1.2 Exponents and Order of Operations Teacher Notes

Vocabulary:

CC

1. product - the result when two numbers are multiplied

   $6 \cdot 3 = 18$

2. factors – the whole numbers multiplied together to make a product

3. exponent - tells you how many times a number (the base) is used as a factor

   5^3 ← exponent

   ↑ base

4. perfect square - The square of a whole number
   25 is a perfect square because is equals $5 \cdot 5$ and 5^2

Examples: Write using an exponent

1.) $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 3^5$	2.) $2.7 \cdot 2.7 \cdot 2.7 = 2.7^3$

Examples: Expand each of the following

3.) $5^3 = 5 \cdot 5 \cdot 5 = 125$	4.) $2^4 = 2 \cdot 2 \cdot 2 \cdot 2$

Examples: Is the expression a perfect square? Why or why not?

5.) 3^2 Yes, because is equals 3 x 3. 3 is used as a factor exactly two times.	6.) $7^3 =$ No, because it equals 7x7x7. 7 is used as a factor more than two times.

Examples: Is the number a perfect square? Why or why not?

7.) 64 Yes, because 8x8 equals 64. 8 is used a factor exactly two times.	8.) 20 No, because there is no whole number that you can multiply by itself to equal 20. 4x4 is 16 (too low) 5x5 is 25 (too high)

1.3 Order of Operations Teacher Notes

Vocabulary:

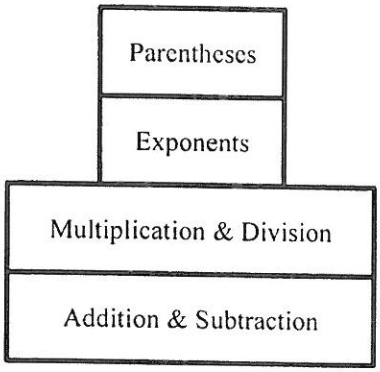
1. expression – contains numbers and operation symbols (no __equal____signs)

2. evaluate – find the value (____the answer_)

Steps on How to Solve Exponent Problems:

USE Order of Operations (PEMDAS)

1.) Do all operations within grouping symbols first.
2.) Then do exponents
3.) Multiply and divide **in order from left to right.**
4.) Add and subtract **in order from left to right.**



Examples: Simplify each of the following

1.) $20 - 5 + 2$ $15 + 2$ 17	2.) $18 + 6 - 3$ $24-3$ 21
3.) $5^2 - 5(10 - 5)$ $5^2 - 5(5)$ $25 - 25 = \mathbf{0}$	4.) $(3 - 1 + 5) - 2^2$ $(2 + 5) - 2^2$ $7 - 2^2$ $7 - 4 = \mathbf{3}$
5.) $30 \div (7 + 2^3) \cdot 6$ $30 \div (7 + 8) \cdot 6$ $30 \div (15) \cdot 6$ $2 \cdot 6 = \mathbf{12}$	6.) $\frac{26 \div 2 + 5}{3^2 - 3}$ $= \frac{13 + 5}{9 - 3}$ $= \frac{18}{6} = \mathbf{3}$

Name: KEY

1.4 Prime, Composite & Factors Teacher Notes

Definitions and Examples

A factor is a whole number that Divides another whole number with a remainder of 0.

Examples: 5 is a factor of 15, because $15 \div 5 = 3$.

A prime number is a whole number with exactly 2 factors, 1 and itself.

Examples: 11, 13, 19

A composite number is a whole number greater than one with more than 2 factors.

Examples: 6 (2 and 3, plus 1 and 6)
8 (2 and 4, plus 1 and 8)

Finding Factors

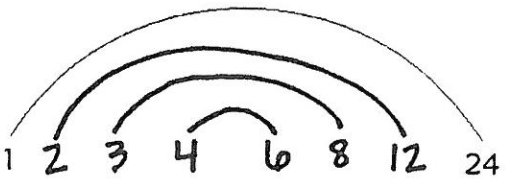
Factors are smaller numbers – they fit inside of a larger number. Factors will always include at least two numbers: 1 and the number itself!

Example 1) Find the factors of 24.

There are two ways to show the factors of 24:

1×24
2×12
3×8
4×6

OR



Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

1.4

Example 2) Find the factors of 20.

1 x 20
2 x 10
4 x 5

Factors of 20: 1, 2, 4, 5, 10, 20

Example 3) Find the factors of 35.

1 5 7 35

Factors of 35: 1, 5, 7, 35

Determining Prime or Composite

If a number has even **one** factor other than 1 or itself, it is composite.

Example 4) Is 63 prime or composite? Explain.

Composite: Divisible by 3.

Example 5) Is 17 prime or composite? Explain.

Prime: only factors are 1 and 17.

Example 6) Is 51 prime or composite? Explain.

Composite: Divisible by 3.

Name: KEY

1.5 **Greatest Common Factor (GCF)** Teacher Notes

Ex. 1) List all of the factors of 12 and 20:

12: 1, 2, 3, 4, 6, 12

20: 1, 2, 4, 5, 10, 20

What does GCF mean??? Define:

Greatest – Biggest

Common – Same/alike

Factor – ex. 1, 2, 3, 4, 6, 12 (12)

We can break down numbers using the same division ladder that we used to find the LCM to help us find the GCF of a pair of numbers!

Ex. 2) Find the GCF of 24 and 45

	24	45
3		
1	8	15

$3 \cdot 1 = \boxed{3}$

Ex. 3) Find the GCF of 36 and 84

	36	84
2		
2	18	42
3	9	21
1	3	7

$2 \cdot 2 \cdot 3 \cdot 1 = \boxed{12}$

Ex. 4) Find the GCF of 11 and 23

	11	23
1		

$\boxed{1}$

Ex. 5) Find the GCF of 54 and 84

	32	60
4		
1	8	15

$4 \cdot 1 = \boxed{4}$

Section 1.6: Multiples and Least Common Multiple Notes

Vocabulary:

1. least common multiple (LCM) – the smallest multiple that is common to 2 or more numbers

Examples:

Finding Multiples: To find the multiples of a number, take the number and multiply it by any non-zero whole number.

1.) List the first four multiples of 7.

7, 14, 21, 28

2.) List the first four multiples of 15.

15, 30, 45, 60

Steps on Finding the LCM:

1.) Create the ladder for the two numbers.
2.) Decide if 2, 3, 5, or 7 can go into **BOTH** numbers.
3.) Keep going until the two numbers do not have anything in common.
4.) For LCM: Multiply all the numbers on the outside of the ladder. (Make an L)

3.) Find the LCM of 6 and 8.

$$\begin{array}{r|ll} 2 & 6 & 8 \\ \hline & 3 & 4 \end{array}$$

$LCM = 2 \cdot 3 \cdot 4 = 24$

4.) Find the LCM of 9 and 15

$$\begin{array}{r|ll} 3 & 9 & 15 \\ \hline & 3 & 5 \end{array}$$

$LCM = 3 \cdot 3 \cdot 5 = 45$

5.) Find the LCM of 18 and 12

$$\begin{array}{r|ll} 2 & 18 & 12 \\ 3 & 9 & 6 \\ \hline & 3 & 2 \end{array}$$

$LCM = 2 \cdot 3 \cdot 3 \cdot 2 = 36$

6.) Find the LCM of 30 and 45

$$\begin{array}{r|ll} 3 & 30 & 45 \\ 5 & 10 & 15 \\ \hline & 2 & 3 \end{array}$$

$LCM = 3 \cdot 5 \cdot 2 \cdot 3 = 90$

7.) Find the and LCM of 12 and 40.

$$\begin{array}{r|ll} 2 & 12 & 40 \\ 2 & 6 & 20 \\ \hline & 3 & 10 \end{array}$$

$LCM = 2 \cdot 2 \cdot 3 \cdot 10 = 120$