Name _____ Date _____ Class _____

LESSON 4-5

Practice B

Exponential and Logarithmic Equations and Inequalities

Solve and check.

1. $5^{2x} = 20$

2. $12^{2x-8} = 15$

3. $2^{x+6} = 4$

4. $16^{5x} = 64^{x+7}$

5. $243^{0.2x} = 81^{x+5}$

6. $25^{x} = 125^{x-2}$

7. $\left(\frac{1}{2}\right)^{x} = 16^{2}$

8. $\left(\frac{1}{32}\right)^{2x} = 64$

9. $\left(\frac{1}{27}\right)^{x-6} = 27$

Solve.

10. $\log_4 x^5 = 20$

11. $\log_3 x^6 = 12$

12. $\log_4 (x-6)^3 = 6$

13. $\log x - \log 10 = 14$

14. $\log x + \log 5 = 2$

15. $\log (x+9) = \log (2x-7)$

16. $\log (x+4) - \log 6 = 1$

17. $\log x^2 + \log 25 = 2$

18. $\log (x-1)^2 = \log (-5x-1)$

Use a table and graph to solve.

19. $2^{x-5} < 64$

20. $\log x^3 = 12$

21. $2^x 3^x = 1296$

Solve.

22. The population of a small farming community is declining at a rate of 7% per year. The decline can be expressed by the exponential equation $P = C(1 - 0.07)^t$, where P is the population after t years and C is the current population. If the population was 8,500 in 2004, when will the population be less than 6,000?

Name _____ Date _____ Class _____

LESSON 4-5

Practice C

Exponential and Logarithmic Equations and Inequalities

Solve.

1. $16^{3x} = 8^{x+6}$

2. $\log_2 x^6 = 3$

3. $12^{x-1} = 20^2$

4. $9^{2x} = 27^{x+4}$

5. $256^{0.5x} = 64^{2x+5}$

6. $216^{\frac{x}{3}} = 36^{2x+3}$

7. $\left(\frac{1}{9}\right)^{3x} = 27$

8. $\left(\frac{1}{16}\right)^{x+5} = 8^2$

9. $\left(\frac{2}{5}\right)^{8x} = \left(\frac{25}{4}\right)^2$

10. $\log_5 (4x - 5)^2 = 6$

11. $\log_4 (3x + 4)^5 = 15$

12. $\log_3 (10x - 1)^5 = 10$

13. $\log x - \log 8 = 3$

14. $\log 5x + \log 2 = 10$

15. $\log (x^2 - 9) = \log (5x + 5)$

16. $\log (x^2 - 1) - \log 12 = 1$

17. $\log x^3 + \log 8 = 3$

18. $\log (9x + 1) - \log x^2 = 1$

Use a table and graph to solve.

19. $\log x^2 - \log 200 = \log 2$

20. $4^{x^2} \cdot 2^{5x} = 8$

21. $3^{x^2-4x} \geq \frac{1}{27}$

Solve.

22. Lorena deposited $9000 into an account that earns 4.25% interest each year.

    a. Write an equation for the amount, A, in the account after t years.

    b. In how many years will her account exceed $20,000?

    c. If she waits for 50 years, how much will be in her account?

Practice B

1. $x \approx 0.9307$
2. $x \approx 4.5449$
3. $x = -4$
4. $x = 3$
5. $x \approx -6.67$
6. $x = 6$
7. $x = -8$
8. $x = -0.6$
9. $x = 5$
10. $x = 256$
11. $x = 9$
12. $x = 22$
13. $x = 10^{15}$
14. $x = 20$
15. $x = 16$
16. $x = 56$
17. $x = \pm 2$
18. $x = -1, -2$
19. $x < 11$
20. $x = 10{,}000$
21. $x = 4$
22. 2009

Practice C

1. $x = 2$
2. $x \approx 1.414$
3. $x \approx 3.4$
4. $x = 12$
5. $x = -3.75$
6. $x = -2$
7. $x = -0.5$
8. $x = -6.5$
9. $x = -0.5$
10. $x = 32.5$
11. $x = 20$
12. $x = 1$
13. $x = 8000$
14. $x = 10^9$
15. $x = 7$ or $x = -2$
16. $x = \pm 11$
17. $x = 5$
18. $x = -0.1, 1$
19. $x = \pm 20$
20. $x = -3$, or $x = \frac{1}{2}$
21. $x \leq 1$ or $x \geq 3$
22. a. $A = 9000(1.0425)^t$

    b. 20 years

    c. $72,118.34