7th Grade Math Reference Sheet

Number Sense

DECIMALS — NS 1

To change a **DECIMAL ⇨ FRACTION**, use the place value of the decimal as the denominator of the fraction; simplify if needed.

Addition

1. Line up decimal points
2. Add numbers
3. Bring down the decimal point

Subtraction

1. Line up decimal points
2. Subtract numbers
3. Bring down the decimal point

Multiplication

1. Multiply the numbers
2. Count the total number of decimal places
3. Insert the decimal point from the right

Division

1. Change divisor to a whole number
2. Move dividend decimal the same number of places
3. Divide
4. Move decimal point straight up into answer

FRACTIONS — NS 2

To change a **FRACTION ⇨ DECIMAL**, divide the numerator by the denominator

Addition

1. Find common denominator
2. Change the numerator(s), if needed
3. Add
4. Simplify to lowest terms

Subtraction

1. Find common denominator
2. Change the numerator(s), if needed
3. Subtract
   Simplify to lowest terms

Multiplication

1. Change mixed numbers to improper fractions
2. Cross simplify
3. Multiply numerators then multiply denominators
4. Simplify to lowest terms

Division

1. Change mixed numbers to improper fractions
2. Flip the fraction after the division sign to its reciprocal
3. Multiply numerators then multiply denominators
4. Simplify to lowest terms

INTEGER RULES			NS 3
	Same Signs	**Different Signs**	
Addition	Add numbers Keep sign the same	Subtract numbers Use sign of larger number	**ABSOLUTE VALUE** A number's distance from zero Always positive Symbol |x|
Subtraction	Change subtraction to adding the opposite Follow addition rules		
Multiplication & Division	Even Number of Negative Signs; Answer is Positive	Odd Number of Negative Signs; Answer is Negative	

DIVISIBILTY RULES	NS 4
A number is divisible by 3 if the sum of the digits is divisible by 3 A number is divisible by 4 if the last two digits is a number that is divisible by 4 A number is divisible by 6 if it is divisible by 2 and 3 A number is divisible by 9 if the sum of the digits is divisible by 9	

PERCENTS	NS 5
To change a **DECIMAL ⇨ PERCENT**, move the decimal point 2 places to the RIGHT To change a **PERCENT ⇨ DECIMAL**, move the decimal point 2 places to the LEFT **Equation Method** _____% of _____ is _____ (decimal or fraction) (x) (=) **Proportion Method** $\frac{\%}{100} = \frac{is}{of}$ **Percent Change** $\frac{\%}{100} = \frac{amount\ of\ change}{original}$	

PRIME FACTORIZATION — NS 6

- To break down a number using only prime numbers
- Factor Tree or Ladder Method
- Use exponents in your answer, if necessary

GCF & LCM — NS 7

GCF:

Use Ladder Method
Only prime numbers that can divide all numbers
Multiple numbers on side of ladder

LCM:

Use Ladder Method
Prime Numbers until only common factor = 1
Multiply numbers on side and bottom of ladder

SIGNAL WORDS IN WORD PROBLEMS — NS 8

Addition	Subtraction	Multiplication	Division
Increased by	Decrease by	Of	Equal Parts
Sum	Difference	Times	Quotient
Total	How much more	Product	Average
In all	Minus	Multiplied By	Divided By
Added To	Fewer	Twice	
Together	Fewer than		

Data Analysis, Statistics, and Probability

MEASURES OF CENTRAL TENDENCY — DSP 1

Vocabulary

sum
median
mode
range
outlier

PROBABILITY — DSP 2

Probability ranges from 0 (never happens) to 1 (always happens)

Probability of one event =

$$\frac{\text{number of favorable outcomes}}{\text{number of total possible outcomes}}$$

Probability of two events = P(first event) * P(second event)

Patterns, Relations, and Algebra

SOLVING EQUATIONS — PRA 1

Steps to Solve an Equation

1. Distribute numbers outside parentheses, if needed
2. Collect like terms on the same side of the equal sign, if needed
3. Isolate the variable by inverse operation(s); keep equation balanced (what you do to one side, you must do to the other side)
4. Solve

SOLVING INEQUALITIES — PRA 2

Steps to Solve an Inequality

1. Use the same steps as solving equations
2. Reverse the inequality sign when you multiply or divide by a negative number
3. Shade the number line to make the inequality statement true
4. > or < use an open circle on the number line
5. ≥ or ≤ use a closed circle on the number line

SCIENTIFIC NOTATION — PRA 3

Scientific Notation Form:

$a \times 10^x$ $\quad 1 \leq a \leq 10$

n = exponent; represents number of places to move decimal to the right

Standard Notation to Scientific Notation:

Move the decimal after first digit

The number of digits after decimal point is the exponent

EXPONENTS — PRA 4

a^n a is the base number, n = exponent number of times to multiply the base number by itself

Multiplying with Exponents:

$$a^m \cdot a^n = a^{m+n}$$

Power of a Power:

$$(a^m)^n = a^{mn}$$

Dividing with Exponents:

$$\frac{a^m}{a^n} = a^{m-n}$$

Zero Exponent:

$$a^0 = 1$$

Geometry and Measurement

GEOMETRY TERMS — GM 1

Lines:

Parallel

Perpendicular

Vertical

Triangle Sides:

Isosceles

Equilateral

Scalene

Angles:

Acute

Obtuse

Straight

Reflex

Triangle Angles:

Acute

Obtuse

Right

GEOMETRY HINTS — GM 2

Angles:

Complementary comes before Supplementary

Circles:

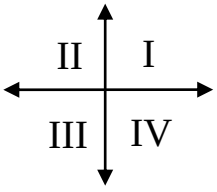
Radius < Diameter

Polygons:

Triangles = 180^o Quadrilaterals = 360^o

COORDINATE PLANE

GM 3



x-axis = horizontal axis

y-axis = vertical axis

origin = intersection of axes

Ordered Pair:

(x, y)

Movement

x-coordinate = *left* or *right*

y-coordinate = *up* or *down*

GRAPHING

GM 4

Equation:

a) Table of Values (input/output)

- Use a value for x from the table to solve for y
- Graph the value of x and the solution for y as an ordered pair

b) Slope - Intercept Form: $y = mx + b$

- To graph: Start at y-intercept (b)
- Count the slope: (m) = $\frac{\text{Rise}}{\text{Run}}$