Algebra 2 Unit 5 Day 06 Notes/HW Name _____
Nth Roots & Rational Exponents Date _____ Block _____ 1

Rational Exponents
If an exponent is a fraction, the numerator represents the **power** and the denominator represents the **root**.

$\sqrt[n]{a^x} = \left(\sqrt[n]{a}\right)^x = a^{\frac{x}{n}}$	
$(base)^{\frac{power}{root}}$	$3^{\frac{3}{2}} = \sqrt{3^3} = \sqrt{3^2 \cdot 3} = 3\sqrt{3}$

1-8: Rewrite each expression using rational exponent notation.

1. $\sqrt[5]{x^2}$
2. $\sqrt[3]{5}$
3. $\sqrt[6]{16}$
4. $\sqrt[10]{x^8}$
5. $\sqrt{36x^5y^7}$
6. $\sqrt[4]{16a^2b^3}$
7. $\sqrt[3]{28x^2y^4z^3}$
8. $3\sqrt[4]{8n^{11}w^2}$

9-13: Rewrite each expression using radical notation.

9. $5^{\frac{2}{3}}$
10. $41^{\frac{2}{7}}$
11. $(216)^{\frac{4}{3}}$
12. $16^{-\frac{5}{3}}$
13. $(256)^{-\frac{7}{6}}$

14-18: Rewrite each expression USING A CALCULATOR. Round results to the nearest hundredth.

14. $(36)^{\frac{5}{2}}$
15. $(-12)^{-\frac{1}{3}}$
16. $\left(\sqrt[3]{28}\right)^7$
17. $\left(\sqrt[5]{3}\right)^{-4}$
18. $\left(\sqrt[4]{22^3}\right)$

19-23: Evaluate each expression WITHOUT USING A CALCULATOR.

19. $\sqrt[3]{125}$
20. $\sqrt[4]{81^3}$
21. $49^{-\frac{3}{2}}$
22. $-27^{\frac{2}{3}}$
23. $\left(\sqrt[3]{-64}\right)^2$

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24-35: Simplify each expression completely. Write your final answer in simplest radical form.

24. $\sqrt[5]{7a^{10}b^7c^{10}}$

25. $\sqrt[4]{16d^4e^{10}f^{15}}$

26. $\sqrt[4]{(x+2)^4}$

27. $\sqrt[6]{128x^4y^{13}z^7}$

28. $\sqrt[3]{-64(x-1)^6}$

29. $\sqrt{25(x+6)^{10}}$

30. $3^{\frac{1}{3}}x^{\frac{1}{4}}y^{\frac{5}{6}}z^{\frac{4}{3}}$

31. $(25g^5h^4)^{\frac{1}{2}}$

32. $(256j^{16}k^2l^{10})^{\frac{1}{4}}$

33. $\frac{\sqrt[3]{36xy^2}}{\sqrt[3]{10xz}}$

34. $\sqrt[4]{48a^9b^3c^{16}}$

35. $\frac{1}{3^{\frac{1}{2}}}$