Name:_____ Date:_____ Band:_____

Algebra 2

Rational Exponents and Radical Functions Practice Problems

6.1 nth Roots and Rational Exponents

1. Evaluate $8^{\frac{4}{3}}$ without using a calculator.   **2.** Find the real solution(s) of $x^4 - 45 = 580$.

Evaluate the expression without using a calculator.

3. $8^{\frac{7}{3}}$

4. $9^{\frac{5}{2}}$

5. $(-27)^{-\frac{2}{3}}$

Find the real solution(s) of the equation. Round your answer to two decimal places when appropriate.

6. $x^5 + 17 = 35$

7. $7x^3 = 189$

8. $(x + 8)^4 = 16$

6.2 Properties of Rational Exponents and Radicals

9. Use the properties of rational exponents to simplify $\left(\dfrac{54^{\frac{1}{3}}}{2^{\frac{1}{3}}}\right)^4$.

10. Write $\sqrt[4]{16x^{13}y^8z^7}$ in simplest form.

Simplify the expression.

11. $\left(\dfrac{6^{\frac{1}{5}}}{6^{\frac{2}{5}}}\right)^3$

12. $\sqrt[4]{32} \cdot \sqrt[4]{8}$

13. $\dfrac{1}{2-\sqrt[4]{9}}$

14. $4\sqrt[5]{8} + 3\sqrt[5]{8}$

15. $2\sqrt{48} - \sqrt{3}$

16. $\left(5^{\frac{2}{3}} \cdot 2^{\frac{3}{2}}\right)^{\frac{1}{2}}$
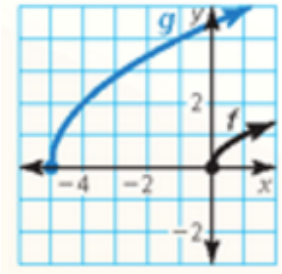
Simplify the expression. Assume all variables are positive.

17. $\sqrt[3]{125z^9}$

18. $\dfrac{2^{\frac{1}{4}}z^{\frac{5}{4}}}{6z}$

19. $\sqrt{10z^5} - z^2\sqrt{40z}$

6.3 Graphing Radical Functions

20. Describe the transformation of $f(x) = \sqrt{x}$ represented by $g(x) = 2\sqrt{x} + 5$. Then graph each function.

Describe the transformation of f represented by g. Then graph each function.

21. $f(x) = \sqrt{x}, g(x) = -2\sqrt{x}$

22. $f(x) = \sqrt[3]{x}, g(x) = \sqrt[3]{-x} - 6$

23. Let the graph of g be a reflection in the y-axis, followed by a translation 7 units to the right of the graph of $f(x) = \sqrt[3]{x}$. Write a rule for g.

6.4 Solving Radical Equations and Inequalities

24. Solve $6\sqrt{x+2} < 18$.

Solve the equation. Check your solution.

25. $4\sqrt[3]{2x+1} = 20$

26. $\sqrt{4x-4} = \sqrt{5x-1} - 1$

27. $(6x)^{\frac{2}{3}} = 36$

Solve the inequality.

28. $5\sqrt{x} + 2 > 17$

29. $2\sqrt{x-8} < 24$

30. $7\sqrt[3]{x-3} \geq 21$

31. In a tsunami, the wave speeds (in meters per second) can be modeled by $s(d) = \sqrt{9.8d}$, where d is the depth (in meters) of the water. Estimate the deoth of the water when the wave speed is 200 meters per second.