Section 11-1:
Intro to Exponents

Objectives:

- **Create factor trees.**
- **Tell if a # is prime or composite.**
- **Rewrite #'s and expressions into exponential form.**
- **Simplify expressions with exponents and square roots.**
- **Use the order of operations with exponents.**

Exponent: Counts how many times a # is multiplied to itself.

$$5^3 = 5 \cdot 5 \cdot 5 = 125$$

Ex 1 - Expand the following:

$$2^4 \cdot 3^5 \cdot 4^2$$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 4 \cdot 4$

Exponential Form:

Write with exponents.

Ex 2:

$3 \cdot 5 \cdot 3 \cdot 7 \cdot 7 \cdot 5 \cdot 7 \cdot 3 \cdot 3 \cdot 2$

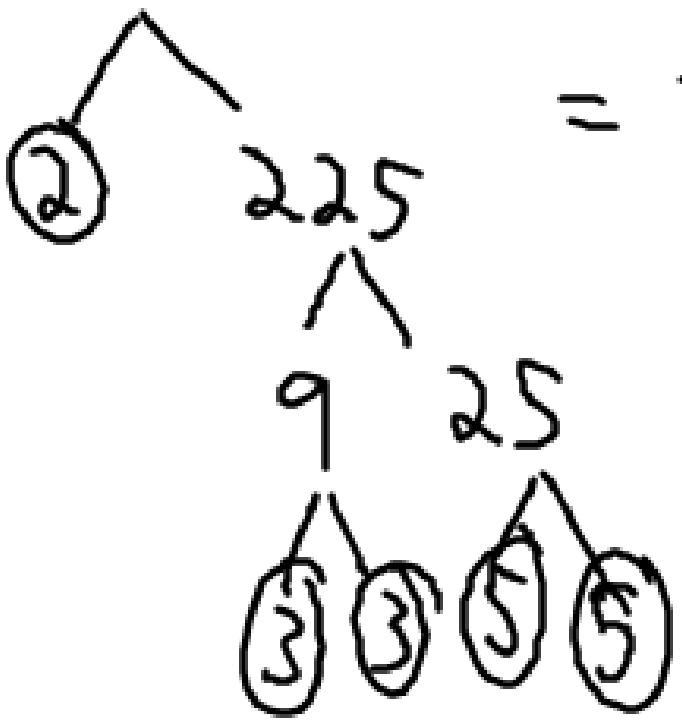
$2 \cdot 3^4 \cdot 5^2 \cdot 7^3$

Prime Factorization

(Use a Factor Tree)

Ex 3: $450 = 2 \cdot 3 \cdot 3 \cdot 5 \cdot 5$

$= 2 \cdot 3^2 \cdot 5^2$



A Prime # is only divisible by 1 and itself.

A Composite # is any # that's not prime.

**** 1 is not prime or composite ****

Ex 4: Prime or Composite?

51 → Composite, divisible by 3

73 → Prime

213 → Composite, divisible by 3

Ex 5 - **Write in expanded form:**

$$x^2 \cdot y^3 \cdot z^4$$

$x \cdot x \cdot y \cdot y \cdot y \cdot 2 \cdot 2 \cdot 2 \cdot 2$

Ex 6 - **Write in exponential form:**

$$4 \cdot x \cdot y \cdot y \cdot 2 \cdot x \cdot y \cdot z$$

$8 \cdot x^2 \cdot y^3 \cdot 2$ or $8x^2y^3z$

Ex 7 - Exponential form:

abccbaa $= a^3 b^2 c^2$

Square Root:

Asks what # can be multiplied to itself to get the # inside.

Ex 8:

$\sqrt{25} = 5$ $\sqrt{100} = 10$ $\sqrt{49} = 7$

Order of Operations:

- **P** ( ) [ ] { } |x| $\sqrt{\ }$
- **E** $5^{③}$
- **M** · } Left to Right
- **D** ÷ }
- **A** + } Left to Right
- **S** − }

Simplify each exponent.

	Exp.	Simplified	Exp.	Simplified
25.	-2^2	$-2 \cdot 2 = -4$	$(-2)^2$	$(-2)\cdot(-2) = 4$
26.	-2^3	$-2 \cdot 2 \cdot 2 = -8$	$(-2)^3$	$(-2)(-2)(-2) = -8$
27.	-2^4	$-2 \cdot 2 \cdot 2 \cdot 2 = -16$	$(-2)^4$	$(-2)(-2)(-2)(-2) = 16$

Use the order of operations to evaluate.

34. $-6^2 + 2 \cdot 3$

$-36 + 2 \cdot 3$

$-36 + 6$

-30

37. $(7-9)^2 + 36 \div 4$

$(-2)^2 + 36 \div 4$

$4 + 36 \div 4$

$4 + 9$

13

40. $\frac{x^2}{2}$ for $x = -4$

$\frac{(-4)^2}{2} = \frac{16}{2}$

$= 8$