CLASSWORK: Sections 3.1 – 3.2 **Algebra 3-4**

NAME: _____ **DATE: _____**

Simplify using properties of exponents.

1. 4^{-3} = _____ **2.** 2^{-4} = _____ **3.** $49^{-1/2}$ = _____

4. 11^{0} = _____ **5.** $8^{-2/3}$ = _____ **6.** $25^{-3/2}$ = _____

7. $9^{1/4} \cdot 9^{1/4}$ **8.** $\dfrac{5^{1/2}}{5^{3/2}}$ **9.** $3^{5/2} \cdot 3^{1/2}$

10. $7^{2/3} \cdot 7^{-2/3}$ **11.** $\dfrac{6^{7/3}}{6^{1/3}}$ **12.** $64^{1/2} \cdot 64^{-1/6}$

13. $\dfrac{25^{7/4}}{25^{5/4}}$ **14.** $(4^{6})^{1/3}$ **15.** $(8^{0})^{5/3}$

16. $(4^{1/3})^{3/2}$ **17.** $(27^{1/2})^{4/3}$ **18.** $(16^{5/8})^{4/5}$

19. In 1990, the population of Austin, Texas, was 494,290. During the next 10 years, the population increased by about 3% each year.

a. Write a model giving the population P (in thousands) of Austin t years after 1990.

b. What was the population in 2000?

c. Estimate the year when the population was about 590,000.

20. At an online auction, the opening bid for a pair of in-line skates is $50. The price of the skates increases by 10.5% per bid during the next 6 bids.

a. Write a model giving the price p (in dollars) of the skates after n bids.

b. What was the price after 5 bids?

21. You buy a new mountain bike for $200. The value of the bike decreases by 25% each year.

- Write a model giving the mountain bike's value y (in dollars) after t years.
- Use the model to estimate the value of the bike after 3 years.
- Estimate when the value of the bike will be $100.

22. The value of a snowmobile has been decreasing by 7% each year since it was new. After 3 years, the value is $3000. Find the *original cost* of the snowmobile.

23. Each March from 1998 to 2003, a website recorded the number y of referrals it received form Internet search engines. The results can be modeled by $y = 2500\,(1.5)^x$ where x is the number of years since 1998.

a. Identify the initial amount, the growth factor, and the annual percent increase.

b. Estimate the number of referrals and website received from the search engines in March of 2002.

24. The equation $P = 3000(1.019)^h$ models the size of a population of bacteria, where h represents the number of hours past 12 noon.

a. Estimate the size of the bacteria population at 10am., 3pm., and 9:15pm.

b. By what *percent* is the bacteria population growing each hour?

Reference: Practice Bank, Algebra 2 Explorations and Applications, McDougall Littell, Inc. 1997
Algebra 2, Larson, Boswell, Kanold, Stiff, McDougal Littell, 2007