

Honors Algebra 2 Review  
Chapter 8

Key

Section 1 – No calculators.

1. Graph:  $y = 3 \cdot 2^{x+1} - 1$  give  $y = 3 \cdot 2^x$ . Be exact.

The function  $y = 70 \cdot 1.05^x$  models the annual growth (in thousands) of a city in the U.S.A. since 1980 (i.e.,  $x = 0$  in 1980)

2. What is the annual percent of increase?  $5\%$

3. How large was the city in 1980?  $70,000$

Write an exponential function to model the situation.

4. \$27,000 purchase that lost 12% in value each year.  $y = 27000(0.88)^x$

5. \$5000 investment that has a continuous growth of 8.5% each year.  $y = 5000e^{.085t}$

Identify each exponential function as growth or decay. Then identify the PERCENT of growth or decay.

6.  $y = 9 \cdot 1.35^x$   
Growth - 35%

7.  $y = 15 \cdot 0.75^x$   
Decay - 25%

8. Write  $7^5 = 16807$  in logarithmic form.

$$5 = \log_7 16807$$

9. Write  $\log_5 625 = 4$  in exponential form.

$$625 = 5^4$$

Evaluate the following.

10.  $\log_3 81 = 4$

11.  $\log_6 6^7 = 7$

12.  $6^{\log_6 81} = 81$

12.b  $\ln e^7 = 7$

13. If  $\log t = 12$  and  $\log n = 3$  evaluate  $\log(tn^2) = 18$

Solve each equation or inequality.

14.  $\frac{1}{8} = 2^{x+3}$   
 $x = -6$

15.  $\log_a 25 = 2$   
 $a = 5$

16.  $\log_4 y = -2$

$$y = \frac{1}{16}$$

17.  $\ln(x+3) + \ln(x+2) = \ln(6)$

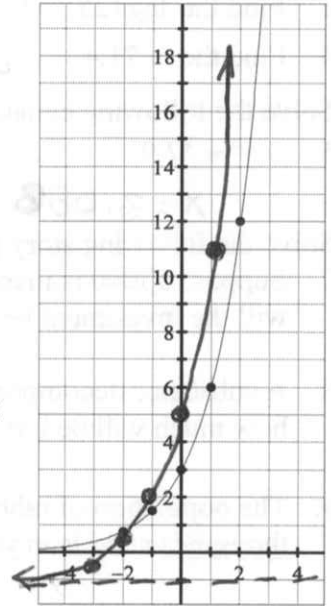
$$x = 0$$

18.  $\log_2(x+4) - \log_2(x-3) = 3$

$$x = 4$$

19.  $\ln(8x+5) < \ln(7-x)$

$$-\frac{5}{8} < x < \frac{2}{9}$$



Section 2 – Calculators may be used and are needed.

Round all answers to three decimal places.

1. Find the  $\log 125.357$       $2.098$      2. Find  $x$  if  $\log x = 1.8597$       $72.394$

3. Find the  $\ln 71.4$       $4.268$      4. Find  $x$  if  $\ln x = 5.831$       $340.699$

Solve the following equations and inequalities

5.  $3.5^x = 47.9$      6.  $2^{x+1} < 5^{2x-1}$      6b.  $2e^x - 7 = 131$

$x = 3.088$       $x < 0.912$       $x = 4.234$

Solve the following story problems.

7. Suppose \$3000 is invested at a 4% annual percentage rate and it is compounded monthly. How much will the investment be worth in 18 years?

$\$6155.92$

8. A substance decomposes radioactively. If it started with 60 grams and it has a half-life is 10 seconds, how much will be left in 1 minute?

$0.938$  grams

9. The population of rabbits in an area is modeled by the growth function  $P = 6e^{0.26t}$ , where  $P$  is in thousands and  $t$  is in years. How long will it take for the population to reach 20 thousand?

$4.631$  years

10. Suppose the population of a certain endangered species decreases continuously every year. You have counted 90 of these animals in the habitat you are studying. If it took 14 years the population to decrease to 15 animals, what was the rate of decay?

$r = 12.798\%$

11. The population of a certain habitat follows the logistic growth function  $P(t) = \frac{16300}{1 + 17.5e^{-0.065t}}$ .

- a. What is the maximum population?      $16,300$
- b. What is the population after 5 years?      $1194.644$
- c. When does the population reach 16,200?      $122.305$  years

Use the information in the table below to solve the following problems.

According to the World Almanac, the population in the United States has changed over a period of years since 1780. Below is a chart that shows the growth.

$P = 4.718 * 1.021^x$   
 $x = \text{years since 1780}$   
 $y = \text{pop in millions}$

12. Write a ExpReg equation of best fit for this data.

13. Based on the equation what is the percent of increase in population?

$2.1\%$

14. Based on the equation estimate the population for the year 2000.

$461.5$  million

15. Based on the equation what year will the population be 190 million people?

$1957$

Years Since 1780	Population (In millions)	Years Since 1780	Population (In millions)	Years Since 1780	Population (In millions)
10	3.9	80	31.4	150	132.2
20	5.3	90	38.6	160	132.2
30	7.2	100	50.2	170	151.3
40	9.6	110	63.0	180	179.3
50	12.8	120	76.2	190	203.3
60	17.0	130	92.2	200	226.5
70	23.2	140	106.1	210	248.7