Honors: Unit 5 Review Name:________________________

Simplify the following exponents

1. $\left(14a^4b^6\right)^2\left(a^6c^3\right)^7 =$

2. $\left(\dfrac{4d^3}{c^5}\right)^3 =$

3. $\left(\dfrac{x^{-8}}{y^{11}}\right)^{-2}$

4. $(g^3 \cdot g^{-2})^4$

Simplify each expression, and write your final answer with <u>exponents.</u>
***Hint: Change all radicals to exponents first!**

5. $\sqrt[3]{k} \cdot k^{6/4}$

6. $\sqrt{36s^2} \cdot (s^6)^{\frac{1}{3}}$

7. $2k^{2/3} \cdot \frac{1}{4}k^{5/6}$

Simplify each expression, and write your final answer in <u>simplest radical form</u>.

8. $m^{1/2} \cdot m^{4/3}$

9. $\sqrt[4]{256x^8} \cdot \sqrt{8x^3}$

Solve the following equations. Remember to rewrite radicals as exponential expressions and check your solutions.

10. $\sqrt[3]{2x-4} = -2$

11. $\sqrt{x+1} = x+1$

12. $\sqrt{x-7} = -9$

13. $\sqrt{3x+19} = x-3$

Solve the following word problems

14. The function $y = 187900\ (1.025)^x$ represents the value of a home x years after purchase. Find the monthly and quarterly rate of appreciation of the home.

15. In a dish, there are 18 bacteria. Ten hours later, there are 180 bacteria in the dish. $P(t) = 18(10^{0.1t})$ provides an exponential growth model that matches these data points.

a. Find the amount after 4 hours.

b. Use the given function to estimate the time when the bacteria would be 20,000.

16. The buffalo population in the Midwest is decreasing by a rate of 15% each year. The population in 1904 is 200. Write an explicit equation to model this situation. In what **year** will the population be 500?

Convert from exponential to log form or log to exponential form

17. $\left(\frac{2}{3}\right)^x = \frac{1}{9}$

18. $3^x = 42$

19. $log_2 p = q$

20. $log_u \frac{1}{4} = v$

Solve for the variables in the exponents

21. $(2^{x+1})^5 = 2^x$

22. $10^{2x} - 3 = 997$

23. $2(3^{2x-5}) = 86$

24. $3(10)^{x+4} + 3 = 15$

Fill in the blank to make each statement true

25. $(\_\_\_\_\_)^3 = 8x^3$

26. $5x^3 \cdot \_\_\_\_\_ = 125x$

27. $(\_\_\_\_\_)^{-2} = (9/25x^2)$