Dear upcoming 6th Grade Math students,

Duval County offers a lot of math review resources which allow you to brush up on your skills. The JWJ Math Department has streamlined the process for you and created a review plan for the summer prior to starting Math your 6th grade year.

To make sure you have a good foundation for this upcoming year we HIGHLY recommend you start with the Khan Academy program. This program is very user-friendly, it diagnoses and helps you fill in any math gaps that you may have, and it also allows for enrichment to challenge yourself. Follow the instructions below to start the Khan Academy program.

1) Go to www.khanacademy.org and create a username if you do not already have one.
2) After you have made a username go to www.khanacademy.org/coaches
3) In the “Add a Coach” field, enter the class code WBYESZEQ.
4) Once your child has joined the class, the 6th grade math teacher will assign the tasks in 1-3 days. There are 12 total tasks for the summer.

The math teachers at JWJ know it can be VERY TEMPTING to not write down your notes or show your work when you are doing online questions, but this is the WORST habit you can ever acquire. Please WRITE DOWN the sample problems and notes from the videos and follow up questions in a spiral notebook. We promise this practice of writing down your work and notes will pay off in the end. We would then encourage you to keep this notebook so you may use it in class at the start of the school year.

If you earned an average of C or below this past year in 5th grade, we recommend you begin working on Khan Academy an average of 30 minutes a day starting towards the beginning of July. If you earned an average of a B or higher we recommend you start towards mid-July and spend on average 45 minutes every other day with the program. The more effort you put in the summer, the more prepared you will be for Math I and the more successful you will be in the course.

If you have any problems or questions about what you or your child should be doing over the summer to prepare for 6th grade Math please contact the 6th grade math teachers at JWJMath6th@gmail.com
Order of Operations

- The order that operations are completed in is Parentheses, Exponents, Multiplication, Division, Addition, Subtraction.
- The acronym P.E.M.D.A.S. can be used to remember the order (Please Excuse My Dear Aunt Sally).
- *Multiplication and Division are done at the same time, depending on which operations comes first when looking at the expression left to right. The same is true for Addition and Subtraction.

Example 1:

\[
30 \div 5 \times 4 + 2
\]

Divide.

\[
6 \times 4 + 2
\]

Multiply.

\[
24 + 2
\]

Add.

26

Example 2:

\[
2 \times (12 \div 3) - 2 + 5
\]

Parenthesis.

\[
2 \times 4 - 2 + 5
\]

Multiply.

\[
8 - 2 + 5
\]

Subtract.

\[
6 + 5
\]

Add.

11

Adding/Subtracting Decimals

- When adding or subtracting decimals, the place values of the numbers must be lined up. Once the place values are lined up, then add or subtract using the standard algorithm from right to left, remembering to regroup when needed.
- Remember to add 0’s as placeholders behind the number if it is needed to help line up all place values.

Example 1:

\[
2.568 \quad \text{Line up decimal points and place values.}
\]

\[
+3.010 \quad \text{Pad in 0’s as placeholders.}
\]

\[
5.578 \quad \text{Add.}
\]

Example 2:

\[
5.407 \quad \text{Line up decimal points and place values.}
\]

\[
-3.214 \quad \text{Regroup the “4” and the “0” so that the 4 becomes a 3, and the 0 becomes a 10.}
\]

\[
2.193 \quad \text{Then, continue subtracting from right to left.}
\]
Rounding Decimals

- To round a decimal, look at the number to the right of the place value that you are rounding to. If that number is 5 or greater, then round the number in the place value that you are rounding to, up 1. If that number is less than 5, then keep the number in the place value that you are rounding to, the same.

Example 1:
Round 1.524 to the nearest hundredths place. In 1.5\underline{2}4, the 2 is in the hundredths place. The 4 in the thousandths places tells us to keep the 2 the same. So the number when rounded to the hundredths place becomes 1.52.

Example 2:
Round 2.37 to the nearest tenths place. In 2.\underline{3}7, the 3 is in the tenths place. The 7 in the hundredths places tells us to round the 3 up 1. So the number when rounded to the tenths place becomes 2.4.

Long Division

- Long division is completed carrying out a series of steps. You can use the acronym D.M.S.B. to help you recall the order of the steps. This acronym stands for Divide, Multiply, Subtract, Bring Down. Complete each step one by one and repeat until there is nothing left to bring down.

Examples:

```
\begin{array}{l}
\text{Divide:} \\
\quad 3 \overline{) 75} \\
\quad 3 \times 2 = 6 \\
\quad \underline{-6} \\
\quad \underline{15} \\
\end{array}
```

```
\begin{array}{l}
\text{Multiply:} \\
\quad 3 \overline{) 75} \\
\quad 2 \times 3 = 6 \\
\quad \underline{-6} \\
\quad \underline{15} \\
\end{array}
```

```
\begin{array}{l}
\text{Subtract:} \\
\quad 3 \overline{) 75} \\
\quad 75 - 6 = 69 \\
\quad \underline{-6} \\
\quad \underline{63} \\
\end{array}
```

```
\begin{array}{l}
\text{Bring Down:} \\
\quad 3 \overline{) 75} \\
\quad 68 - 9 = 59 \\
\quad \underline{-9} \\
\quad \underline{60} \\
\end{array}
```

```
\begin{array}{l}
\text{Repeat:} \\
\quad 3 \overline{) 75} \\
\quad 54 - 9 = 45 \\
\quad \underline{-9} \\
\quad \underline{54} \\
\end{array}
```
Adding and Subtracting Fractions

- In order to add and subtract fractions, the fractions that are being added or subtracted must have the same denominator. Once the denominators are the same, you add or subtract the numerators, and leave the denominator the same for the sum or difference.

Example 1:

\[
\frac{1}{2} + \frac{3}{5}
\]

**Step 1:** Find a common denominator by finding a common multiple between 2 and 5. In this example, 10 is a common multiple of 2 and 5.

\[
\frac{5}{10} + \frac{6}{10}
\]

**Step 2:** Write equivalent fractions with the common denominator: \(\frac{1}{2} = \frac{5}{10}\) and \(\frac{3}{5} = \frac{6}{10}\).

\[
\frac{5}{10} + \frac{6}{10} = \frac{11}{10}
\]

**Step 3:** Add the numerator, and keep the denominator the same to express the sum.

Example 2:

\[
\frac{3}{4} - \frac{1}{2}
\]

**Step 1:** Find a common denominator by finding a common multiple between 2 and 4. In this example, 4 is a common multiple of 2 and 4.

\[
\frac{3}{4} - \frac{2}{4}
\]

**Step 2:** Write equivalent fractions with the common denominator: \(\frac{3}{4} = \frac{3}{4}\) and \(\frac{1}{2} = \frac{2}{4}\).

\[
\frac{3}{4} - \frac{2}{4} = \frac{1}{4}
\]

**Step 3:** Add the numerator, and keep the denominator the same to express the sum.

Area and Perimeter

- To find the perimeter of a shape, add the lengths of all the sides together.
- To find the area of a shape, multiply certain dimensions. For a rectangle, multiply the length by the width.

Example 1:

A rectangle is shown below. What is the perimeter of the rectangle?

\[
\begin{align*}
\text{8 cm} \\
\text{5 cm} \\
\text{8 cm}
\end{align*}
\]

**P = 2l + 2w**

First figure out the length and width of the shape. \(l = 8\text{ in}\) \(w = 5\text{ in}\)

\[
P = 2(8) + 2(5)
\]

Then multiply your numbers. When two numbers are right next to each other with parentheses, it means multiply. \(2(8) = 16\) and \(2(5) = 10\)

Then add the products together. \(16 + 10 = 26\)
Example 2:

A rectangle is shown below. What is the area of the rectangle?

![Rectangle diagram](image)

\[ A = lw \]

First figure out the length and width of the shape. \( l = 12 \text{ in} \quad w = 4 \text{ in} \)

\[ A = 12 \times 4 \quad \text{Then multiply the numbers together.} \quad 12 \times 4 = 48 \]

\[
\text{ANSWER:} \quad A = 48 \text{ square inches} \quad \text{or} \quad A = 48 \text{ in.}^2
\]

### Multiplying Fractions (area with fractions included)

- How to multiply a whole number by a fraction or a fraction by a whole number: Make the whole number into a fraction by putting it over 1. Then multiply the top number by the top and the bottom number by the bottom.
- How to multiply a fraction by a fraction: Multiply the top number by the top and the bottom number by the bottom.
- How to multiply a mixed number by a fraction: Change the mixed number to an improper fraction first. (Multiply the whole number by the bottom number, then add the top number. Put that new number on top and keep the bottom number the same). Then multiply the top number by the top and the bottom number by the bottom.
- To find the area of a rectangle, multiply the length and the width together. The formula is \( A = lw \).

**Example 1:**

\[
4 \times \frac{5}{8} \quad \text{becomes} \quad \frac{4}{1} \times \frac{5}{8} \quad \text{becomes} \quad \frac{4 \times 5}{1 \times 8} \quad \text{becomes} \quad \frac{20}{8}
\]

**Example 2:**

\[
\frac{3}{5} \times \frac{6}{7} \quad \text{becomes} \quad \frac{3 \times 6}{5 \times 7} \quad \text{becomes} \quad \frac{18}{35}
\]

**Example 3:**

Find the area of the rectangle below. The dimensions are on the rectangle.
\[ A = lw \]

\[ l = 3 \frac{3}{4} \quad w = 2 \frac{1}{2} \]

\[ A = 3 \frac{3}{4} \times 2 \frac{1}{2} \]

\[ \Rightarrow l = (3 \times 4) + 3 = 12 + 3 = 15 \quad l = \frac{15}{4} \]

\[ \Rightarrow w = (2 \times 2) + 1 = 4 + 1 = 5 \quad w = \frac{5}{2} \]

\[ A = 3 \frac{3}{4} \times 2 \frac{1}{2} \quad \text{becomes} \quad \frac{15}{4} \times \frac{5}{2} \quad \text{Then multiply} \quad \frac{15 \times 5}{4 \times 2} \quad \text{which becomes} \quad \frac{75}{8} \]

**Dividing Fractions**

- How to divide fractions: Dividend ÷ Divisor = Quotient
- The dividend stays the same; The division sign gets changed to multiplication; The divisor gets reciprocated (flip the numbers). Then multiply the top by the top and the bottom by the bottom.
- Reciprocal: when you “flip” the fraction, so the number on top goes to the bottom and the number on the bottom goes to the top.
- If you have a whole number, put it over 1 to make it a fraction.

**Example 1:**

\[ \frac{1}{15} \div 3 \quad \text{becomes} \quad \frac{1}{15} \div \frac{1}{3} \quad \text{becomes} \quad \frac{1}{15} \times \frac{1}{3} \]

Then multiply: \( \frac{1 \times 1}{15 \times 3} \) becomes \( \frac{1}{45} \).

**Example 2:**

\[ 6 \div \frac{1}{8} \quad \text{becomes} \quad \frac{6}{1} \div \frac{1}{8} \quad \text{becomes} \quad \frac{6}{1} \times \frac{8}{1} \]

Then multiply: \( \frac{6 \times 8}{1 \times 1} \) becomes \( \frac{48}{1} \) which is 48.

**Converting Metric Units**

- Metric units include units most of the world uses. It uses a base-10 system, which means multiply and divide by powers of 10 (10, 100, 1000, etc.)
- To go from a bigger unit to a smaller unit, multiply.
- To go from a smaller unit to a bigger unit, divide.
Example 1:
Convert 5.9 kilometers to meters.
There are 1,000 meters in 1 kilometer. A kilometer is bigger than a meter, so multiply 5.9 by 1,000.
5.9 \times 1,000 = 5,900 \text{ meters}

Example 2:
Convert 6,220 milliliters to liters.
There are 1,000 milliliters in 1 liter. A milliliter is smaller than a liter, so divide 6,200 by 1,000.
6,200 \div 1,000 = 6.2 \text{ liters}

Converting Customary Units

- Customary units include units the USA uses.
- To go from a bigger unit to a smaller unit, multiply.
- To go from a smaller unit to a bigger unit, divide.

Example 1:
Convert 11 yards to inches.
There are 12 inches in 1 yard. A yard is bigger than an inch, so multiply 11 by 12.
11 \times 12 = 132 \text{ inches}

Example 2:
Convert 32 ounces to cups.
There are 8 ounces in 1 cup. An ounce is smaller than a cup, so divide 32 by 8.
32 \div 8 = 4 \text{ cups}

Coordinate Plane

- A coordinate plane is a graph where two number lines, called axes, intersect at a perpendicular angle, forming the origin when the 0 from each number line meet. The x-axis is the horizontal number line, and the y-axis is the vertical number line. A picture of a coordinate plane is shown below.
- An ordered pair is the units that make a point on the coordinate plane. An ordered pair is written as $(x, y)$. The first number is how far to the right you move. The second number is how far up you move.
Example 1:

Use the coordinate plane below to answer the question.

Which point is located at \((2,4)\)?

→ Point Z is located at \((2,4)\) because when you start at the origin, you move 2 units to the right and 4 units up.

Example 2:

Identify the ordered pair for Point A as shown on the coordinate plane below.
Point A is located at (3,5) because when you start at the origin, you move 3 units to the right and 5 units up.
**Area and Perimeter**

- To find the perimeter of a shape, add the lengths of all the sides together.
- To find the area of a shape, multiply certain dimensions. For a rectangle, multiply the length by the width.

**Example 1:**

A rectangle is shown below. What is the perimeter of the rectangle?

\[ P = 2l + 2w \]

First figure out the length and width of the shape. 

\[ l = 8 \text{ in} \quad w = 5 \text{ in} \]

\[ P = 2(8) + 2(5) \]

Then multiply your numbers. When two numbers are right next to each other with parentheses, it means multiply.

\[ 2(8) = 16 \quad \text{and} \quad 2(5) = 10 \]

Then add the products together.

\[ 16 + 10 = 26 \]

**ANSWER:** 

\[ P = 26 \text{ cm} \]

**Example 2:**

A rectangle is shown below. What is the area of the rectangle?

\[ A = lw \]

First figure out the length and width of the shape. 

\[ l = 12 \text{ in} \quad w = 4 \text{ in} \]

\[ A = 12 \times 4 \]

Then multiply the numbers together.

\[ 12 \times 4 = 48 \]

**ANSWER:** 

\[ A = 48 \text{ square inches} \quad \text{or} \quad A = 48 \text{ in}^2 \]

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- How to multiply a whole number by a fraction or a fraction by a whole number: Make the whole number into a fraction by putting it over 1. Then multiply the top number by the top and the bottom number by the bottom.
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To find the area of a rectangle, multiply the length and the width together. The formula is $A = lw$.

Example 1:

$4 \times \frac{5}{8}$ becomes $\frac{4}{1} \times \frac{5}{8}$ becomes $\frac{4 \times 5}{1 \times 8}$ becomes $\frac{20}{8}$

Example 2:

$\frac{3}{5} \times \frac{6}{7}$ becomes $\frac{3 \times 6}{5 \times 7}$ becomes $\frac{18}{35}$

Example 3:

Find the area of the rectangle below. The dimensions are on the rectangle.

\[
\begin{array}{c}
\text{3}\frac{3}{4} \\
2\frac{1}{2}
\end{array}
\]

$A = lw$ $l = 3\frac{3}{4}$ $w = 2\frac{1}{2}$ $A = 3\frac{3}{4} \times 2\frac{1}{2}$

$\rightarrow$ $l = (3 \times 4) + 3 = 12 + 3 = 15$ $l = \frac{15}{4}$

$\rightarrow$ $w = (2 \times 2) + 1 = 4 + 1 = 5$ $w = \frac{5}{2}$

$A = 3\frac{3}{4} \times 2\frac{1}{2}$ becomes $\frac{15}{4} \times \frac{5}{2}$. Then multiply $\frac{15 \times 5}{4 \times 2}$ which becomes $\frac{75}{8}$.

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Then multiply: \( \frac{1 \times 1}{15 \times 3} \) becomes \( \frac{1}{45} \).

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\[
6 \div \frac{1}{8} \text{ becomes } 6 \div \frac{1}{8} \text{ becomes } 6 \times \frac{8}{1}
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\[
5.9 \times 1,000 = 5900 \text{ meters}
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