Algebra 2   Name: _____

Simplifying Radicals using Prime Factorization   Date: _____

When the index matches the exponent, the answer is the base.

Ex 1. $\sqrt[3]{7^3} = $ _____   Ex 2. $\sqrt[6]{13^6} = $ _____

When we get a number that is not already written as a power, then we will use prime factorization to rewrite the number.

Make a list of the first 5 prime numbers: _____

Ex 3. 243   Ex 4. 160

Now, using our new-found skills, let's simplify these radicals.

Ex 5. $\sqrt[3]{250}$ Ex 6. $\sqrt[4]{112}$

Remember how to rationalize a denominator from first semester?

$$\frac{2}{\sqrt{3}}$$

And now we can write the expression in simplest form.

Ex 7. $\dfrac{\sqrt[5]{9}}{\sqrt[5]{2}}$ Ex 8. $\dfrac{\sqrt[3]{7}}{\sqrt[3]{3}}$

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Simplify the following by following the rules of exponents.

1. $\sqrt[7]{128}$	2. $\sqrt[3]{686}$
3. $\sqrt[4]{162}$	4. $\sqrt[5]{972}$
5. $\sqrt{3} \cdot \sqrt{12}$	6. $\sqrt[3]{5} \cdot \sqrt[3]{25}$
7. $\sqrt[4]{8} \cdot \sqrt[4]{2}$	8. $\frac{\sqrt{98}}{\sqrt{2}}$
9. $\frac{\sqrt[3]{5}}{\sqrt[3]{3}}$	10. $\frac{\sqrt[4]{9}}{\sqrt[4]{2}}$
11. $5^{\frac{2}{3}} \cdot 5^{\frac{4}{3}}$	12. $3^{\frac{1}{5}} \cdot 3^{\frac{4}{5}}$
13. $\left(4^{\frac{2}{3}}\right)^3$	14. $\left(10^{\frac{1}{2}}\right)^4$
15. $\frac{8^{\frac{5}{2}}}{8^{\frac{1}{2}}}$	16. $\frac{7^{\frac{2}{3}}}{7^{\frac{5}{3}}}$