

# 1.1 Exponents, Order of Operations, GCF, LCM, Mixed and Improper Fractions

## 7th Grade

1.1 Exponents, Order of Operations, GCF, LCM, Mixed <-> Improper Fractions  
Review

Repeated addition shortcut = multiplication

$$2+2+2 = 2 \times 3$$

Repeated multiplication shortcut = exponents

$$2 \times 2 \times 2 = 2^3$$

base  $\rightarrow$   $2^3$   $\leftarrow$  power or exponent

Special Names:

$x^2$ : x to the 2nd power = x squared

$x^3$ : x to the 3rd power = x cubed

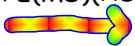
Write as a product

1)  $6^5$   $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$

2)  $2^7$   $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

## Order of Operations

PE(MD)(AS) - Please Excuse My Dear Aunt Sally



- ↓ Parentheses or { }, [ ] (work from inside out)
- Exponents
- Multiplication & Division (from left to right)
- Addition & Subtraction (from left to right)

Ex)  $8 + 5 \times (12 - 6 \div 3)$   $(58)$

$8 + 5 \times 10$

$8 + 50$

Ex)  $2 [18 - (5 + 3^2) \div 7]$   $(32)$

$2 [18 - 14 \div 7]$

$2 \cdot 16$

Fraction Bar - do top and bottom separately, then divide

Ex)  $\frac{8 + 2(4-1)}{3^2 - 2} \cdot \frac{14}{7} = 2$

$\frac{8 + 2(4-1)}{9-2} \cdot \frac{14}{7} = 2$

You Try:

1)  $5^2 - 4 \cdot 6 \div 3$  (17)  
 $5 \cdot 5 = 25$   
 $25 - 24 \div 3$   
 $25 - 8 = 17$

2)  $\frac{36}{8-3}$  = 6  
 $8-3 = 5$   
 $\frac{36}{5} = 7.2$

GCF - Greatest Common Factor:

- equal to or smaller than the given #'s
- use prime factorization, product of all common factors.

Find the GCF of the following:

1) 30, 15 (15)  
 $30 = 2 \cdot 3 \cdot 5$   
 $15 = 3 \cdot 5$   
 Common factors: 3, 5

2) 12, 16 (4)  
 $12 = 2 \cdot 2 \cdot 3$   
 $16 = 2 \cdot 2 \cdot 2 \cdot 2$   
 Common factors: 2, 2

LCM - Least Common Multiple:

- equal to or greater than the given #'s
- list multiples of each number, 1st common factor found

Find the LCM of the following:

5) 6, 9  

6	12	18
9	18	27

6) 3, 5  

3	6	9	12	15
5	10	15	20	25

You Try:

Find the GCF of 8 and 14

$8 = 2 \cdot 2 \cdot 2$   
 $14 = 2 \cdot 7$   
 Common factor: 2

Find the LCM of 5 and 15

5	10	15
15	30	45

$2 \cdot 2 \cdot 2 \cdot 7$

(2)

Mixed and Improper Fractions

Change from improper to mixed number - Use Long Division

$$\frac{5}{2} = 2 \frac{1}{2}$$

Divisor → 2  
 Dividend → 5  
 Remainder → 1  
 Divisor → 2

1)  $\frac{13}{4}$

$$\begin{array}{r} 3 \frac{1}{4} \\ 4 \overline{) 13} \\ \underline{12} \\ 1 \end{array}$$

2)  $\frac{21}{5}$

$$\begin{array}{r} 4 \frac{1}{5} \\ 5 \overline{) 21} \\ \underline{20} \\ 1 \end{array}$$

Change from mixed number to improper fraction  
 - Multiply Divisor and Dividend then add Remainder

$$4 \frac{1}{2} = \frac{4 \cdot 2 + 1}{2} = \frac{8 + 1}{2} = \frac{9}{2}$$

Dividend → 4 + 1  
 Divisor → 2

3)  $2 \frac{1}{6}$

$$\frac{13}{6}$$

4)  $3 \frac{3}{4} = \frac{15}{4}$

Try this:

Change to improper fraction

$$8 \frac{2}{5} = \frac{42}{5}$$

Change to mixed number

$$\frac{25}{6} = 4 \frac{1}{6}$$

# Homework

## Worksheet