Blake Middle School Math Reference Sheet

Adding Integers

Same Sign:	Different Sign:
1. Add absolute value of the numbers	1. Subtract absolute value of the numbers
2. Keep the sign	2. Keep the sign of the number with the larger absolute value

Subtracting Integers (Change to an addition problem)

1. Keep the first number the same
2. Change subtraction to addition
3. Change the sign of the second number to be its opposite
4. Add using addition rules above

Multiplying and Dividing Numbers

+ · + = +	+ ÷ + = +
− · − = +	− ÷ − = +
+ · − = −	+ ÷ − = −
− · + = −	− ÷ + = −

Absolute Value

|+ number| = + number

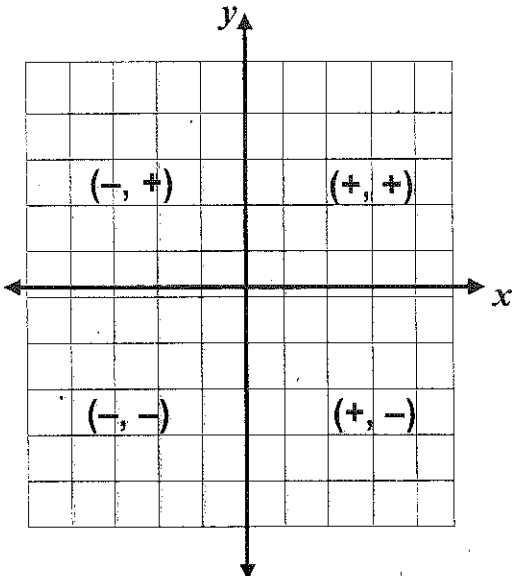
|− number| = + number

How to Plot a Point

(x, y)

Use x axis first: move left or right

Use y axis next: move up or down



Metric Conversions	1 kilometer (km) = 1,000 meters (m) 1 meter (m) = 100 centimeter (cm) 1 centimeter (cm) = 10 millimeters (mm) ***King Henry Died Unwillingly Drinking Chocolate Milk***
Measurements	1 foot = 12 inches 1 yard = 3 feet 1 mile = 5280 feet 1 year = 52 weeks 1 year = 365 days 1 minute = 60 seconds

Order of Operations - PEMDAS

1. **P**arenthesis
2. **E**xponent
3. **M**ultiplication and **D**ivision (left to right)
4. **A**ddition and **S**ubtraction (left to right)

Prime Factorization

1. Choose two factors
2. Make a factor tree
3. Circle prime numbers
4. Write prime numbers, using exponents, as a product

Comparing and Ordering Numbers

$\_\_\_\_\_ < \_\_\_\_\_$

Smaller number < Larger number

$\_\_\_\_\_ > \_\_\_\_\_$

Larger Number > Smaller Number

Divisibility Rules

A number is able to be divided by…

2	If the last digit is even
3	If the sum of the digits can be divided by 3.
4	If the last two digits can be divided by 4.
5	If the last digit is 0 or 5.
6	If the number can be divided by both 2 and 3.
8	If the number is divisible by 4 and result is even
9	If the sum of the digits can be divided by 9.
10	If the last digit is 0.
12	If the number can be divided by 3 and 4
15	If the number can be divided by 3 and 5.

Adding/Subtracting Fractions

1. If mixed, change to improper
2. Find common denominator
   - Multiply top and bottom by same number
3. Add/subtract numerators
4. Keep denominator
5. Simplify and reduce

Multiplying Fractions

1. If mixed, change to improper
2. Multiply numerators
3. Multiply denominators
4. Simplify and reduce

Dividing Fractions

1. If mixed, change to improper
2. Flip second fraction, keep first fraction
3. Multiply numerators
4. Multiply denominators
5. Simplify and reduce

Mixed Number to Improper Fraction

1. Multiply the whole number by the denominator
2. Add the numerator
3. Answer becomes numerator
4. Denominator stays the same as original

Improper Fraction to a Mixed number

1. How many times does denominator go into numerator?
2. Answer becomes whole number
3. Remainder becomes numerator
4. Denominator stays the same as original

Comparing Fractions

1. Find least common denominator (LCD) of the fractions
2. Rewrite each fraction as an equivalent fraction using the LCD
3. Compare the numerators

Decimal Operations

Operation	+ or −	x or ·	÷ by whole # (W)	÷ by decimal (D)
Memory CUE	Line up +/−	Multiply then count X	Up W)	Over, over, up D)
You need to :	1. Line up decimals 2. Fill empty places to the right of the decimal point with zeros 3. Add or subtract	1. Multiply as normal 2. Move decimal to the left in the answer the number of spaces from right in problem	1. Move the decimal to the answer line 2. Divide as normal	1. Move the decimal on the outside all the way to the right 2. Move the decimal inside the same number of places (Add zeros if needed) 3. See steps to the left

Percent to Decimal

1. Trade percent sign for decimal point.
2. Move two places to the left.

Decimals to Percent

1. Move decimal two places to the right.
2. Add percent sign.

Percent to Fraction

1. Place number over 100.
2. Reduce if possible.

Fraction to Percent

1. Find an equivalent fraction with a denominator of 100.
2. Or change the fraction to a decimal and follow decimal to percent rules.

Percent Calculations

$$\frac{\text{Part}}{\text{Whole}} = \%$$

$$\frac{\text{is}}{\text{of}} = \frac{\%}{\text{total}}$$

Discount (% off, decrease)

Price − (% · Price)

Mark-Ups (tips, increase)

Price + (% · Price)

Fraction to Decimal

Put the numerator inside and the denominator outside of the division box and divide

$$\frac{x}{y} = y\overline{)x}$$

Decimal to Fraction

Read decimal aloud and write as fraction over ten, hundred, thousand, etc

Place value chart

Hundred Millions	Ten Millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths	Ten-thousandths
		,			,								

Scientific Notation

number × 10^{n}; Move decimal n spaces to right

number × 10^{-n}; Move decimal n spaces to left

*number in front must be between 1 and 10

Transformations

Tran **SL** ation
Re **FL** ection
Ro **T** ation

Labels

PeRIMeter = units
Area = units^2
Volume = units^3

Geometry Measurements

180 degrees = sum of angles in a triangle
$180(n-2)$ = sum of angles in a polygon
360 degrees in a circle

Total Area of Irregular Shapes

1. Break up into familiar shapes
2. Find area of each shape
3. Add to find total area

Rate/Rate of Change

Positive Rate - Increase left to right
Negative Rate - Decrease left to right

Distance = Rate · Time

Proportions

$\frac{a}{b} = \frac{c}{d}$

1. Cross multiply to solve
2. $a \cdot d = b \cdot c$

Distributive Property

Ex: $a(b-c) = ab - ac$

$a(b+c) = ab + ac$

Solving Equations with Variables

1. Figure out what you are solving for
2. Get the variable term alone on one side of equation
3. To isolate the variable, do the opposite operation with the same number on both sides of the equation

To undo Addition you Subtract
To undo Multiplication you Divide

Data

meAn MEDian mOde

A Four Step Plan To Writing An Open Response

EXPLORE	What are you trying to find? What information do you need to solve the problem? Underline/highlight/circle important information.
PLAN	Select a strategy to solve your problem. Estimate what your answer should be. First - Next - Then....
SOLVE	This is where you show all of your work. Include chart graph or picture to explain your answer. Label your answer(s)
EXAMINE	In a sentence or two. Prove that your answer makes sense. Refer back to the question and the clues.

Word Problem Knowledge

ADD	SUBTRACT	MULTIPLY	DIVIDE
sum total all together deposited more than increased by plus in all	difference minus how many more decreased less less than fewer than withdraw take away	product times double twice multiplied by triple factor any exponent of	Quotient per average each separated split portion part of by half into fraction of

Probability

Write the fraction as: $\frac{\text{\# of Desired Outcomes}}{\text{\# of Possible Outcomes}}$

Combinations

Multiply number of choices together

How to Construct a Stem and Leaf Plot

1. Order the data from the least to the greatest.
2. Draw a vertical line and write the tens digits from least to greatest to the left of the line. These digits form the stem.
3. Write the units (ones place value) digits in order to the right of the line with the corresponding stem. The units digits form the leaves.
4. Include a key that explains the stems and the leaves
5. Count that the "leaves" match the number of pieces of data.

Massachusetts Comprehensive Assessment System
Grade 7 Mathematics Reference Sheet

PERIMETER FORMULAS

square . . . . . $P = 4s$

rectangle . . . . . $P = 2b + 2h$

OR

$P = 2l + 2w$

triangle . . . . . $P = a + b + c$

AREA FORMULAS

square . . . . . $A = s^2$

rectangle . . . . . $A = bh$

OR

$A = lw$

parallelogram . . . . . $A = bh$

triangle . . . . . $A = \frac{1}{2}bh$

trapezoid . . . . . $A = \frac{1}{2}h(b_1 + b_2)$

circle . . . . . $A = \pi r^2$

TOTAL SURFACE AREA FORMULAS

rectangular prism . . $SA = 2(lw) + 2(hw) + 2(lh)$

cylinder . . . . . $SA = 2\pi r^2 + 2\pi rh$

VOLUME FORMULAS

rectangular prism . . . . . $V = lwh$

OR

$V = Bh$

(B = area of a base)

cube . . . . . $V = s^3$

(s = length of an edge)

cylinder . . . . . $V = \pi r^2 h$

CIRCLE FORMULAS

$C = 2\pi r$

OR

$C = \pi d$

$A = \pi r^2$