Wilkinson Junior High School

Mary Mimbs, Vice-Principal
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Dear Parent & Student,

Attached to this letter is the math packet for the summer. The purpose of this math packet is to retain math skills taught this year that will be needed for the upcoming school year. This packet is not optional. It must be completed and given to your math teacher during the first week of school. This will be your first grade in the grade book. Wilkinson Junior High is a no-opt out school. This means that all homework and summer assignments must be completed.

The math packet has examples for each section to help you with the problems. If that is not enough help, please feel free to use some of the resources listed below. During the first week of school students will also be able to ask questions over a problem that is giving them difficulty. After the first week, students who haven't finished the packet or have many wrong answers will be assigned to the Math Success Lab for help during their elective period. This support will ensure that your child doesn't struggle right off the bat in their new class.

Thank you for your help with this over the summer. The math department and the school want your child to be successful in the upcoming school year.

Sincerely,

Mrs. Cornwell
Principal
Wilkinson Junior High - Eagles
N.E.S.T. - Northeast Exemplary School of Technology

Resources:
Khan Academy
You Tube
Virtual nerd
Learn Zillion

"Soaring Above & Beyond"

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Name: _____ Date: _____

8th Grade Summer Math Packet

Unit 1- Rational and Irrational Numbers

Key Concept Number 1: Turing a Fraction into a Decimal **NO CALCULATOR**

Definitions:

- Fraction- a way of representing division of a "whole" into "parts.
- Numerator- the top number of a fraction, the number of parts chosen
- Denominator- the bottom number of a fraction, the total number of parts

$$\frac{\textit{Numerator}}{\textit{Denominator}}$$

Examples of Fractions:

$\frac{1}{3} = 1 \div 3$ $\frac{2}{5} = 2 \div 5$ $\frac{2}{9} = 2 \div 9$

When turning a fraction into a decimal, you divide the numerator by the denominator

Denominator$\overline{)\text{Numerator}}$

Example 1:

$$\frac{4}{5} \qquad \begin{array}{r} 0.8 \\ 5\overline{)\,4.0} \\ -4.0 \\ \hline 0 \end{array}$$

Directions: Turn the following fractions into a decimal. Place your answer on the blank space provided.

1) $\frac{2}{4}$ = _____

4$\overline{)\ 2}$

2) $\frac{3}{5}$ = _____

3) $\frac{1}{3}$ = _____

4) $\frac{6}{7}$ = _____

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Key Concept Number 2: Turing a Decimal to Fractions **NO CALCULATOR**

Definitions:

- Fraction- a way of representing division of a "whole" into "parts.
- Numerator- the top number of a fraction, the number of parts chosen
- Denominator- the bottom number of a fraction, the total number of parts
- Simplify: the fraction is reduced by a number that can go into the numerator and denominator. When the fraction is simplified completely there will be no more numbers that will divided into the top and the bottom.

Examples of Decimals: 0.45 3.4 2.56

Step on turning a decimal into a fraction:

1. Remove the decimal to get a whole number
2. Put the number over 100
3. Reduce the fraction into simplest form

Example 1: 0.32

$\frac{32}{100} = \frac{16}{50} = \frac{8}{25}$

- $\frac{8}{25}$ is in simplest form because no other numbers can go into BOTH 8 and 25

Example 2: 1.25 (the number to the left of the decimal becomes the whole number)

$1\frac{25}{100} = 1\frac{5}{20} = 1\frac{1}{4}$

- $1\frac{1}{4}$ is in simplest form because no other numbers can go into BOTH 1 and 4 besides 1.

Directions: Turn the following fractions into decimals. Place your answer on the blank space provided.

1) 0.45 = _____

$\frac{45}{100} = \_$

2) 1. 64 = _____

3) 4. 23 = _____

4) 0.52 = _____

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Unit 2- Equations

Key Concept Number 1: One Step Equations

Definitions:

- Variable a letter that hold the place of a unknown numbers
- Inverse Operation: the opposite operation
  - inverse operation of addition is subtraction
  - inverse operation of subtraction is addition
  - inverse operation of multiplication is division
  - inverse operation of division is multiplication
- Constant: a number without a variable
- Coefficient: a number that is in front of the variable

$12 = \mathbf{2}x$ — Coefficient

Variable — $5 = x - 2$ — Constant

- When solving a one step equations we ALWAYS want the variable ALONE!!!
- Use inverse operations to move the number to the opposite side of the equal sign.

Example 1:

$X + 7 = -6$ (what is in the way from x being alone? -7)

$+7 \quad +7$ (use inverse operations to move the -7)

$X = 1$

Example 2:

$X + 5 = 8$ (what is in the way of x being alone? +5)

$-5 \quad -5$ (use inverse operations to move the +5)

$X = 3$

Example 3:

$\frac{3x}{3} = \frac{-15}{3}$ (what is in the way of x being along? 3)

(since 3x is multiplication we ÷ by 3 on both sides)

$X = -5$

Example 4:

$\frac{x}{5} = 6$ (what is in the way of x being alone? 5)

$*5 \quad *5$ (since $\frac{x}{5}$ is division we * both side by 5)

$X = 30$

Directions: Solve each equation for x. Provide your answer in the space provided.

1) $X - 1 = -5$

X = _____

2) $X + 2 = 7$

X = _____

3) $-6X = -54$

X = _____

4) $\frac{X}{3} = -12$

X = _____

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Key Concept Number 2: Two Step Equations

Definitions:

- Variable a letter that hold the place of a unknown numbers
- Inverse Operation: the opposite operation
  - inverse operation of addition is subtraction
  - inverse operation of subtraction is addition
  - inverse operation of multiplication is division
  - inverse operation of division is multiplication
- Constant: a number without a variable
- Coefficient: a number that is in front of the variable

$12 = 2x$ — Coefficient

Variable — $5 = x - 2$ — Constant

- When solving a two step equation you HAVE TO MOVE THE CONSTANT FIRST!!!!!
- Use inverse operations to move the numbers to the opposite side of the equal sign.

Example 1:

$3x + 6 = 12$ **(we HAVE TO MOVE THE CONSTANT FIRST!)**

$+6 \quad +6$ (move the constant by inverse operations)

$\frac{3x}{3} = \frac{18}{3}$ (what is in the way of x being alone? 3)

(use inverse operations to move the 3)

$X = 6$

Example 2:

$\frac{x}{5} + 6 = 0$ **(we HAVE TO MOVE THE CONSTANT FIRST!)**

$-6 \quad -6$ (move the constant by inverse operations)

$\frac{x}{5} = -6$ (what is in the way of x being alone? 5)

$*5 \quad *5$ (use inverse operations to move the 5)

$X = -35$

Directions:

1) $2x - 10 = 52$

X = _____

2) $3x + 1 = 10$

X = _____

3) $\frac{x}{6} - 2 = -1$

X = _____

4) $1 + \frac{x}{3} = 13$

X = _____

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Key Concept Number 3: Combining Like Terms

Definitions:

- Constant: a number without a variable
- Coefficient: a number that is in front of the variable
- Variable a letter that hold the place of a unknown numbers
- Like Terms: terms that look like each other; two or more terms that done have a variable, two or more terms that have the same variable.

Examples of like terms:

3 8 -3 8 24 -.5 9,641 In this group they all don't have variables	-4x 5x 3x -12x 4x In this group they all have a variable of x... it doesn't matter they have different coefficients	-4y 5y 3y -12y 4y In this group they all have a variable of x... it doesn't matter they have different coefficients

When combining like terms, all we do is add the coefficients and keep the same variable, if there is one.

Example 1: Combine the following like terms

3x + 4x – 1x

3+ 4 - 1 = 6 (identify the coefficients and add them)

6x (then add the variable to the coefficient)

Example 2: Combine the following like terms:

3 – 2x + 4x – 5

3 & -5 -2x & 4x (identify the like term groups)

-2 2x (combine the like terms)

-2 + 2x (put them back together to make a number sentence)

Directions: Combine the following like terms. Provide your answer on the blank space provided.

1) 3x + 5x + 4

_____

2) -2 – 5X + 7

_____

3) 3X – 3y + 6 y – 4

_____

4) 5y – 2 + 5x – y + (-x)

_____

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Key Concept Number 4: Distribution Property

The distribution property is a special way of expanding a number sentence by multiplication.

This is the unexpanded form looks like before you perform the distribution property

$3(x + 5)$

When using the distribution property all you do is multiply 3 by each term inside the parentheses

Example 1:

$3(x + 5)$
$(3)(x) + (3)(5)$ multiply each number inside by 3
$3x + 15$ this is most simplified it can be because they are not like terms

Example 3:
$4(2x - 5)$
$(4)(2x) - (4)(5)$
$8x - 20$

Example 2
$-2(3x + -4)$
$(-2)(3x) + (-2)(-4)$
$-6x + -6$ or $-6x - 6$

Directions: Use the distributive property to simplify each expression. Provide your answer in the blank space provided.

1) $-2(3x - 4)$	2) $5(x + 2)$ _____
3) $-7(-2x = 3)$ _____	4) $8(-y - 2)$

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Unit 3- Unit Rates

Key Concept Number 1: Unit Rate on and off a Graph

Definitions:

- Rate: a ratio (fraction) that compares
- Unit Rate: when a rate is simplified to have a denominator of 1.

Common Unit Rates

Rate	Unit Rate	Abbreviation	Name
$\frac{Number\ of\ Miles}{1\ Hour}$	Miles Per Hour	MPH or Mi/h	Average Speed
$\frac{Number\ of\ Miles}{1\ Gallon}$	Miles Per Gallon	MPG or Mi/G	Gas Mileage
$\frac{Number\ of\ Dollars}{1\ Pound}$	Price Per Pound	Dollars/lb	Unit Price

Basically all we do for unit rate is divide the numerator by the denominator. It is THAT easy!

Example 1

A 4 pack of soda costs $2.50.

What is the unit rate for 1?

$$\frac{4\ Sodas}{\$2.50}\ \frac{\div 2.50}{\div 2.50} = \frac{\$1.60}{1}$$

1 Soda costs $1.60

Example 2

Lisa drove 200 miles in 3 hours. How many did she drive in 1 hour?

$$\frac{200}{3}\ \frac{\div 3}{\div 3} = \frac{66.67}{1}$$

Lisa drive 66.67 miles in 1 hour

Directions: Find the Unit rate of each of the following. Place your answer in the space provided.

1) 2 quarts of orange juice for $2.49

_____

2) A 5 pound bag of apples for $1.89

_____

3) A 4 ounce can of soup for $1.15

_____

4) A 9 pack of water bottles for $4.50

_____

Name: _____ Date: _____

Unit 4- Square Roots

Key Concept Number 1: Square Roots **NO CALCULATOR**

Definitions:

- Square Roots: the factors multiplied together to form a perfect squares.
- Perfect Squares : numbers with square roots that are whole numbers. 25 is a perfect square because the square root of 25 is 5.

Perfect Square	Square Root
1	$\sqrt{1}$
2	$\sqrt{4}$
3	$\sqrt{9}$
4	$\sqrt{16}$
5	$\sqrt{25}$
6	$\sqrt{36}$
7	$\sqrt{49}$
8	$\sqrt{64}$
9	$\sqrt{81}$
10	$\sqrt{100}$

Example 1:
$\sqrt{25} = 5$
Because 5 * 5 is 25

Example 2:
$\sqrt{169} = 13$
Because 13 * 13 is 169

Helpful Hint
Ask yourself, what number multiplied by itself will give you the number under the radical sign.

Directions: Find the square root of each of the following numbers. Place your answer in the blank space provided.

1) $\sqrt{9}$ = _____

2) $\sqrt{121}$ = _____

3) $\sqrt{100}$ = _____

4) $\sqrt{81}$ = _____