RATIONAL NUMBER OPERATIONS
CHEAT SHEET - A

Name _____

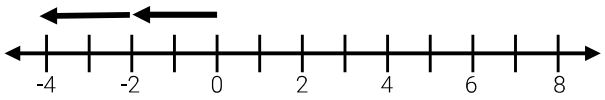
Date _____ Pd_____

INTEGERS

ADDITION

- If the signs are the **SAME**, then **ADD** and use the same sign.
- If the signs are **DIFFERENT**, then **SUBTRACT** and **TAKE THE SIGN** of the number with the **GREATEST ABSOLUTE VALUE**.

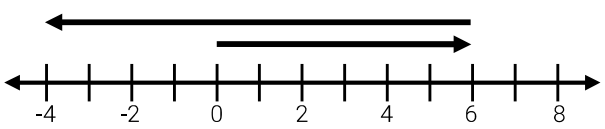
$-2 + -2 = -4$



SUBTRACTION

- Rewrite the problem to **ADD THE OPPOSITE**. Then, follow the rules for adding rational numbers.

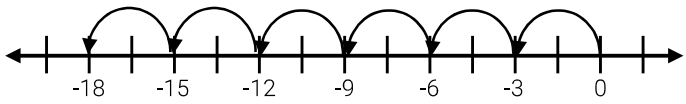
$6 - 10 = -4$



MULTIPLICATION & DIVISION

- If there is an **EVEN NUMBER** of signs, then the solution is **POSITIVE**.
- If there is an **ODD NUMBER** of signs, then the solution is **NEGATIVE**.

$-3 \cdot 6 = -18$



INTEGER OPERATIONS

$8 - 11 =$ **−3**

$-3 - 13 =$ **−16**

$15 \div -3 =$ **−5**

$-4 + -6 =$ **−10**

$8 + -2 =$ **6**

$6 \cdot -9 =$ **−54**

$-27 \div 9 =$ **−3**

$8 \cdot 11 =$ **88**

$12 - (-9) =$ **21**

RATIONAL NUMBER OPERATIONS

$-9.6 \cdot 5 = -48$

$-60.8 \div 4 = -15.2$

$\frac{3}{5} \cdot \frac{1}{4} = \frac{3}{20}$

$\frac{5}{8} \div \frac{3}{4} = \frac{5}{6}$

$-12.7 \cdot -3 = 38.1$

$100 \div 2.5 = 40$

$\frac{2}{3} \cdot \frac{3}{2} = 1$

$\frac{4}{7} \div \frac{1}{2} = 1\frac{1}{7}$

PROPORTIONALITY & SCALE DRAWINGS

CHEAT SHEET - A

Name _____

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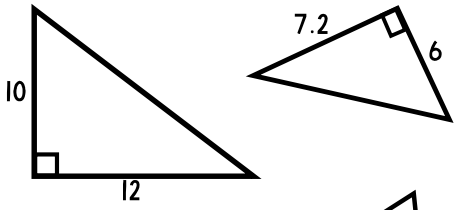
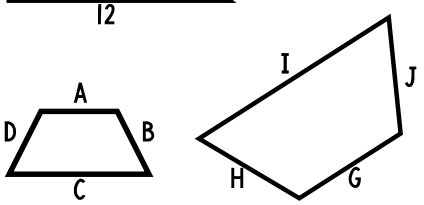
similarity

SIMILAR FIGURES have **CORRESPONDING**:

1. **PROPORTIONAL** sides
2. **EQUAL** angles



$$\frac{10}{12} = \frac{6}{7.2}$$



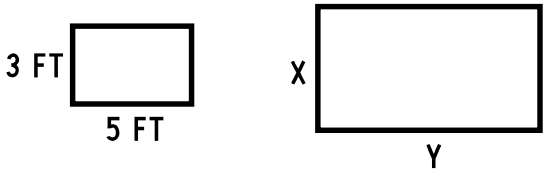
$$\frac{A}{G} = \frac{B}{H}$$

scale factor

$$\frac{\text{NEW}}{\text{ORIGINAL}}$$

The **SCALE FACTOR** is the ratio in which a figure is **DILATED**.

ENLARGEMENT	REDUCTION
scale factor is greater than 1	scale factor is less than 1



SCALE FACTOR OF 1.5 ⟹ **X = 4.5 FT**, **Y = 7.5 FT**

scale drawings

SCALE DRAWING: uses a **SCALE** to convert measurements

1 CM = 2.5 MILES **1 IN = 300 FEET**

Frequently used on **MAPS** and **BLUEPRINTS**

- Label the various units
- The conversion will be given
- Set up and solve the proportion

$$\frac{\text{IN}}{\text{FT}} = \frac{2}{75} = \frac{7}{X}$$

$$525 = 2X$$

$$262.5 = X$$

7 IN = 262.5 FT

RATES AND PERCENTS
CHEAT SHEET - A

Name _____

Date _____ Pd_____

Rates

RATE: a ratio with **TWO DIFFERENT UNITS**

$\frac{\$5.25}{6\ LB}$ $\frac{250\ MI}{4\ HRS}$ $\frac{49\ FT}{5\ SEC}$

UNIT RATE: a ratio with a quantity of **ONE**

$\frac{PRICE}{1\ LB}$ $\frac{MILES}{1\ HR}$ $\frac{FEET}{1\ SEC}$

FRACTIONAL UNIT RATE

- Will result in a complex fraction
- Follow the steps for dividing fractions

$$\frac{MILES}{HR} = \frac{\frac{1}{3}}{\frac{1}{4}} = \frac{1}{3} \cdot \frac{4}{1} = 1\frac{1}{3}$$

$1\frac{1}{3}$ MILES IN 1 HOUR

Interest & Error

SIMPLE INTEREST: $I = p \cdot r \cdot t$

I = interest
p = principal
r = annual interest rate (as a decimal)
t = time (in years)

- Be sure to change the rate to a decimal and convert any number of months to years.

PERCENT ERROR

$$\frac{|A-X|}{|X|} = \frac{\%}{100}$$

A = approximate

X = exact

Percent Vocabulary

MARKUP	DISCOUNT	OTHER
tax	sale price	commission
tip	amount off	interest
mark up	decrease	
gratuity	mark down	
increase	discount	
	whole sale	

PERCENT: a **QUANTITY** out of **100**

- Set up a percent proportion or an equation
- Solve for the missing quantity
- Reread the problem to make sure you answer the question

$$\frac{\%}{100} = \frac{PART}{WHOLE} \qquad PART = \% \cdot WHOLE$$
(as a decimal)

PERCENT OF CHANGE: the percent **GAINED** or **LOST** over a period of time

- Determine the change
- Set up a percent proportion
- Solve for the missing quantity
- Reread the problem to make sure you answer the question

$$\frac{\%}{100} = \frac{CHANGE}{ORIGINAL}$$

Percent

EQUATIONS AND INEQUALITIES
CHEAT SHEET - A

Name _____

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SOLVING EQUATIONS

Use **INVERSE OPERATIONS** to **UNDO** the equation.

- undo addition or subtraction
- undo multiplication or division
- isolate the variable
- check your work

$6x+7=31$

$6x=24$

$x=4$

$6(4)+7=31$

GRAPHING INEQUALITIES

GRAPH the inequality statement on a number line to represent **THE POSSIBLE SOLUTIONS**.

● **VALUE IS INCLUDED**

○ **VALUE IS NOT INCLUDED**

INEQUALITIES

SAME STEPS as **SOLVING EQUATIONS!**

- When dividing by a negative number, flip the inequality symbol.
- To check your work, choose a value that is within the constraints of the inequality and plug in the number.
- If it is correct, then you should get a true statement.

$-\frac{1}{2}x - 5 > 25$

$-\frac{1}{2}x > 30$

$x < -60$

CHECK ✓

$-\frac{1}{2}(-80) - 5 > 25$

$-\frac{1}{2}(-80) > 30$

$40 > 30$

INEQUALITY VOCABULARY

- Remember that each term can represent a different inequality symbol when writing inequalities.

<	≤	≥	>	=
• less than • is fewer than • is smaller than • below	• less than or equal to • maximum • at most • is not more than • is not greater than	• greater than or equal to • minimum • at least • is not less than • is not smaller than	• greater than • is more than • is larger than • above	• equal • is • same

PROPERTIES OF OPERATIONS

ORIGINAL EXPRESSION	PROPERTY	EQUIVALENT EXPRESSION
$8 + 0$	IDENTITY	0
$6 \cdot 3 \cdot 2$	COMMUTATIVE	$3 \cdot 2 \cdot 6$
$6 + (3 + 2)$	ASSOCIATIVE	$(6 + 3) + 2$
$8(x + 7)$	DISTRIBUTIVE	$8x + 56$

PROPERTIES OF OPERATIONS RESULT IN EQUIVALENT EXPRESSIONS

The **RECIPROCAL** of a number results in a **PRODUCT OF 1.**

$\frac{5}{6} \cdot \frac{6}{5} = 1$ ← **FLIP**