Simplifying Radical Expressions Notes

Simplifying Radical Expressions → reducing a radical to its simplest form.

Prime Factorization → the set of prime numbers that multiply to give the original number. A prime number is any number that is only divisible by 1 and itself.

Factor Tree → a diagram that you can use to find the factors of a number.

Method 1: Steps for simplifying radical expressions

1. If there are any integers (numbers) under the radical, use a factor tree to find the prime factorization.
2. Break down the expression under the radical into all of its factors.
3. Circle matching numbers or variables in groups of *n* (whatever the index is).
4. Simplify. Leave any left over numbers or variables inside the radical.

Method 2: See examples on Pages 363 and 368 of textbook. You need to memorize perfect squares & cubes!

Simplify the following radical expressions.

Method 1	Method 2
Ex. 1 $\sqrt{24x^7y^3}$ $\sqrt{2\cdot2\cdot2\cdot3\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot y\cdot y\cdot y}$ $2\cdot x\cdot x\cdot x\cdot y\cdot\sqrt{2\cdot3\cdot x\cdot y}$ $2x^3y\sqrt{6xy}$	
Ex. 2 $\sqrt[3]{54a^5b^9}$ $\sqrt[3]{3\cdot3\cdot3\cdot2\cdot a\cdot a\cdot a\cdot a\cdot a\cdot b\cdot b\cdot b\cdot b\cdot b\cdot b\cdot b\cdot b}$ $3\cdot a\cdot b\cdot b\cdot b\cdot\sqrt[3]{2\cdot a\cdot a}$ $3ab^3\sqrt[3]{2a^2}$	
Ex. 3 $\sqrt[4]{64r^3v^6}$ $\sqrt[4]{2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot r\cdot r\cdot r\cdot v\cdot v\cdot v\cdot v\cdot v}$ $2\cdot v\cdot\sqrt[4]{2\cdot2\cdot r\cdot r\cdot r\cdot v\cdot v}$ $2v\sqrt[4]{4r^3v^2}$	