

# 5 Grade 5 Math

## Category 1 – Numerical Representations & Relationships

### PLACE, PLACE VALUE, AND VALUE OF A DIGIT

Find **place** starting at decimal; **digit's value = digit x place value**

**Example:** In 921,154,803.637, the value of 7 is  $7 \times 0.001 = 0.007$

Place	Place Value	Digit	Digit's Value
hundred millions	100,000,000	9	900,000,000
ten millions	10,000,000	2	20,000,000
millions,	1,000,000	1	1,000,000
hundred thousands	100,000	1	100,000
ten thousands	10,000	5	50,000
thousands,	1,000	4	4,000
hundreds	100	8	800
tens	10	0	0
ones.	1	3	3
tenths	0.1	6	0.6
hundredths	0.01	3	0.03
thousandths	0.001	7	0.007

**expanded notation:** expression that adds each digit's value

**Examples:** two and twelve thousandths:  $2.012 = 2 + 0.01 + 0.002$   
 sixty-seven hundredths:  $0.67 = 0.6 + 0.07$   
 five million three and two tenths:  $5,000,003.2 = 5,000,000 + 3 + 0.2$

### COMPARING, ORDERING, ROUNDING DECIMALS

- Line up the same place values in columns by aligning the decimals.
- Starting from the left, compare the digits.
- If the digits in a column are the same, go to the next column (right) and compare. Do this until a column has different digits.
- Compare the different digits.

**Example:**  $6.08 > 6.079$   
 $6.08$  ← Wrong, decimals are not aligned.  
 $6.079$

**rounding:** used to estimate values to a certain place

**Examples:** If digit to right of rounding place is 5 or greater, round up. If digit to right < 5, round down.

Number	Round to	Because ...
15.867	nearest whole number	digit of 8 is $> 5$
0.003	nearest hundredth	digit of 3 is $< 5$
9.051	nearest tenth	digit of 5 is $= 5$
2.196	nearest hundredth	digit of 6 is $> 5$

### PRIME AND COMPOSITE NUMBERS

Two numbers multiply together to make a product. Example: 3 and 9 are factor pair of 63

**prime number:** these number types are only prime numbers  
 only one factor other than itself  
 Examples: 2, 3, 5, 7, 11, 13, 17, 19, 23

**composite number:** has more than two factors  
 Example: 573 is not prime, has more than two factors  
 $5 + 7 + 3 = 15$ , and 15 is a multiple of 3  
**Rule (c):** 573 ÷ 3 = 191, so 3 is a factor

**Examples:** 4, 6, 8, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24  
**factor tree:** composite number's factors shown until only prime numbers remain

**Example:** Circle the prime numbers. 972 57 59 81 13 27 49 23 2 5

## NUMERICAL EXPRESSIONS AND SIMPLIFICATION

**parentheses ( ): used to group an expression** Example:  $(3 - \frac{1}{2})$

**brackets [ ]:** used to group an expression that includes one or more groups in parentheses Example:  $2(10(\frac{1}{2} - \frac{1}{3}) + 5)$

There are many ways to indicate multiplication: the **x** sign, the **•** sign, and with no symbol (as in  $6(5 - \frac{1}{2})$ ) or in **brackets [ ]**.

**Examples:**  $2 \times 3 = 2 \cdot 3 = 2(3) = 2(5 - \frac{1}{2})$   
 $\frac{1}{3}(100 - 22)$  is half of  $(100 - 22)$  is 5 times larger than 17

To **simplify** an expression, use the **order of operations:** start from the "inside" and work outward:

1. Parentheses
2. Brackets
3. Multiplication (left to right)
4. Addition and subtraction (left to right)

**Examples:** Simplify  $2(4 + 6) - 3(5 - 2)$   
 $2(10) - 3(3) = 20 - 9 = 11$   
 A-2:  $\frac{49}{5} - \frac{1}{7} = \frac{343}{35} - \frac{5}{35} = \frac{338}{35}$   
 $3(9 - 4 \times 2 + 18 \div 3) = 3(9 - 8 + 6) = 3(7) = 21$   
 $9 - 8 + 6 = 1 + 6 = 7$  → left to right, not 9 - 14

## Category 2 – Computational Skills & Algebraic Relationships

### WORKING WITH POSITIVE RATIONAL NUMBERS

Before performing operations, convert numbers to same form.

From	To	Conversion Method
whole number	fraction	put the whole number over 1 ( $5 = \frac{5}{1}$ )
decimal	fraction	put digits to right of decimal point as numerator; use smallest place value for denominator; any whole number portion remains whole ( $2.15 = 2\frac{15}{100}$ )
fraction	decimal or whole number	divide numerator by denominator (if evenly divisible, answer is whole number) $\frac{a}{b} = n + \frac{d}{b}$ or $d \div b$ ( $\frac{3}{2} = 0.6$ ) $5 \overline{) 3.0}$
fraction	equivalent fraction	multiply or divide both numerator and denominator by same non-zero number ( $\frac{1}{2} = \frac{5 \times 1}{2 \times 2} = \frac{5}{4}$ ; $\frac{215}{100} = \frac{215 \div 5}{100 \div 5} = \frac{43}{20}$ ; $\frac{6}{10} = \frac{6 \div 2}{10 \div 2} = \frac{3}{5}$ )
mixed number	improper fraction	convert whole number to equivalent fraction with same denominator as fraction part and add ( $2\frac{15}{100} = \frac{200}{100} + \frac{15}{100} = \frac{215}{100}$ )
improper fraction	mixed number	divide $d \overline{) n}$ ; quotient is mixed number's whole part; remainder over divisor is fraction part ( $\frac{7}{2} \rightarrow 2 \overline{) 7} \rightarrow 3 \text{ R } 1 = 3\frac{1}{2}$ )

### ADDITION AND SUBTRACTION PROBLEMS

**tract.**  
 left?  
 3 gal  
 to  
 ned.  
 7.5 ✓  
 [7  
 5

Day 2 =  $4\frac{15}{100} - \frac{3}{100} = 3\frac{12}{100} = 3\frac{3}{25}$ ; Day 2 =  $4.75 - 0.8 = 3.95$   
 Total =  $4\frac{15}{100} + 3\frac{12}{100} = 7\frac{27}{100} = 7\frac{27}{100}$ ; Total =  $4.75 + 3.95 = 8.7$  km

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