NAME:_____ PERIOD:_____

BIG 20 NOTES PROBLEM #1

ADDING DECIMALS

Step 1: If there are any whole numbers, put a decimal after the number (to the right of the number).
Step 2: Line the decimals up.
Step 3: Fill the empty spaces with zeros.
Step 4: Add. Carry the decimal straight down.

EXAMPLE

$4.26 + 12.8 + 7 \rightarrow 4.26 \rightarrow 04.26 \rightarrow 24.06$

$$\begin{array}{r} 12.8 \\ +\ 7.\_\_ \\ \hline \end{array} \qquad \begin{array}{r} 12.80 \\ +07.00 \\ \hline 24.06 \end{array}$$

1) The decimal goes after the 7
2) Line all of the decimals up
3) A 0 goes before the 4, after the 8, and before and after the 7 in order to fill in the empty spaces.
4) Add and carry the decimal down.

BIG 20 NOTES PROBLEM #2

SUBTRACTING DECIMALS (A LOT LIKE ADDITION)

Step 1: If there are any whole numbers, put a decimal after the number (to the right of the number).
Step 2: Line the decimals up.
Step 3: Fill the empty spaces with zeros.
Step 4: Subtract. Don't forget to borrow if you are subtracting from a zero. Carry the decimal straight down.

EXAMPLE

$14 - 3.17 \rightarrow 14. \rightarrow 14.00 \rightarrow 13.9{}^{1}0$

$$\begin{array}{r} -\ 3.17 \\ \hline \end{array} \qquad \begin{array}{r} -\ 3.17 \\ \hline \end{array} \qquad \begin{array}{r} 3.17 \\ \hline 10.83 \end{array}$$

1) The decimal goes after the 7
2) Line all of the decimals up
3) A 0 goes before the 4, after the 8, and before and after the 7 in order to fill in the empty spaces.
4) Add and carry the decimal down.

BIG 20 NOTES PROBLEM #3

MULTIPLYING DECIMALS

Step 1: **Do not line up the decimals.** Put the numbers on top of each other with the number that has the longest decimal on top.
Step 2: Multiply as if the decimals are whole numbers.
Step 3: When finished multiplying, count the total number of digits to the right of both decimal points in the factors. Place the decimal point in the answer with the same amount of numbers after the decimal.

EXAMPLE

$.7 \times 1.64 \rightarrow 1.64 \leftarrow$ 2 places after the decimal

$\times\ .7 \leftarrow$ 1 place after the decimal

$1.148 \leftarrow$ 3 places after the decimal because $1 + 2 = 3$

BIG 20 NOTES PROBLEM #4

DIVIDING DECIMALS

Step 1: **Do not line up the decimals.** Place the 1st number in the house (because he is the fastest).
Step 2: Move the decimal of the number on the outside all the way to the right. Move the number on the inside the same number of spaces as you did to the number on the outside.
Step 3: When finished multiplying, count the total number of digits to the right of both decimal points in the factors. Place the decimal point in the answer with the same amount of numbers after the decimal.

EXAMPLE

$.372 \div .04 \rightarrow .04.\overline{)}.37.2 \rightarrow 04\overline{)}37.2$

$$\begin{array}{r} 9.3 \\ 04\overline{)}37.2 \\ -36 \\ \hline 12 \\ -\ 12 \\ \hline 0 \end{array}$$

BIG 20 NOTES PROBLEM #5 and #6

MULTIPLYING A DECIMAL NUMBER BY 10, 100, OR 1000.

Step 1: When you are **MULTIPLYING**, you are going to move the decimal to the **RIGHT**. When you are **DIVIDING**, you move the decimal to the **LEFT**.

← D M → (LIKE DISCOVERY MIDDLE)

Step 2: Now you count your zeros (in 10, there is 1; in 1000, there are 3). That is how many times you move the decimal.
Step 3: If you have a whole number, place the decimal at the end (right) of the whole number.
Step 4: Add zeros if find any blank spaces when you are moving the decimals.

EXAMPLE

3.214 × 100 = 321.4
2 zeros=move the decimal 2 places to the right.

100 × 3.1478 = 314.78
2 zeros=move the decimal 2 places to the right.

.04 × 1000 = 40
3 zeros=move the decimal 3 places.

.005 × 10 = .05
1 zero=move the decimal 1 place to the right.

BIG 20 NOTES PROBLEM #7 and #8

DIVIDING A DECIMAL NUMBER BY 10, 100, OR 1000.

Step 1: When you are **MULTIPLYING**, you are going to move the decimal to the **RIGHT**. When you are **DIVIDING**, you move the decimal to the **LEFT**.

← D M → (LIKE DISCOVERY MIDDLE)

Step 2: Now you count your zeros (in 10, there is 1; in 1000, there are 3). That is how many times you move the decimal.
Step 3: If you have a whole number, place the decimal at the end (right) of the whole number.
Step 4: Add zeros if find any blank spaces when you are moving the decimals.

EXAMPLE

3.214 ÷ 100 = .03214
2 zeros=move the decimal 2 places to the left.

3147.8 ÷ 1000 = 3.1478
2 zeros=move the decimal 2 places to the left.

14 ÷ 1000 = .014
3 zeros=move the decimal 3 places.

1 zero=move the decimal 1 place to the left.

BIG 20 NOTES PROBLEM #9

ADDING TWO MIXED NUMBERS WITH DIFFERENT DENOMINATORS.

Step 1: Find the least common denominator (bottom number). Do this by finding all of the multiples of both denominators and choosing the number that matches.
Step 2: Find what you have to multiply to your old denominator in order to get your new denominator. Multiply that same number to your numerator (top number) because what you do to the bottom, you must do to the top.
Step 3: Add the whole numbers and add the numerators. **Do not add the denominators.**
Step 4: Check to see if your new numerator is bigger than your denominator. If it is, divide the numerator by the denominator to get a mixed number.
Step 5: Don't forget to add your mixed number to your whole number.
Step 6: Simplify if possible by dividing the numerator and the denominator by the same number. **Do not change the whole number.**

EXAMPLE

$3\ ½ + 4\ ¾ \rightarrow 3\ ^{2}/_{4} + 4\ ¾ \rightarrow 7\ ^{5}/_{4} \rightarrow 8\ ¼$

1.) 2→2, **4**, 6, 8, 10 (The 4s match. This is your least common denominator.)
4→**4**, 8, 12, 16
2.) $\frac{1}{2} \times 2 = \frac{2}{4}$ (What you do to the bottom, you must do to the top)
$2 \times 2 = 4$ (In 3 ½, I need to multiply 2 by 2 in order to get 4, the common denominator)
3.) $3 + 4 = 7$, $^{2}/_{4} + ¾ = {}^{5}/_{4}$ $7\ ^{5}/_{4}$
4.) $4\overline{)5} = 1\ ¼$ (1 remainder 1)
5.) $7 + 1\ ¼ = \mathbf{8\ ¼}$
6.) It cannot be simplified because 1 and 4 cannot be divided by the same number.

BIG 20 NOTES PROBLEM #10

SUBTRACTING TWO MIXED NUMBERS WITH DIFFERENT DENOMINATORS.

Step 1: Find the least common denominator (bottom number). Do this by finding all of the multiples of both denominators and choosing the number that matches. **These first two steps are just like addition.**
Step 2: Find what you have to multiply to your old denominator in order to get your new denominator. Multiply that same number to your numerator (top number) because what you do to the bottom, you must do to the top.
Step 3: If you cannot subtract your numerators, borrow 1 from the first whole number and add the numerator and the denominator to get your new numerator. **The denominator stays the same.**
Step 4: Subtract the whole numbers and subtract the numerators. **Do not subtract the denominators.**
Step 5: Simplify if possible by dividing the numerator and the denominator by the same number. **Do not change the whole number.**

EXAMPLE

$7\ ½ - 4\ ¾ \rightarrow 7\ ^{2}/_{4} - 4\ ¾ \rightarrow 6\ ^{6}/_{4} - 4\ ¾ \rightarrow 2\ ¾$

1.) 2→2, **4**, 6, 8, 10 (The 4s match. This is your least common denominator.)
4→**4**, 8, 12, 16
2.) $\frac{1}{2} \times 2 = \frac{2}{4}$ (What you do to the bottom, you must do to the top)
$2 \times 2 = 4$ (In 3 ½, I need to multiply 2 by 2 in order to get 4, the common denominator)
3.) $7\ ^{2}/_{4} = 6\ ^{6}/_{4}$ because $2 + 4 = 6$
4.) $6 - 4 = 2$, $6 - 3 = 3$, **2 ¾**
5.) You cannot simplify.

BIG 20 NOTES PROBLEM #11

MULTIPLYING TWO MIXED NUMBERS WITH DIFFERENT DENOMINATORS.

Step 1: **Do not find a common denominator.** Change the mixed numbers to an improper fraction. Do this by multiplying the denominator with the whole number and adding the numerator. Your denominator stays the same. If there is no fraction, just put the whole number over 1.
Step 2: Multiply straight across (numerators with numerators, denominators with denominators).
Step 3: If the numerator is bigger than the denominator, divide the numerator by the denominator (the numerator goes in the house).
Step 4: Simplify if possible by dividing the numerator and the denominator by the same number. **Do not change the whole number.**

EXAMPLE

$1\ ^{2}/_{3} \times 2\ ^{3}/_{5} \rightarrow\ ^{5}/_{3} \times\ ^{13}/_{5} \rightarrow\ ^{65}/_{15} \rightarrow 4\ ^{5}/_{15} \rightarrow 4\ ^{1}/_{3}$

1.) $3 \times 1 + 2 = 5,\ 5 \times 2 + 3 = 13 \rightarrow\ ^{5}/_{3} \times\ ^{13}/_{5}$
2.) $^{5}/_{3} \times\ ^{13}/_{5} =\ ^{65}/_{15}$
3.) $15\overline{)65} \rightarrow 4\ ^{5}/_{15}$ (4 remainder 5; -60)
4.) Both 5 and 15 can be divided by 5 $\frac{5 \div 5 = 1}{15 \div 5 = 5} \rightarrow 4\ ^{1}/_{3}$

BIG 20 NOTES PROBLEM #12

DIVIDING TWO MIXED NUMBERS WITH DIFFERENT DENOMINATORS.

Step 1: **Do not find a common denominator.** Change the mixed numbers to an improper fraction. Do this by multiplying the denominator with the whole number and adding the numerator. Your denominator stays the same. If there is no fraction, just put the whole number over 1. **This is the same step as multiplying.**
Step 2: Keep it, Switch it, Flip it. Keep the first fraction the same, switch the division sign to multiplication, and flip the last fraction.
Step 3: **Now act like it was a multiplication problem to begin with.** Multiply straight across (numerators with numerators, denominators with denominators).
Step 3: If the numerator is bigger than the denominator, divide the numerator by the denominator (the numerator goes in the house).
Step 4: Simplify if possible by dividing the numerator and the denominator by the same number. **Do not change the whole number.**

EXAMPLE

$1\ ^{2}/_{3} \div 2\ ^{3}/_{5} \rightarrow\ ^{5}/_{3} \div\ ^{13}/_{5} \rightarrow\ ^{5}/_{3} \times\ ^{5}/_{13} \rightarrow\ ^{25}/_{39}$

1.) $3 \times 1 + 2 = 5,\ 5 \times 2 + 3 = 13 \rightarrow\ ^{5}/_{3} \times\ ^{13}/_{5}$
2.) $^{5}/_{3} \div\ ^{13}/_{5} =\ ^{5}/_{3} \times\ ^{5}/_{13}$
3.) $^{5}/_{3} \times\ ^{5}/_{13} =\ ^{25}/_{39}$ 4.) 25 and 39 cannot be divided by the same number so it cannot be simplified.

BIG 20 NOTES PROBLEM #13

FINDING THE SQUARE OF A DECIMAL

Step 1: Write the numbers on top of each other. You do not have to line up the decimals.
Step 2: Multiply as if they are whole numbers. **DO NOT ADD!**
Step 3: When finished multiplying, count the total number of digits to the right of both decimal points in the factors. Place the decimal point in the answer with the same amount of numbers after the decimal.

EXAMPLE

$(.04)^2 \rightarrow .04$ ← Two places after the decimal
$\times .04$ ← Two places after the decimal
$.0016$ ← Four places after the decimal

BIG 20 NOTES PROBLEM #14

FINDING THE SQUARE OF A FRACTION

Step 1: Write the numbers side by side.
Step 2: Multiply straight across (numerators with numerators, denominators with denominators). **DO NOT ADD!**
Step 3: Simplify if possible by dividing the numerator and the denominator by the same number. **Do not change the whole number.**

EXAMPLE

$(^1/_5)^2 \rightarrow {}^1/_5 \times {}^1/_5 \rightarrow {}^1/_{25}$

BIG 20 NOTES PROBLEM #15

ROUNDING A MIXED NUMBER TO THE NEAREST WHOLE NUMBER

In order to solve this problem, you need to see whether the fraction is more than ½ or less than ½. You can do this many different ways.

Way 1: Draw a picture of the fraction if ½ or more is shaded, then round the whole number up and drop the fraction. If less than ½ of the picture is shaded, then keep the whole number the same and drop the fraction.

Way 2: Multiply the Numerator (top number) by 2. If your answer is bigger than, or the same as, the denominator, round the whole number up one and then drop the fraction. If your answer is smaller than the denominator, then the whole number stays the same and you just drop the fraction.

Example: 4 5/9 rounded to the nearest whole number: Because 5 x 2 = 10, and 10 is bigger than 9, you would round your whole number—4—up one to 5 and drop the fraction. Your answer would be 5.

Example 2: 2 4/9 rounded to the nearest whole number: Because 4 x 2= 8, and 8 is smaller than 9, you would keep the whole number the same and drop the fraction.

BIG 20 NOTES PROBLEM #16

ROUNDING A DECIMAL NUMBER

Step 1: Find the place you are rounding to.
Step 2: Look at the number to the right of that number. If that number is a 5 or higher, you will round the number in front of it up. If it is a 4 or lower, you will keep the number in front of it the same.
Step 3: Remember, the cent's place is the hundredths place (because there are 100 cents in a dollar)
Remember, the dime's place is the tenths place (because there are 10 dimes in a dollar).
Step 4: **Money must have only two numbers after the decimal.**
Step 5: Drop off every number after the one you are rounding (including the number you looked at to see what it does.

EXAMPLE

Round 12.34567 to the nearest hundredths place.

1 2. 3 4 5 6 7 ←This is 12.34567 There is no oneths place.

Ones
Tens
Tenths/Dimes
Hundredths/Cents
Thousandths
Ten thousandths
Hundred thousandths

The 4 is in the hundredths place. So I need to look at the 5 to see whether it rounds up or stays the same. The 5 is a 5 or larger so the 4 will round up. The 4 rounds up to 5 because that is one number after 4. 12.24567→12.25 The numbers after the 4 drop off.

BIG 20 NOTES PROBLEM #17

CHANGING A FRACTION TO A DECIMAL

Step 1: Divide the numerator (top number) by the denominator (bottom number). The top number goes in the house.
Step 2: Keep on dividing until you get a remainder of 0.
Step 3: If you have a whole number, it is also the whole number for the decimal (put it in front of the decimal sign).

Change each fraction to a decimal. Show **All** Work

BIG 20 NOTES PROBLEM #18

CHANGING A DECIMAL TO A FRACTION

Step 1: Write the numbers that are after the decimal on top of a fraction bar.
Step 2: Count how many numbers are after the decimal (including zeros). This is how many zeros you put in your denominator after the number 1. (For example, if there is one number after the decimal, your denominator will be 10, if you have 3 numbers after the decimal, your answer will be 1000).
Step 3: If there is a whole number in the decimal that is the whole number for the fraction.
Step 4: Simplify the fraction by dividing the numerator and the denominator by the same number.

BIG 20 NOTES PROBLEM #19

CHANGING A FRACTION TO A PERCENT

Step 1: Divide the numerator (top number) by the denominator (bottom number). The top number goes in the house.
Step 2: Keep on dividing until you get a remainder of 0.
Step 3: Change the decimal to a percent by moving the decimal two places to the right.
Step 4: Fill in any empty spaces with zeros and place a percent sign at the end.

BIG 20 NOTES PROBLEM #20

FINDING THE PERCENT OF A NUMBER

Step 1: Remember that **OF** means **MULTIPLY**. Change the word **of** to a **multiplication symbol**.
Step 2: Change the percent to a decimal by moving the decimal two places to the left. You can remember that it is two places because there are two dots in the percent symbol→ %
Step 3: Just multiply them.

Grades 6–8 FCAT 2.0 Mathematics Reference Sheet

Area

Rectangle	$A = bh$
Parallelogram	$A = bh$
Triangle	$A = \frac{1}{2}bh$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Circle	$A = \pi r^2$

KEY	
b = base	A = area
h = height	B = area of base
w = width	C = circumference
d = diameter	V = volume
r = radius	P = perimeter of base
ℓ = slant height	$S.A.$ = surface area

Use 3.14 or $\frac{22}{7}$ for π.

Circumference

$C = \pi d$ or $C = 2\pi r$

	Volume/Capacity	Total Surface Area
 Rectangular Prism	$V = bwh$ or $V = Bh$	$S.A. = 2bh + 2bw + 2hw$ or $S.A. = Ph + 2B$
 Right Circular Cylinder	$V = \pi r^2 h$ or $V = Bh$	$S.A. = 2\pi rh + 2\pi r^2$ or $S.A. = 2\pi rh + 2B$
 Right Square Pyramid	$V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}P\ell + B$
 Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$

Sum of the measures of the interior angles of a polygon = $180(n - 2)$

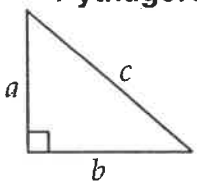
Measure of an interior angle of a regular polygon = $\frac{180(n - 2)}{n}$

where:

n represents the number of sides

Grades 6–8 FCAT 2.0 Mathematics Reference Sheet

Pythagorean theorem



$a^2 + b^2 = c^2$

Simple interest formula

$I = prt$

where p = principal, r = rate, t = time

Slope-intercept form of a linear equation

$y = mx + b$

where m = slope and b = y-intercept

Distance, rate, time formula

$d = rt$

where d = distance, r = rate, t = time

Conversions within a System of Measure

1 yard = 3 feet
1 mile = 1,760 yards = 5,280 feet
1 acre = 43,560 square feet

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 pound = 16 ounces
1 ton = 2,000 pounds

1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters = 1000 cubic centimeters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

1 minute = 60 seconds
1 hour = 60 minutes
1 year = 52 weeks = 365 days

Conversions between Systems of Measure

When converting from Customary to Metric, use these approximations.

1 inch = 2.54 centimeters
1 foot = 0.305 meter
1 mile = 1.61 kilometers

1 cup = 0.24 liter
1 gallon = 3.785 liters
1 ounce = 28.35 grams
1 pound = 0.454 kilogram

When converting from Metric to Customary, use these approximations.

1 centimeter = 0.39 inch
1 meter = 3.28 feet
1 kilometer = 0.62 mile

1 liter = 4.23 cups
1 liter = 0.264 gallon
1 gram = 0.0352 ounce
1 kilogram = 2.204 pounds

Temperature conversions between Celsius and Fahrenheit

$°C = (°F - 32) \div 1.8$
$°F = (°C \times 1.8) + 32$