

Math
Reference
Packet

Factors and Multiples

- **FACTORS** are numbers that, when multiplied together, result in a product.
 - **12:** 1, 2, 3, 4, 6, 12 or **36:** 1, 2, 3, 4, 6, 9, 12, 18, 36
- **MULTIPLES** are products of a whole number and another whole number.
 - **2:** 2, 4, 6, 8, 10, 12, 14 or **7:** 7, 14, 21, 28, 35, 42, 49, 56

Unit Rates

- **RATE** is a special ratio comparing 2 numbers with different units.

$$\frac{90 \text{ miles}}{\text{-----}} \\ 5 \text{ hours}$$

- **UNIT RATE** tells the rate in lowest terms of the amount for one.

$$\frac{90 \text{ miles}}{\text{-----}} = \frac{18 \text{ miles}}{\text{-----}} \\ 5 \text{ hours} \qquad \qquad \qquad 1 \text{ hour}$$

Fractions

ADD & SUBTRACT

1. Find a common denominator.
2. Add (or subtract) the numerators; denominator stays the same.
3. Simplify if needed.

$$\frac{1}{2} + \frac{1}{3} = ?$$

$$\frac{1 \times 3}{2 \times 3} = \frac{3}{6} \quad \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$

$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

MULTIPLY

1. Multiply across (numerator times numerator; denominator times denominator)

$$\frac{2}{5} \times \frac{1}{3} = \frac{2 \times 1}{5 \times 3} = \frac{2}{15}$$

DIVIDING

1. KEEP the first fraction.
2. SWITCH the sign.
3. FLIP the second fraction.

$$\frac{5}{6} \div \frac{4}{7} = \frac{5}{6} \times \frac{7}{4} = \frac{35}{24} = 1 \frac{11}{24}$$

Decimals

ADD & SUBTRACT

1. Find the decimal.
2. Line up the decimals.
3. Fill in empty spots with zero.
4. Add or Subtract.
5. Bring down the decimal in your answer.

$$\begin{array}{r} 16.4 \\ + 31.3 \\ \hline 47.7 \end{array}$$

MULTIPLY

1. The number with the most digits goes on the top.
2. Decimals DO NOT line up.
3. Multiply like normal.
4. Count how many places in the first number and the second number the decimal is moved over.
5. This is how many places you move the decimal in your answer.

$$\begin{array}{r} 1.75 \leftarrow 2 \text{ decimal places} \\ \times 2.6 \leftarrow + 1 \text{ decimal place} \\ \hline 1050 \\ 350 \\ \hline 4.550 \leftarrow 3 \text{ decimal places} \end{array}$$

DIVIDE

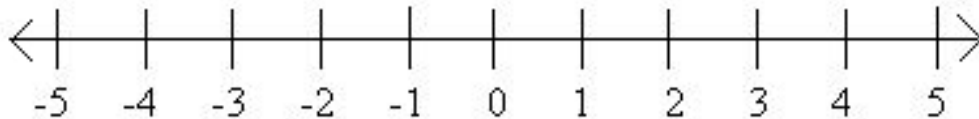
1. Divisor can't have a decimal. If it has a decimal, move it over so it's a whole number.
2. Move the same amount of places in the dividend.
3. Place a decimal straight up where you write your answer, rewrite your problem.
4. Divide like normal.

$$\begin{array}{r} 1.32 \\ 7 \overline{)9.24} \text{ --- dividend} \\ \underline{7} \\ 22 \\ \underline{21} \\ 14 \\ \underline{14} \\ 0 \end{array}$$

divisor

Integers - 6th

- **Integers:** positive and negative numbers and their opposites
 - Ex. -3, -2, -1, 0, 1, 2, 3
- **Opposites:** A whole number (pos. or neg.) and the opposite (positive of negative)
 - Ex. -3 and 3, -4 and 4
- **Absolute Value:** the distance a number is from 0.
 - Ex. $|-7| = 7 \rightarrow$ "The absolute value of -7 is positive 7."



Exponents

Exponent

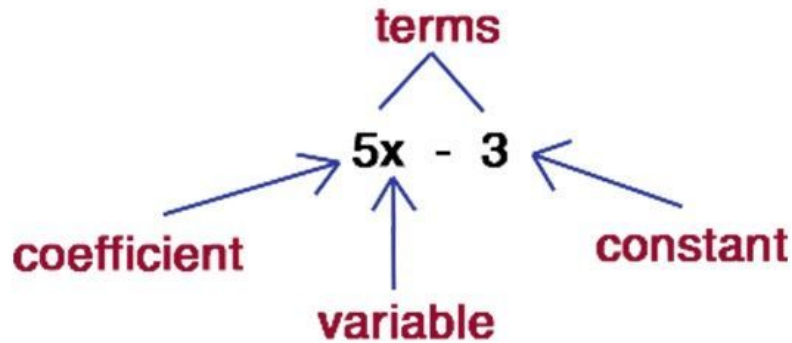
Base

$$3^2 = 3 \times 3 = 9$$

2 threes

Algebraic Expressions

Parts of an Expression



Writing an Expression

Six more than a number
 $n + 6$

Seven less than a number
 $n - 7$

One-Step Equation

$$r + 12 = 25$$

$$\underline{-12} \quad | \quad \underline{-12}$$

$$r = 13$$

Add/Subtract Cloud Method:

1. Solve with the opposite operation.
2. Whatever you do to one side, you need to do to the other.
3. Cross off the “zero pair”; think about it.
4. Solve adding/subtraction problem for answer.

Multiply/Divide Cloud Method:

1. Solve with the opposite operation.
2. Whatever you do to one side, you need to do to the other.
3. Slice off, make it “one”; think about it.
4. Solve multiplication or division problem for answer.

$$\cancel{4x} \frac{1}{\cancel{4}} m = 3 \times 4$$

$$m = 12$$

Two-Step Equation

$$\frac{x}{4} - 3 = 2$$

$+3 \quad +3$

Undo addition
& subtraction first.

$$4 \cdot \frac{x}{4} = 5 \cdot 4$$

Undo multiplication
& division next.

$$x = 20$$

Inequalities

Greater Than			Open circle	
Less Than			Open circle	
Greater Than or Equal to			Closed circle	
Less Than or Equal to			Closed circle	
Equal			Closed circle	

Inequalities

Sign	Inequality	Circle (Open/Closed)	Phrases
$<$	Less Than	$\leftarrow \bigcirc$	
$>$	Greater Than	$\bigcirc \rightarrow$	
\leq	Less than or = to	$\leftarrow \bullet$	"At most" "No more than" "No greater than"
\geq	Greater than or = to	$\bullet \rightarrow$	"At least" "No less than" "No fewer than"

Graphing Inequalities





← ON A NUMBER LINE →

- this value is **included** in the solution
- this value is **not included** in the solution

KEYWORDS

\leq	$<$	$>$	\geq
maximum	smaller than	more than	minimum
at most	less than	greater than	at least
no more than	below	larger than	no less than
	fewer than	above	

Geometry - 6th

Perimeter	Add up all the sides!	
Area of a Rectangle	$L \times W$	
Area of a Parallelogram	$B \times H$	
Area of a Triangle	$(B \times H) / 2$	
Area of a Trapezoid	$((B1 + B2) \times H) / 2$	

Mean, Median, Mode, Range

***MEAN:** add up all the numbers and divide by the amount of numbers in your number set.

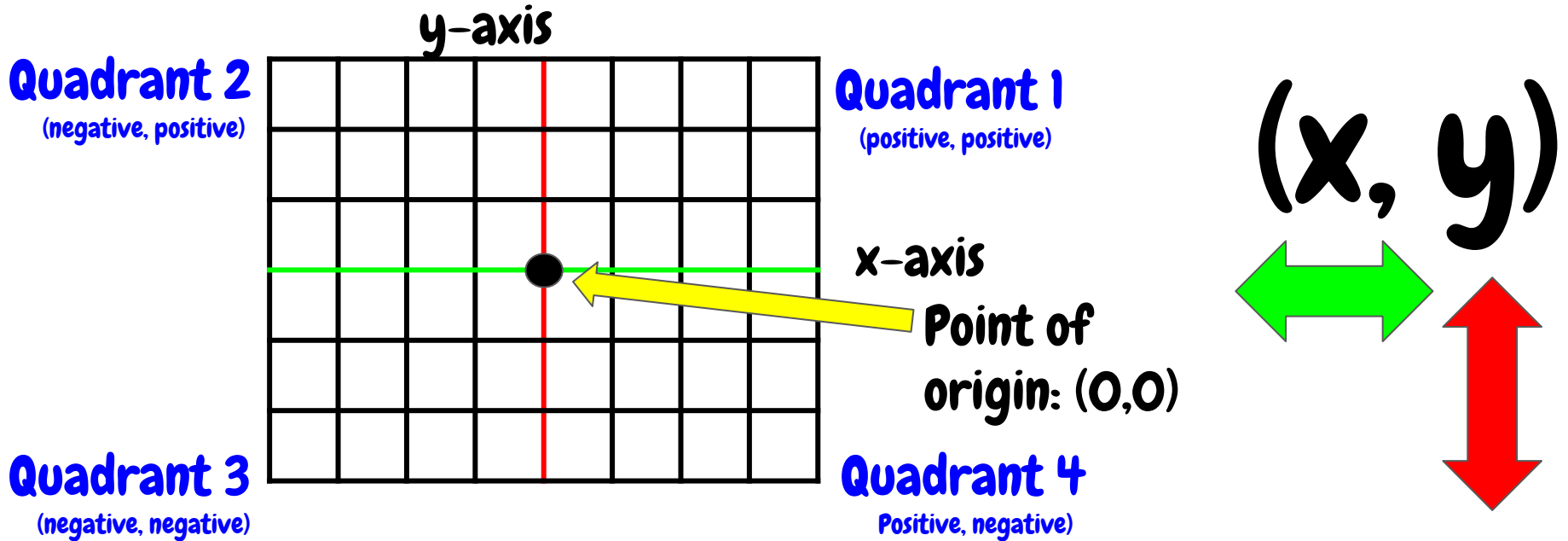
Also known as the AVERAGE.

***MEDIAN:** line up the numbers least to greatest and then cross off on each side until you find the middle number. If there are two numbers in the middle, add them together and divide by 2.

***MODE:** the number that shows up the most often. There can also be NO mode.

***RANGE:** Highest number minus the lowest number equal the range of numbers.

Coordinate Graph



Percents - 7th

Find the DISCOUNT:

\$35.99 at 60% off

$$\frac{60}{100} = \frac{?}{\$35.99}$$

Find the SALES PRICE:

\$46.00 at 20% off

STEP 1:

$$\frac{20}{100} = \frac{d}{\$46.00}$$

STEP 2: $\$46.00 - d = \text{total price}$

Find the ORIGINAL PRICE:

Sale Price = \$3.75 and it was 20% off.

Step 1: $100\% - 20\% = 80\%$

Step 2:

$$\frac{80}{100} = \frac{\$3.75 \text{ (sale price)}}{n \text{ (original price)}}$$

Percents - 7th

Find the TOTAL COST:

\$100.25 (price) 20% off (discount) Sales Tax (6%)

STEP 1: Proportion 20 d (discount) d = \$20.05

$$\frac{20}{100} = \frac{d}{\$100.25}$$

STEP 2: Subtract \$100.25 - \$20.05 (discount) = \$80.20 (sale price)

STEP 3: Proportion 6 t (tax) T = \$4.81

$$\frac{6}{100} = \frac{t}{\$80.20}$$

STEP 4: Add \$80.20 (sale price) + \$4.81 (tax) = \$85.01 (total cost)

Find the SIMPLE INTEREST:

\$400 2% interest rate 2 years

$$I = P * R * T$$

I = Interest

P = Principal (\$\$)

R = rate of interest

T = time (years)

Tax/Tip - 7th

Find TAX (6%):

Ex. Find the tax for a \$14 hat.

$$\frac{6}{100} = \frac{\$0.84}{\$14}$$

Find the TIP:

Ex. Find the tip based on bill total. (20% = common)

$$\frac{20}{100} = \frac{\$8.00}{\$40 \text{ bill}}$$

Find FINAL COST (including tax):

Ex. Find the final cost for a \$120 coat.

STEP 1:

$$\frac{6}{100} = \frac{\$7.20}{\$120}$$

STEP 2: $\$120 + \$7.20 = \$127.20$

Find the AMOUNT of INCREASE:

Ex. \$15 factory pants with a mark-up of 70%

$$\frac{70}{100} = \frac{\$10.50}{\$15}$$

Integers - 7th

Adding

*Negatives + Negatives = Negatives

*Look to see which number is bigger, positive or negative!

Subtracting (L C O)

Leave. Change. Opposite.

$$-5 - 6 =$$

L C O

$$-5 + (-6) = -11$$

Multiplying and Dividing

$$+ \times + = +$$

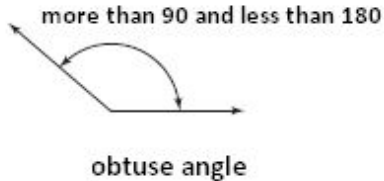
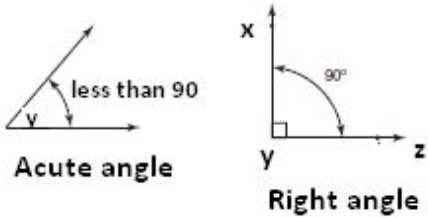
$$- \times - = +$$

$$- \times + = -$$

$$+ \times - = -$$

Geometry - 7th

TYPES OF ANGLES



LINE AND ANGLE RECOGNITION

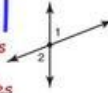
Adjacent

Angles that share a side



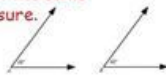
Vertical

Opposite angles made by two intersecting lines



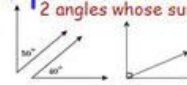
Congruent

Angles with the same measure.



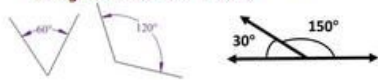
Complementary

2 angles whose sum 90°



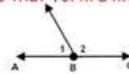
Supplementary

2 angles whose sum is 180°



Linear Pair

2 angles that form a line.



TYPES OF TRIANGLE

scalene



ISOSCELES



EQUILATERAL



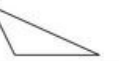
ACUTE



RIGHT



OBTUSE



Geometry - 7th

Circumference of Circles

$$C = \pi * d$$

Area of Circles

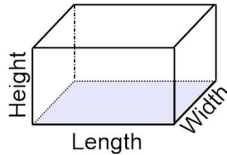
$$A = \pi * r * r$$

$$\pi =$$

Volume of Prisms

* Rectangular Prism:

$$V = LWH$$



* Triangular Prism:

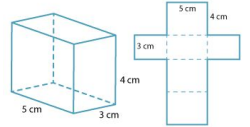
$$V = 0.5bhH$$

Surface Area of Prisms

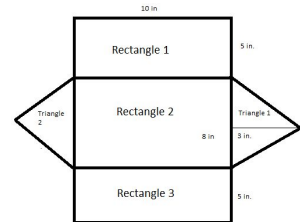
* Rectangular Prism:

$$SA = 2LW + 2WH + 2LH$$

Triangular Prism:



2 triangle areas + 3 rectangular areas

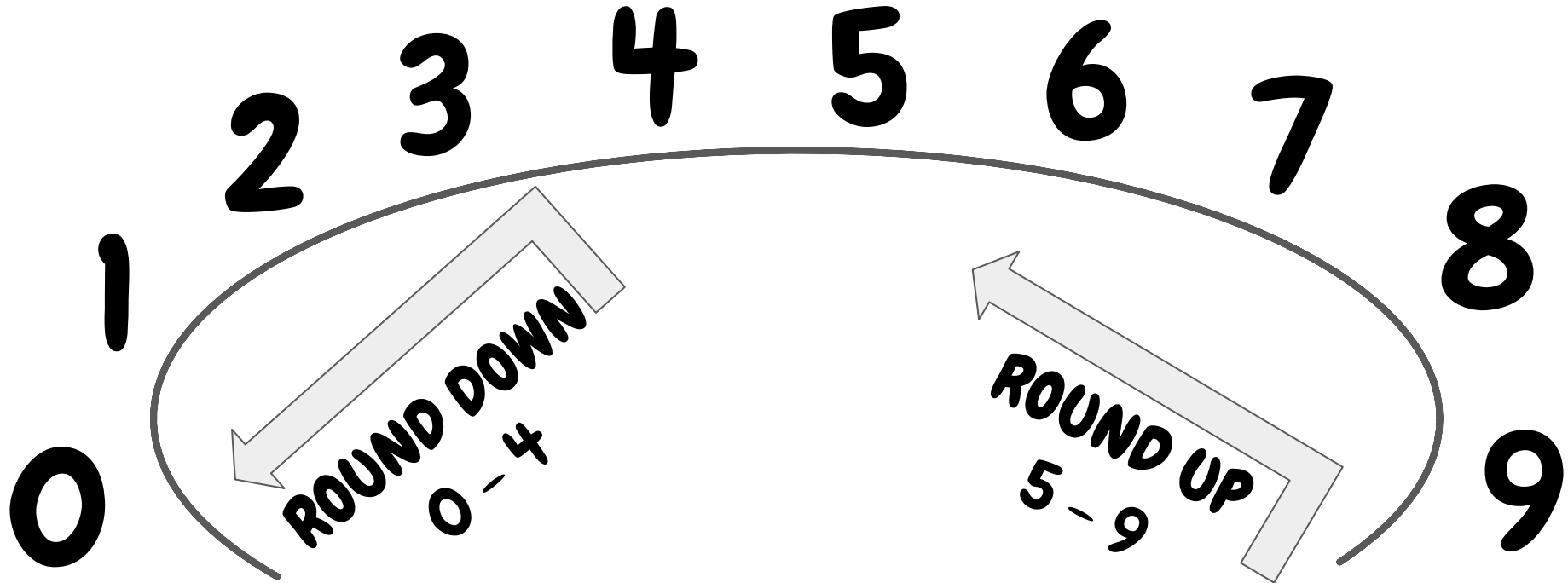


Odds / Evens

Odd #s: 1, 3, 5, 7, 9

Even #s: 0, 2, 4, 6, 8

Rounding



Place Value

3	hundreds
4	tens
8	ones
.	● (decimal place)
9	tenths
5	Hundredths
2	Thousandths
1	Hundred Thousandths