Name: _____ Date: _____
Math 7 Ms. Conway

Review Packet: Unit 1 – The Number System

Key Concepts

Module 1: Adding and Subtracting Integers

7.NS.1, 7.NS.1a, 7.NS.1b, 7.NS.1c, 7.NS.1d, 7.NS.3, 7.EE.3

- To add integers with the same sign, add the absolute value of the integers and use the sign of the integers for the sum. *(Lesson 1.1)*
- To add integers with different signs, subtract the smaller absolute value from the greater absolute value. The sign of the sum will be the sign of the addend with the greater absolute value. *(Lesson 1.2)*
- Subtracting one integer from another integer is the same as adding its opposite. *(Lesson 1.3)*
- To solve multi-step problems involving addition and subtraction of integers, use a four step problem-solving plan. *(Lesson 1.4)*

Module 2: Multiplying and Dividing Integers

7.NS.2, 7.NS.2a, 7.NS.2b, 7.NS.2c, 7.NS.3

- The product of two integers with the same sign is positive. The product of two integers with different signs is negative. *(Lesson 2.1)*
- The quotient of two integers with the same sign is positive. The quotient of two integers with different signs is negative. *(Lesson 2.2)*
- To simplify an expression with more than one operation, use the order of operations. *(Lesson 2.3)*

Module 3: Rational Numbers

7.NS.1, 7.NS.1a, 7.NS.1b, 7.NS.1c, 7.NS.1d, 7.NS.2, 7.NS.2a, 7.NS.2c, 7.NS.2d, 7.NS.3, 7.EE.3

- A number that can be written as a terminating decimal or a repeating decimal is a rational number. *(Lesson 3.1)*
- Addition and subtraction of rational numbers can be demonstrated on a number line. *(Lesson 3.2)*
- To subtract a number, add its opposite. *(Lesson 3.3)*
- The product of two numbers with different signs is negative. The product of two numbers with the same signs is positive. *(Lesson 3.4)*
- The quotient of two numbers with different signs is negative. The quotient of two numbers with the same signs is positive. *(Lesson 3.5)*
- Solving real-world and mathematical problems involves applying properties of operations as well as being able to strategically convert rational numbers to any form to better facilitate computation and estimation. *(Lesson 3.6)*

Adding and Subtracting Rational Numbers Flow Chart

Are there any fractions, mixed numbers, or decimals?
If not, skip down to "Subtracting Integers" or "Adding Integers".

Fractions/Mixed Numbers

If there are mixed numbers,
convert mixed numbers to improper fractions.
(see below)

If the fractions have different denominators,
find the least common denominator (LCD).
(see below)

Decimals

Put the number with the
greater absolute value on top.

Line up the decimals.

Add zeros as place holders,
if necessary.

Decide if you have to add or subtract, and then follow the directions below.

Subtracting Integers

a number minus a negative number
(ex: 2 – – 6 OR –2 – – 6)

change signs to positive
(ex: 2 + 6 OR –2 + 6)

a number minus a positive number
(ex: 2 – 6 OR –2 – 6)

Change it to adding a negative number
by putting a + in front of the –.

Use
Keep **C**hange **C**hange!

Adding Integers

same signs

find the sum (+);
keep the original sign

different signs

find the difference (–);
use the sign of the number
with the larger absolute value

If your fraction needs to be simplified:
Convert the improper fraction to a mixed number, if necessary:

$\frac{17}{5}$

1) First divide the numerator by the denominator.
$17 \div 5 = 3$ r2

$3\frac{2}{5}$

2) The 3 is your whole number. While the remainder become the numerator.

$3\frac{2}{5}$

3) Your denominator stays the same.
And now you have your mixed number.

Simplify:
Divide by the same number in the numerator and denominator

HELPFUL REMINDERS:

Subtracting Integers Hint:

Keep Change Change

Keep the first number Change the operational sign Change the second number to its additive inverse

Example:

K C C	K C C
− 3 − 5	11 − − 2
− 3 + − 5	11 + + 2

Same sign: Add, keep original sign 3 + 5 = 8 → − 8 11 + 2 = 13 → + 13 Same sign: Add, keep original sign

Converting Mixed Numbers to Improper Fractions

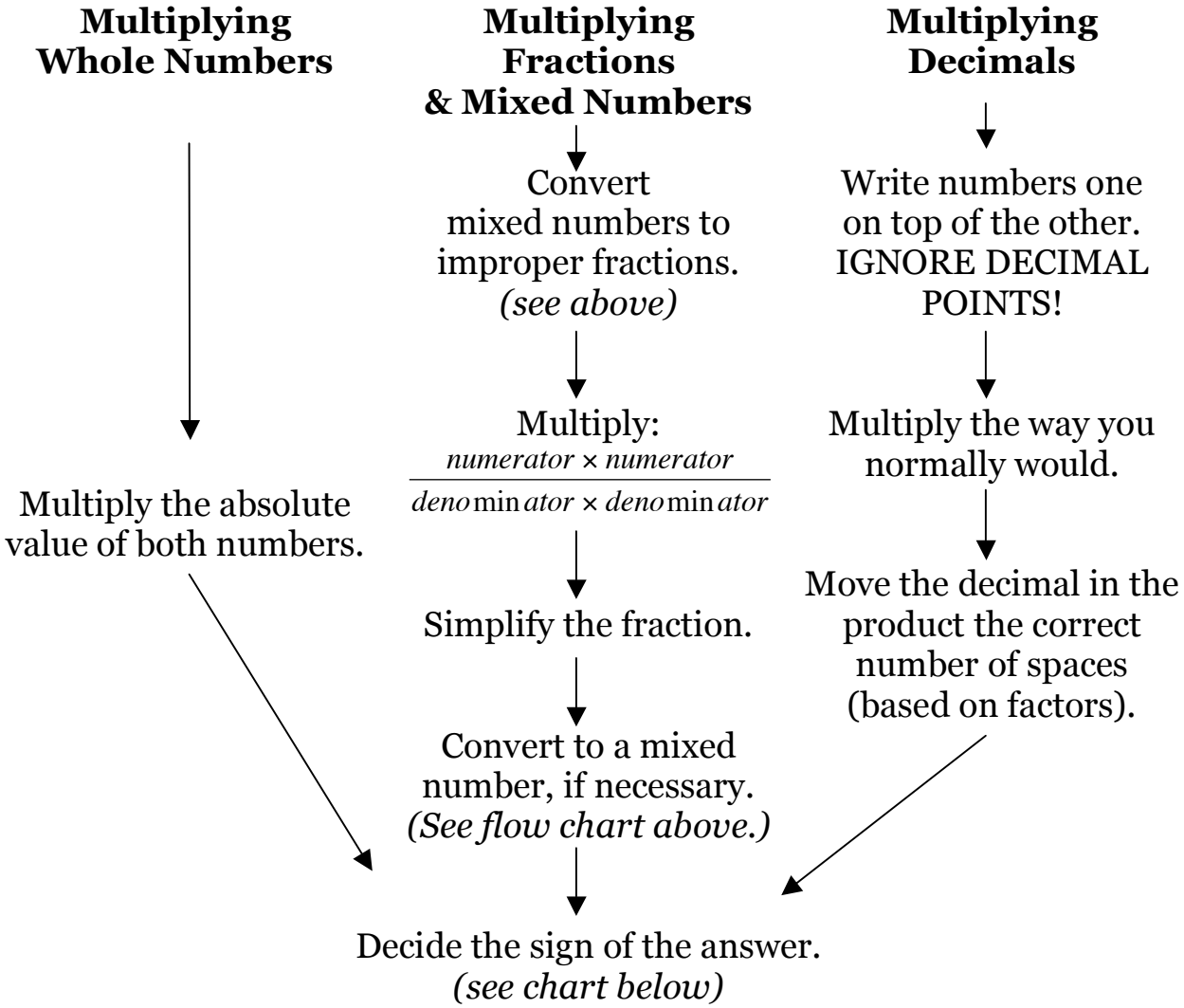
$3\frac{2}{5}$ $3\frac{17}{5}$ $\frac{17}{5}$

1) First multiply the denominator times the whole number.
   $5 \times 3 = 15$
2) Next, add your answer from step 1 to your numerator.
   $15 + 2 = 17$
3) Get rid of your whole number.
   And now you have your improper fraction.

Finding the Least Common Denominator (LCD)

1) Write the multiples of both denominators by counting by each number.
2) Circle the numbers that are in common (the same) between both sets of multiples.
3) Choose the least (smallest) of the common numbers. **This is the LCD.**
4) Change both original fractions into equivalent fractions using the LCD. Do this by multiplying. (THINK: What do you have to multiply to get from the original denominator to the LCD? Multiply that number by the numerator to get the new numerator.)

Multiplying Rational Numbers Flow Chart



Sign of Factor *p*	Sign of Factor *q*	Sign of Product *pq*
+	-	-
-	+	-
+	+	+
-	-	+

<u>factor</u> = a number that is multiplied by another number to get a product
<u>product</u> = the answer in a multiplication problem

Dividing Rational Numbers Flow Chart

Dividing Whole Numbers

Divide the absolute values of both numbers.

Dividing Fractions & Mixed Numbers

Convert mixed numbers to improper fractions. *(see above)*

Set up and use KCF. (**K**eep **C**hange **F**lip)

Multiply: $\frac{numerator \times numerator}{denominator \times denominator}$

Simplify the fraction.

Convert to a mixed number, if necessary. *(See flow chart above.)*

Dividing Decimals

Set up a long division problem, using the absolute values of both numbers.

Move the decimal in the divisor to the end.

Move the decimal in the dividend the same number of spaces, and then move it up into the quotient too.

Do long division as you normally would.

Decide the sign of the answer. *(see chart below)*

Sign of Dividend p	Sign of Divisor q	Sign of Quotient $\frac{p}{q}$
+	-	-
-	+	-
+	+	+
-	-	+

The location of the negative sign does not affect the quotient. For a fractional quotient, the negative sign can be in the numerator, in the denominator, or in front of the fraction.

Remember

Dividend ÷ Divisor = Quotient

$$\text{Divisor})\overline{\text{Dividend}}\quad \text{Quotient}$$

$\frac{\#}{0}$ = undefined

$\frac{0}{\#}$ = zero

Writing Rational Numbers as Decimals

To convert rational numbers to decimals, use long division.

$$\frac{numerator}{denominator} = denominator\overline{)numerator}$$

Remember:
If the decimal comes to an end, it is a terminating decimal.
If the decimal continues forever, it is a repeating decimal.

An improper fraction is greater than 1. Therefore,
its equivalent decimal should also be greater than 1.

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1) Divide: $denominator\overline{)numerator}$
2) Remember to add decimals (in the dividend AND the quotient), and zeros.
3) Then, either:
    a. Add zeros in the dividend and continue dividing until the remainder is 0.
    OR
    b. Stop dividing once you discover a repeating pattern in the quotient.
        i. Write the quotient with its repeating pattern and indicate that the repeating numbers continue by putting a line over only the repeating numbers.

Writing Mixed Numbers as Decimals

To convert mixed numbers to decimals,
rewrite the fractional part of the number as a decimal using long division.

$$\frac{numerator}{denominator} = denominator\overline{)numerator}$$

Remember:
Keep the whole number from the mixed number as the
whole number in the decimal, by writing it to the
LEFT of the decimal point.

Mixed numbers are greater than 1 so their
decimal equivalents should also be greater than 1.

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1) Turn the fractional part into a long division problem.
2) Rewrite the fractional part of the number as a decimal.
3) Rewrite the mixed number as the sum of the whole part and the decimal part.

Adding Three or More Rational Numbers

When adding more than two rational numbers,
GROUP NUMBERS WITH THE SAME SIGN
and combine them first.

Then, combine numbers with different signs,
using the rules for adding/subtracting integers.

REMEMBER:
When lining up decimals, if there are different amounts of numbers after the place value, add zero placeholders.

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For example:

2.32 – 11.2 + 3.95

Since two numbers are positive, group those together: (2.32 + 3.95) – 11.2

Combine those numbers: 6.27 – 11.20

Combine numbers with different signs, using rules for adding integers: –4.93