Name _____ Class _____ Date _____

6-1 Practice

Form G

Roots and Radical Expressions

Find all the real square roots of each number.

1. 400
2. -196
3. 10,000
4. 0.0625

Find all the real cube roots of each number.

5. 216
6. -343
7. -0.064
8. $\frac{1000}{27}$

Find all the real fourth roots of each number.

9. -81
10. 256
11. 0.0001
12. 625

Find each real root.

13. $\sqrt{144}$
14. $-\sqrt{25}$
15. $\sqrt{-0.01}$
16. $\sqrt[3]{0.001}$
17. $\sqrt[4]{0.0081}$
18. $\sqrt[3]{27}$
19. $\sqrt[3]{-27}$
20. $\sqrt{0.09}$

Simplify each radical expression. Use absolute value symbols when needed.

21. $\sqrt{81x^4}$
22. $\sqrt{121y^{10}}$
23. $\sqrt[3]{8g^6}$
24. $\sqrt[3]{125x^9}$
25. $\sqrt[5]{243x^5y^{15}}$
26. $\sqrt[3]{(x-9)^3}$
27. $\sqrt{25(x+2)^4}$
28. $\sqrt[3]{\frac{64x^9}{343}}$
29. $\sqrt[3]{-0.008}$
30. $\sqrt[4]{\frac{x^4}{81}}$
31. $\sqrt{36x^2y^6}$
32. $\sqrt[4]{(m-n)^4}$

33. A cube has volume $V = s^3$, where s is the length of a side. Find the side length for a cube with volume 8000 cm^3.

34. The temperature T in degrees Celsius (°C) of a liquid t minutes after heating is given by the formula $T = 8\sqrt{t}$. When is the temperature 48°C?

Name _____ Class _____ Date _____

6-1 Practice (continued) Form G

Roots and Radical Expressions

Find the two real solutions of each equation.

35. $x^2 = 4$

36. $x^4 = 81$

37. $x^2 = 0.16$

38. $x^2 = \frac{16}{49}$

39. $x^4 = \frac{16}{625}$

40. $x^2 = \frac{121}{625}$

41. $x^2 = 0.000009$

42. $x^4 = 0.0001$

43. The number of new customers n that visit a dry cleaning shop in one year is directly related to the amount a (in dollars) spent on advertising. This relationship is represented by $n^3 = 13{,}824a$. To attract 480 new customers, how much should the owners spend on advertising during the year?

44. **Geometry** The volume V of a sphere with radius r is given by the formula $V = \frac{4}{3}\pi r^3$.
   a. What is the radius of a sphere with volume 36π cubic inches?
   b. If the volume increases by a factor of 8, what is the new radius?

45. A clothing manufacturer finds the number of defective blouses d is a function of the total number of blouses n produced at her factory. This function is $d = 0.000005n^2$.
   a. What is the total number of blouses produced if 45 are defective?
   b. If the number of defective blouses increases by a factor of 9, how does the total number of blouses change?

46. The velocity of a falling object can be found using the formula $v^2 = 64h$, where v is the velocity (in feet per second) and h is the distance the object has already fallen.
   a. What is the velocity of the object after a 10-foot fall?
   b. How much does the velocity increase if the object falls 20 feet rather than 10 feet?