

8th Grade Math Reference Sheet

Number Sense

DECIMALS

NS 1

To change a **DECIMAL** \Rightarrow **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** \Rightarrow **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
4. 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	ABSOLUTE VALUE A number's distance from zero Always positive Symbol $ x $
Addition	Add numbers Keep sign the same	Subtract numbers Use sign of larger number	
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	

DIVISIBILITY RULES	NS 4
<p>A number is divisible by 3 if the sum of the digits is divisible by 3</p> <p>A number is divisible by 4 if the last two digits is a number that is divisible by 4</p> <p>A number is divisible by 6 if it is divisible by 2 and 3</p> <p>A number is divisible by 9 if the sum of the digits is divisible by 9</p>	

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

PRIME FACTORIZATION	NS 6
<ul style="list-style-type: none"> 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
<p>GCF:</p> <p>Use Ladder Method</p> <p>Only prime numbers that can divide all numbers</p> <p>Multiple numbers on side of ladder</p> <p>LCM:</p> <p>Use Ladder Method</p> <p>Prime Numbers until only common factor = 1</p> <p>Multiply numbers on side and bottom of ladder</p>	

SIGNAL WORDS IN WORD PROBLEMS				NS 8
<p>Addition</p> <p>Increased by</p> <p>Sum</p> <p>Total</p> <p>In all</p> <p>Added To</p> <p>Together</p>	<p>Subtraction</p> <p>Decrease by</p> <p>Difference</p> <p>How much more</p> <p>Minus</p> <p>Fewer</p> <p>Fewer than</p>	<p>Multiplication</p> <p>Of</p> <p>Times</p> <p>Product</p> <p>Multiplied By</p> <p>Twice</p>	<p>Division</p> <p>Equal Parts</p> <p>Quotient</p> <p>Average</p> <p>Divided By</p>	

Data Analysis, Statistics, and Probability

MEASURES OF CENTRAL TENDENCY	DSP 1
<p>Vocabulary</p> <p>sum</p> <p>median</p> <p>mode</p> <p>range</p> <p>outlier</p>	

PROBABILITY	DSP 2
<p>Probability ranges from 0 (never happens) to 1 (always happens)</p> <p>Probability of one event =</p> <p style="text-align: center;">$\frac{\text{number of favorable outcomes}}{\text{number of total possible outcomes}}$</p> <p>Probability of two events = $P(\text{first event}) * P(\text{second event})$</p>	

Patterns, Relations, and Algebra

SOLVING EQUATIONS	PRA 1
<p>Steps to Solve an Equation</p> <ol style="list-style-type: none"> 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
<p>Steps to Solve an Inequality</p> <ol style="list-style-type: none"> 1. Use the same steps as solving equations 2. <u>Reverse</u> 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. \geq or \leq use a closed circle on the number line 	

SCIENTIFIC NOTATION	PRA 3
<p>Scientific Notation Form:</p> $a \times 10^x \quad 1 \leq a \leq 10$ <p style="margin-left: 150px;">$n =$ exponent; represents number of places to move decimal to the right</p> <p>Standard Notation to Scientific Notation:</p> <p style="margin-left: 20px;">Move the decimal after first digit</p> <p style="margin-left: 20px;">The number of digits after decimal point is the exponent</p>	

EXPONENTS	PRA 4
<p>a^n a is the base number, $n =$ exponent number of times to multiply the base number by itself</p> <p>Multiplying with Exponents:</p> $a^m \cdot a^n = a^{m+n}$ <p>Power of a Power:</p> $(a^m)^n = a^{mn}$ <p>Dividing with Exponents:</p> $\frac{a^m}{a^n} = a^{m-n}$ <p>Zero Exponent:</p> $a^0 = 1$	

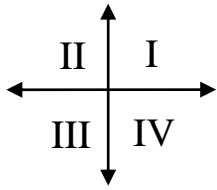
Geometry and Measurement

GEOMETRY TERMS	GM 1
<p>Lines:</p> <ul style="list-style-type: none"> Parallel Perpendicular Vertical <p>Triangle Sides:</p> <ul style="list-style-type: none"> Isosceles Equilateral Scalene 	<p>Angles:</p> <ul style="list-style-type: none"> Acute Obtuse Straight Reflex <p>Triangle Angles:</p> <ul style="list-style-type: none"> Acute Obtuse Right

GEOMETRY HINTS	GM 2
<p>Angles:</p> <p style="margin-left: 40px;">Complementary comes before Supplementary</p> <p>Circles:</p> <p style="margin-left: 40px;">Radius $<$ Diameter</p> <p>Polygons:</p> <p style="margin-left: 40px;">Triangles = 180° Quadrilaterals = 360°</p>	

COORDINATE PLANE

GM 3



x -axis = horizontal axis
 y -axis = vertical axis
origin = intersection of axes

Movement**Ordered Pair:**
right

(x , y)
down

x -coordinate = *left* or

y -coordinate = *up* or

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) = $\frac{\text{Rise}}{\text{Run}}$