x/h}$ where h is the half-life of Neptunium-236.

12. The table below gives the per person (per capita) expenditure for health care in the U.S. during selected years.

Year	1960	1965	1970	1975	1980	1985	1990
Health Care Expenditure	$143	$204	$346	$592	$1064	$1701	$2601

a. Let x = number of years after 1960. Draw a scatter plot of the data.



b. Use the health care data for 1965 and 1970 to write an exponential function that models the data. (DO NOT USE YOUR CALCULATOR FOR THIS!!!) Show your work below.

c. Now, enter your data into the calculator and find the exponential regression equation that fits.

d. Use the equation you found in part (c) to estimate the per capita health care expenditures in 1957 and 2003.