PRE-ALGEBRA

SUMMER PACKET

2017

MRS. MCGOWAN

To students entering 8th grade at Harrisburg Middle School 2017-2018:

Next year will be an exciting and challenging year as you begin Pre-Algebra. The Pre-Algebra curriculum has been designed to prepare students to meet the rigorous requirements of the PARCC test and to prepare students for Algebra I in high school and beyond. Some of the important skills you need to have in order to be successful in the 8th grade are: integer foundations, integer operations, and fraction operations. These are all skills you have studied in 4th, 5th, 6th and 7th grades and knowledge of these skills and how to use them will help make you successful in Pre-Algebra.

This packet has been put together with those skills in mind. I know none of you want to do math homework during the summer. However, many students lose their math skills when they do not practice them. To help you strengthen and keep your math skills sharp over the summer, I need you to complete this packet. The assignments in bold on the schedule are required. The activities are for extra practice. This packet will be your first grade in Pre-Algebra. It is due on Tuesday, August 22. We will review for a couple of days and you will take a test over these skills.

In order to receive credit for this packet, you must show all work where it is indicated. **No calculators may be used in completing this packet.** Answers with no work will receive no credit! If you misplace this packet, you can find another copy on Google Classroom. If you have not signed up for this class, please see Mrs. Davis or me before the last day of school or email me at dmcgowan@harrisburg3.org if you need help during the summer.

I hope you have a fun and safe summer. I look forward to meeting you in August!

Your Pre-Algebra Teacher,

Mrs. McGowan

Week 1 June 5 - 11	Adding Integers 7.NS.1	**Read notes** **Adding Integers Practice** Adding Integers Coloring Activity
Week 2 June 12 - 18	Subtracting Integers 7.NS.1	**Read notes** **Subtracting Integers Practice** Subtracting Integers Secret Message Activity
Week 3 June 19 - 25	Multiplying Integers/Dividing Integers 7.NS.2	**Read notes** **Multiplying/Dividing Integers Practice** Multiplying/Dividing Integers Quick Color
Week 4 June 26 – July 2	Review Integer Operations 7.NS.1, 7.NS.2	**Read notes** **Integer Review Practice** Integer Review Activity
Week 5 July 3 - 9	Adding Fractions 4.NF.1, 4.NF.3, 4.NF.4, 5.NF.1, 5.NF.4, 5.NF.7, 6.NS.4	**Read notes** **Adding Fractions Practice**
Week 6 July 10 - 16	Subtracting Fractions 4.NF.1, 4.NF.3, 4.NF.4, 5.NF.1, 5.NF.4, 5.NF.7, 6.NS.4	**Read notes** **Subtracting Fractions Practice**
Week 7 July 17 - 24	Multiplying Fractions 4.NF.1, 4.NF.3, 4.NF.4, 5.NF.1, 5.NF.4, 5.NF.7, 6.NS.4	**Read notes** **Multiplying Fractions Practice**
Week 8 July 25 – 30	Dividing Fractions 4.NF.1, 4.NF.3, 4.NF.4, 5.NF.1, 5.NF.4, 5.NF.7, 6.NS.4	**Read notes** **Dividing Fractions Practice** Fraction Operations Review
Weeks 9 and 10 July 31 – August 6; August 6 - 13	Review all summer skills	Take some time over the next two weeks to review all of your skills and prepare for the test.

QUICK GUIDE VOCABULARY

Vocabulary/Formulas You Should Know to be Successful in 8th Grade Math

To be successful in math you must learn the vocabulary. You should be familiar with the following vocabulary/formulas from previous math classes.

Number Sense:

- **Absolute Value**: a number's distance from zero
- **Ratio**: a comparison of two quantities by division
- **Percent**: per one hundred
- **Rate**: a ratio comparing two different units
- **Unit Rate**: a rate with a denominator of 1
- **Fraction:** a way of representing part of a whole
  - **Numerator**: above the line in a fraction
  - **Denominator:** below the line in a fraction
- **Real Numbers**: the set of all rational and irrational numbers.
  - **Rational Numbers**: the set of all numbers that can be written as a fraction; includes fractions, decimals that terminate or repeat and:
    - **Integers**: the set of numbers $\{\dots -2, -1, 0, 1, 2 \dots\}$
    - **Whole Numbers**: the set of numbers $\{0, 1, 2, 3, 4 \dots\}$
    - **Natural Numbers**: the set of numbers $\{1, 2, 3, 4 \dots\}$
  - **Irrational Numbers**: the set of all numbers that cannot be written as a fraction; include decimals that do not terminate or repeat – pi and non-perfect squares

Geometry:

- **Perimeter**: the measure of distance around a figure
  - Rectangle: $P = 2l + 2w$
  - Square: $P = 4s$
  - Triangle: $P = s + s + s$
- **Area**: the number of square units needed to cover the surface of a figure
  - Rectangle $A = lw$
  - Square $A = s^2$
  - Triangle: $A = \frac{1}{2}bh$
  - Trapezoid: $A = \frac{1}{2}h(b_1 + b_2)$
  - Circle $A = \pi r^2$
- **Circumference**: perimeter of a circle
  - Circle $C = \pi d$ or $C = 2\pi r$
- **Pi**: $\frac{circumference}{diamter}$; approximately 3.14
- **Volume**: the number of cubic units it takes to fill a figure
  - Rectangular Prism: $V = lwh$
- **Surface Area**: the total area of the faces (including the bases) and curved surfaces of a solid figure.

QUICK GUIDE VOCABULARY

Geometry:

- **Coordinate Plane**: divided into four quadrants by the x-axis and the y-axis
- **x-axis**: horizontal axis
- **y-axis**: vertical axis
- **Ordered Pairs**: (x, y)
- **Coordinates:** an ordered pair of numbers that identify a point on a coordinate plane.
- **Angle**
  - **Acute:** an angle that is less than 90º
  - **Obtuse:** an angle that is more than 90º but less than 180º
  - **Right∫:** an angle that measures 90º

Expressions and Equations:

- **Equation**: mathematical sentence stating that two expressions are equal
- **Expression**:
  - Numerical - a mathematical expression including numbers and operations; $5 + 9$
  - Algebraic: a mathematical expression including numbers and variables; $5x + 9$
- **Variable:** an unknown quantity that changes or can have different values
- **Coefficient:** a numerical factor in a term of an algebraic expression
  - $5x$: 5 is the coefficient of *x*
- **Constant:** a number with a value that is always the same
  - $5x + 4$**:** 4 is the constant

General Terms:

- **Sum:** the answer to an addition problem
- **Difference:** the answer to a subtraction problem
- **Product:** the answer to a multiplication problem
- **Quotient**: the answer to a division problem
- **Factors:** numbers multiplied together to form a product; $6 \bullet 2 = 12$ 6 and 2 are factors of 12; other factors of 12 are 1, 3, 4, and 12.
- **Multiples:** the product of a whole number and any other whole number; multiples of 6: 6, 12, 18, 24, 30, 36, 42, 49, 54, 60, 66, 72…
- **Substitution:** the replacement of the letters in an algebraic expression with known values

QUICK GUIDE INTEGER RULES

Adding and Subtracting Integers

- **Adding Same Sign Integers –** Add the integers and keep the same sign.
  - Positive + Positive = Positive
  - Negative + Negative = Negative
- **Adding Different Sign Integers** -
  - Do you have more positives or more negatives?
  - If you have more positives, your sum will be positive. If you have more negatives, your sum will be negative.
  - How many more positives/negatives do you have?
  - $5 + (-3)$ You have 2 more positives so your answer is 2.
  - $-8 + 4$ You have 4 more negatives so your answer is -4.
- **Subtracting Integers – SAME OPPOSITE OPPOSITE (SOO)**
  - Keep the first integer the same.
  - Change the subtraction to addition.
  - Change the second integer to its opposite.
  - Use your addition rules.
  - $5 - 9 = 5 + (-9)$= -4 because you have 4 more positives than negatives.

Multiplying and Dividing Integers

- **Multiplying/Dividing Same Sign Integers**
  - When you multiply/divide integers with same signs, the product/quotient is positive.
    - Positive • Positive = Positive
    - Negative • Negative = Positive
    - Positive ÷ Positive = Positive
    - Negative ÷ Negative = Positive
- **Multiplying/Dividing Different Sign Integers**
  - When you multiply/divide integers with different signs, the product/quotient is negative.
    - Positive • Negative = Negative
    - Negative • Positive = Negative
    - Positive ÷ Negative = Negative
    - Negative ÷ Positive = Negative

Absolute Value

- The absolute value of a number is its distance from zero.
- The absolute value of any number is positive.
- Absolute value uses the symbol: $|x|$
- Examples:
  - $|5| = 5$
  - $|-5| = 5$
  - $-|5| = -5$

ADDING INTEGERS

Adding Same Sign Integers: Add the numbers and keep the same sign.

Positive + Positive = Positive	$1 + 2 = 3$
Negative + Negative = Negative	$-1 + (-2) = -3$

Adding Different Sign Integers: You can't add numbers with different signs. You actually subtract them. This is the way I look at it if you don't already understand it.

$3 + (-7) =$ _____

First, do you have more positives or more negatives? **Negatives**
If you have more positives, the sum will be positive. If you have more negatives, the sum will be negative. Will the sum (answer) be negative or positive? **Negative**
Next, how many more negatives do you have? 7 is 4 more than 3 so you have 4 more negatives.
What is the answer? -4

Examples:

$\mathbf{5 + (-8) = -3}$

$\mathbf{-15 + 9 = -6}$

$\mathbf{24 + (-6) = 18}$

$\mathbf{-5 + 12 = 7}$

Name: _____ **Pre-Algebra**

Hour: _____ **Date:** _____ **Adding Integers Practice**

Directions: Find the sum.

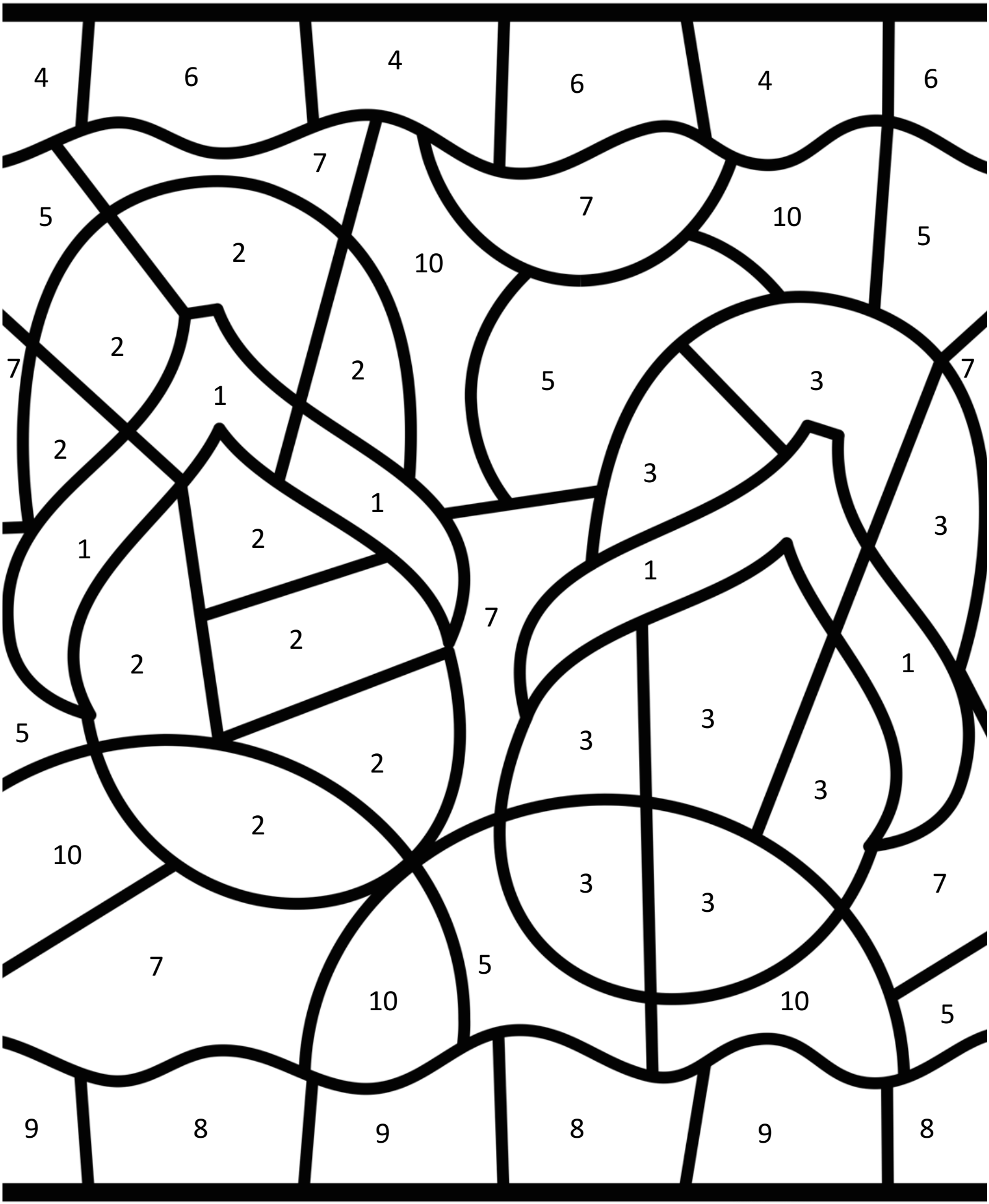
1.	$1+5=$	_____	11.	$3+(-7)=$	_____
2.	$12+24=$	_____	12.	$7+(-14)=$	_____
3.	$-2+(-9)=$	_____	13.	$13+(-2)=$	_____
4.	$-14+(-11)=$	_____	14.	$17+(-8)=$	_____
5.	$-5+3=$	_____	15.	$10+(-5)=$	_____
6.	$-9+6=$	_____	16.	$14+(-30)=$	_____
7.	$-12+2=$	_____	17.	$-12+19=$	_____
8.	$-2+15=$	_____	18.	$16+(-8)=$	_____
9.	$-6+13=$	_____	19.	$23+(-12)=$	_____
10.	$-22+(-17)=$	_____	20.	$-45+45=$	_____

Name: _____ Pre-Algebra

Hour: _____ Date: _____ Adding Integers Coloring Activity

Directions: Solve the problems. Find your answer in the choices to the right and color the picture.
Example. 1. 6 + (-2) = 4 If the answer 4 says orange, you will color all of the #1's orange on the picture.

1	$5 + (-8) =$	**-13** **Orange**	**-3** **Purple**	**3** **Green**
2	$-13 + (-10) =$	**23** **Purple**	**-3** **Green**	**-23** **Orange**
3	$16 + (-12) =$	**-28** **Green**	**4** **Orange**	**-4** **Purple**
4	$-3 + 15 =$	**-18** **Pink**	**12** **Yellow**	**-12** **Blue**
5	$-5 + 12 =$	**7** **Green**	**-7** **Black**	**-17** **Red**
6	$4 + (-6) =$	**-10** **Yellow**	**2** **Pink**	**-2** **Blue**
7	$-5 + 4 =$	**-9** **Red**	**-1** **Green**	**1** **Black**
8	$-9 + 9 =$	**-18** **Blue**	**18** **Pink**	**0** **Yellow**
9	$9 + (-4) =$	**-13** **Yellow**	**5** **Blue**	**-5** **Pink**
10	$0 + (-9) =$	**0** **Black**	**9** **Red**	**-9** **Green**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SUBTRACTING INTEGERS

Subtracting Integers: **S**ame **O**pposite **O**pposite

Keep the first number the same, change the operation to its opposite (from subtraction to addition) and change the last number to its opposite. Once you change the subtraction to addition, follow the addition rules!

$$5 - 8 = 5 + (-8) = -3$$

$$5 - (-8) = 5 + 8 = 13$$

$$-5 - 8 = -5 + (-8) = -13$$

$$-5 - (-8) = -5 + 8 = 3$$

Examples

$$3 - 5 = -2$$

$$8 - (-4) = 12$$

$$-9 - 14 = -23$$

$$-12 - (-6) = -6$$

Name: _____ **Pre-Algebra**

Hour: _____ **Date:** _____ **Subtracting Integers Practice**

Directions: Find the difference. Show your work if needed.

1. $5-1=$ _____
2. $10-7=$ _____
3. $4-11=$ _____
4. $12-18=$ _____
5. $22-30=$ _____
6. $6-(-4)=$ _____
7. $9-(-18)=$ _____
8. $11-(-11)=$ _____
9. $-2-1=$ _____
10. $-3-8=$ _____
11. $-6-(8)=$ _____
12. $-12-(-1)=$ _____
13. $-4-(-4)=$ _____
14. $-10-8=$ _____
15. $15-22=$ _____
16. $-5-13=$ _____
17. $15-(-2)=$ _____
18. $0-(-9)=$ _____
19. $0-16=$ _____
20. $-13-8=$ _____

Name: _____ **Pre-Algebra**

Hour: _____ **Date:** _____ **Subtracting Integers Secret Code**

Directions: Find the difference. Find your answer in the box to the left. Write the letter that corresponds with the answer in the blanks at the bottom. Example: #1 5 – 9 = -4. If -4 corresponds to the letter A, you will put the letter A in all blanks with the #1 underneath.

1. $7 - 10$
2. $-2 - 3$
3. $-5 - (-3)$
4. $-8 - (-11)$
5. $-3 - (-8)$
6. $0 - (-2)$
7. $5 - (-5)$
8. $9 - 16$
9. $8 - 12$
10. $-6 - (-6)$
11. $-6 - (-14)$
12. $-4 - (-5)$
13. $4 - 10$
14. $9 - 18$

A = 8	N = -9
B = 5	O = -7
C = 1	P = 2
D = 4	Q = 7
E = 0	R = -2
F = 9	S = -5
G = 10	T = -6
H = -1	U = -4
I = 3	V = 11
J = -8	W = -11
K = 6	X = 19
L = -10	Y = -19
M = -3	Z = 17

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	
13	8	2	9	5	13	3	11	12	13	

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	
4	14	13	10	7	10	3	2	-4	2	10	

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	
2	11	1	10	8	6	6	8	2	4	13	10	

_____	_____	_____	_____	_____	_____	_____	_____	
8	6	6	8	2	4	13	10	

MULTIPLYING/DIVIDING INTEGERS

Multiplying Same Sign Integers:

- When multiplying integers with same signs, multiply the integers and the product is positive.
- Positive • Positive = Positive $3 \bullet 4 = 12$
- Negative • Negative = Positive $-3 \bullet (-4) = 12$

Multiplying Different Sign Integers:

- When multiplying integers with different signs, multiply the integers and the product is negative.
- Positive • Negative = Negative $3 \bullet (-4) = -12$
- Negative • Positive = Negative $-3 \bullet 4 = -12$

Dividing Same Sign Integers:

- When dividing integers with same signs, divide the integers and the quotient is positive.
- Positive ÷ Positive = Positive $12 \div 4 = 3$
- Negative ÷ Negative = Positive $-12 \div (-4) = 3$

Dividing Different Sign Integers:

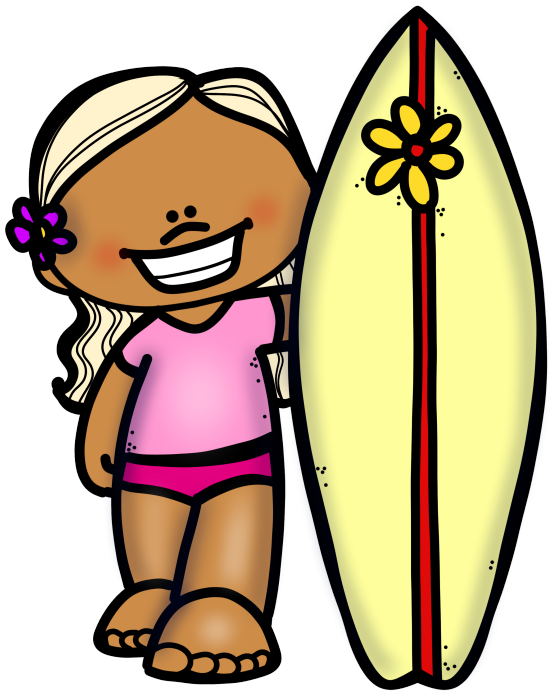
- When dividing integers with different signs, divide the integers and the quotient is negative.
- Positive ÷ Negative = Negative $12 \div (-4) = -3$
- Negative ÷ Positive = Negative $-12 \div 4 = -3$

Name: _____ Pre-Algebra

Hour: _____ Date: _____ Multiplying and Dividing Integers Practice

Directions: Find the product or quotient.

1. $5 \cdot 3 =$
2. $-5 \cdot (-3) =$
3. $5 \cdot (-3) =$
4. $-5 \cdot 3 =$
5. $5(6) =$
6. $(-4)(-6) =$
7. $-7(4) =$
8. $-10(1) =$
9. $0 \cdot 12 =$
10. $0(-7) =$
11. $\frac{45}{9} =$
12. $\frac{-36}{-6} =$
13. $\frac{-18}{6} =$
14. $\frac{42}{-7} =$
15. $\frac{-12}{-12} =$
16. $\frac{-25}{25} =$
17. $\frac{0}{5} =$
18. $\frac{0}{-7} =$
19. $\frac{-33}{-3} =$
20. $\frac{-81}{9} =$



Name: _____ Pre-Algebra

Hour: _____ Date: _____ Multiplying and Dividing Integers
Quick Color.

Directions: Work the problems. Write the answers in the circle. Color the shapes with the positive answers one color and the ones with the negative answers a different color.

$3 \cdot 4$	$-5 \cdot 12$	$\frac{-12}{-4}$	$\frac{-18}{-9}$	$\frac{-36}{4}$
$\frac{26}{-13}$	$\frac{15}{-3}$	$(8)(3) =$	$\frac{-27}{3}$	$-5 \cdot (-4)$
$\frac{-72}{-8}$	$6 \cdot (-5)$	$14 \cdot 3$	$-6 \cdot 8$	$\frac{-70}{-5} =$
$25(-3)$	$\frac{100}{-10}$	$\frac{-90}{9}$	$\frac{-14}{-7} =$	$17 \cdot 3$
$\frac{64}{8}$	$-15 \cdot 3$	$\frac{-56}{-8} =$	$\frac{-15}{-15} =$	$\frac{-121}{11} =$

Name: _____ **Pre-Algebra**

Hour: _____ **Date:** _____ **Integer Operations Review**

Directions: Find each sum, difference, product, or quotient.

1. $5 \bullet 4 =$
2. $8 + (-3) =$
3. $6 - 10 =$
4. $\frac{-72}{9}$
5. $-7 - 8 =$
6. $6 + (-2) =$
7. $-8(5) =$
8. $\frac{-10}{10} =$
9. $8 - 15 =$
10. $-9 + (-4) =$
11. $-4 \bullet 6 =$
12. $\frac{-51}{-3} =$
13. $8 \bullet (-8) =$
14. $5 \bullet 7 =$
15. $7(-6) =$
16. $\frac{0}{-9} =$
17. $-9 - (-6) =$
18. $-5 + 3 =$
19. $\frac{-20}{-1} =$
20. $0 - (-8) =$
21. $7 - (-7) =$
22. $0(-10) =$
23. $-17 + (-8) =$
24. $-8 - 5 =$

QUICK GUIDE

UNDERSTANDING FRACTIONS

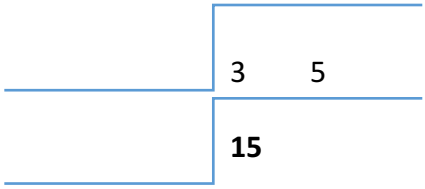
Fraction: A fraction is a part of a whole

Parts of a Fraction:

- **Numerator:** the number on top of the fraction bar
- **Denominator**: the number below the fraction bar
- **Fraction Bar:** The fraction bar means to divide. So, you can read the fraction $\frac{3}{4}$ as 3 divided by 4.

Finding a Common Denominator: There are many methods you can use to find the least common denominator. You may be able to do it in your head if you are really good at your multiplication facts. If not, you can use a factor tree (prime factorization), a list of factors or the ladder method. I am going to show you the ladder method but you may use any of method that works for you.

Ladder Method: $\frac{1}{3}+\frac{2}{5}=$



To use the ladder method, I use the first 5 or 6 prime numbers: 2, 3, 5, 7, 11

Start with the smallest prime number and ask whether the two numbers (denominators) are divisible by that number. If not, then go to the next one. In this example, you can't divide both numbers by any of the prime numbers because they are both prime numbers themselves. Since they are not divisible by any of the prime numbers, multiply the two numbers together and this is the least common denominator. So the least common denominator is 15

Once you find the least common denominator, rewrite the fractions with that denominator. To change the denominator from 3 to 15, multiply the denominator by 5 and then multiply the numerator by 5 as well. To change the denominator from 5 to 15, multiply both the numerator and the denominator by 3.

$\frac{1}{3}\bullet\frac{5}{5}=\frac{5}{15}$, so $\frac{1}{3}$ written with a denominator of 15 is $\frac{5}{15}$.

$\frac{2}{5}*\frac{3}{3}=\frac{6}{15}$, so $\frac{2}{5}$ written with a denominator of 15 is $\frac{6}{15}$

Once you have the common denominator, then you can add the fractions.

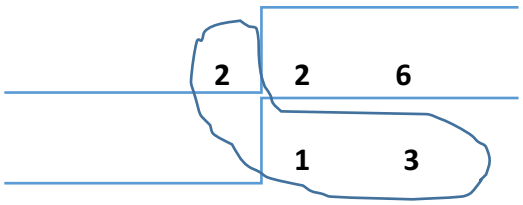
$$\frac{5}{15}+\frac{6}{15}=\frac{11}{15}$$

QUICK GUIDE

UNDERSTANDING FRACTIONS

Another Example of the Ladder Method for Finding the Least Common Denominator: 2, 3, 5, 7, 11

$\frac{1}{2}+\frac{1}{6}=$



In this example, both the 2 and the 6 are divisible by 2. So, divide them both by 2. On the second rung of the ladder, you have 1 and 3 because 2 ÷ 2 = 1 and 6 ÷ 2 = 3. Now, multiply the 2•1•3 = 6. So, the common denominator is 6. If you had just multiplied the 2 •6 you would have gotten a common denominator, 12, but it would not have been the least common denominator.

Simplifying Fractions: to find the simplest form, divide the numerator and the denominator by the greatest common factor (GCF). The GCF is the greatest factor that the numerator and the denominator share. Use any of the methods you know to find the GCF. You can even find it in your head if you are good with your multiplication facts.

Tip: You don't even have to find the GCF, if you keep dividing until the fraction is in simplest form.

Examples:

$\frac{6}{12}\div\frac{6}{6}=\frac{1}{2}$

So, the GCF of 6 and 12 is 6. Divide both by 6 to simplify the fraction.

What if you made a mistake and thought that 2 was the GCF of 6 and 12 since they are both even?

$\frac{6}{12}\div\frac{2}{2}=\frac{3}{6}\div\frac{3}{3}=\frac{1}{2}$

It takes a little more work but you will come to the same answer as long as you know that the fraction was not in simplest form after dividing the numerator and denominator by 2. After doing that division, you should notice that you can still divide both the numerator and the denominator by 3. Now, it is in simplest form!

Mixed Numbers and Improper Fractions:

$3\frac{4}{5}=\frac{19}{5}$

Multiply the denominator by the whole number and add the numerator. Keep the denominator the same. To go from improper to mixed, divide the numerator by the denominator.

QUICK GUIDE

FRACTION OPERATIONS

Adding and Subtracting Fractions

- While it is possible to add or subtract fractions without changing mixed numbers to improper fractions, it is often easier to do it if you change them first.
- Find the least common denominator of the fractions.
- Re-write each fraction using the common denominator. Don't forget to multiply the numerator by the same number you multiplied the denominator by to get the common denominator.
- Add or subtract the numerators. **Keep the denominator the same!**
- Simplify the answer if needed. This means to reduce the fraction to simplest form and to write any improper fractions as mixed numbers.

Trick for Adding and Subtracting Fractions

- I prefer that you be able to add or subtract fractions using the method above, but I am providing you with a simpler way if you are having problems finding the common denominator.
- Cross multiply the numerator of the first fraction with the denominator of the second fraction. The product is your first numerator. Then cross multiply the denominator of the first fraction with the numerator of the second fraction. The product is your second numerator. Finally, cross multiply the denominators. The product is your denominator for both fractions.
- Add or subtract the numerators. **Keep the denominator the same!**
- Simplify the answer if needed.

Multiplying Fractions

- Change mixed numbers to improper fractions first. While this is not required for adding/subtracting, you must do it in order to multiply.
- Multiply the numerators.
- Multiply the denominators.
- Simplify your answer if needed.

Dividing Fractions

- Change mixed numbers to improper fractions first. While this is not required for adding/subtracting, you must do it in order to divide.
- Keep the first fraction the same.
- Find the reciprocal of the divisor (second fraction).
- Change the division symbol to multiplication.
- Multiply the numerators.
- Multiply the denominators.
- Simplify your answer if needed.

ADDING FRACTIONS

Steps for Adding Fractions:

- Change mixed numbers to improper fractions.
- To add fractions, you must have a common denominator. Find the least common denominator using any method you choose. See the Quick Guide for finding the LCM.
- Rewrite the fractions using your common denominator. Remember to multiply the numerator by the same number you multiplied the denominator by to get the common denominator.
- Add the numerators.
- Keep the denominators the same.
- Simplify your answer if needed. See the Quick Guide for simplifying fractions.

Examples:

1. $\frac{1}{7}+\frac{3}{7}=\frac{4}{7}$

2. $\frac{1}{6}+\frac{2}{6}=\frac{3}{6}\div\frac{3}{3}=\frac{1}{2}$

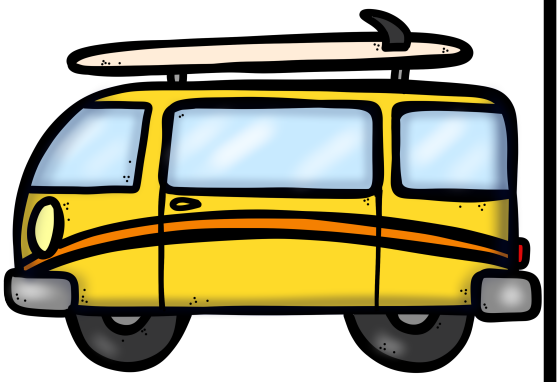
3. $\frac{1}{2}+\frac{1}{4}=\frac{2}{4}+\frac{1}{4}=\frac{3}{4}$

4. $\frac{1}{3}+\frac{2}{5}=\frac{5}{15}+\frac{6}{15}=\frac{11}{15}$

5. $2\frac{1}{2}+3\frac{1}{6}=\frac{5}{2}+\frac{19}{6}=\frac{15}{6}+\frac{19}{6}=\frac{34}{6}=5\frac{4}{6}=5\frac{2}{3}$

6. $\frac{1}{2}+\frac{4}{6}=\frac{3}{6}+\frac{4}{6}=\frac{7}{6}=1\frac{1}{6}$

7. $5+\frac{3}{4}=5\frac{3}{4}$



Name: _____ Pre-Algebra

Hour: _____ Date: _____ Adding Fractions Practice

Directions: Find the product. Show your work. Simplify, if necessary.

1. $\frac{1}{9}+\frac{4}{9}=$

2. $\frac{1}{6}+\frac{2}{6}=$

3. $\frac{3}{7}+\frac{5}{9}=$

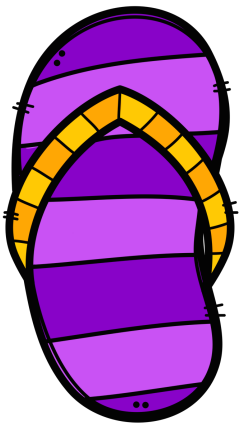
4. $\frac{2}{5}+\frac{3}{8}=$

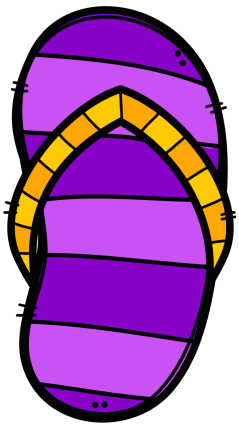
5. $\frac{3}{4}+\frac{1}{3}=$

6. $3\frac{1}{5}+2\frac{2}{5}=$

7. $4\frac{1}{4}+2\frac{4}{5}=$

8. $\frac{1}{2}+4\frac{3}{4}=$





SUBTRACTING FRACTIONS

Steps for Subtracting Fractions:

- Change mixed numbers to improper fractions.
- To subtract fractions, you must have a common denominator. Find the least common denominator using any method you choose. See the Quick Guide for finding a common denominator.
- Rewrite the fractions using your common denominator. Remember to multiply the numerator by the same number you multiplied the denominator by to get the common denominator.
- Subtract the numerators.
- Keep the denominators the same.
- Simplify your answer if needed. See the quick guide for simplifying fractions.

Examples:

1. $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$

2. $\frac{7}{8} - \frac{3}{8} = \frac{4}{8} \div \frac{4}{4} = \frac{1}{2}$

3. $\frac{7}{8} - \frac{1}{2} = \frac{7}{8} - \frac{4}{8} = \frac{3}{8}$

4. $\frac{3}{5} - \frac{1}{2} = \frac{6}{10} - \frac{5}{10} = \frac{1}{10}$

5. $5 - 2\frac{1}{2} = \frac{5}{1} - \frac{5}{2} = \frac{10}{2} - \frac{5}{2} = 2\frac{1}{2}$

Name: _____ Pre-Algebra

Hour: _____ Date: _____ Subtracting Fractions Practice

Directions: Find the difference. Show your work. Simplify, where necessary.

1. $\frac{5}{9} - \frac{3}{9} =$

2. $\frac{8}{9} - \frac{2}{9} =$

3. $\frac{9}{10} - \frac{3}{5} =$

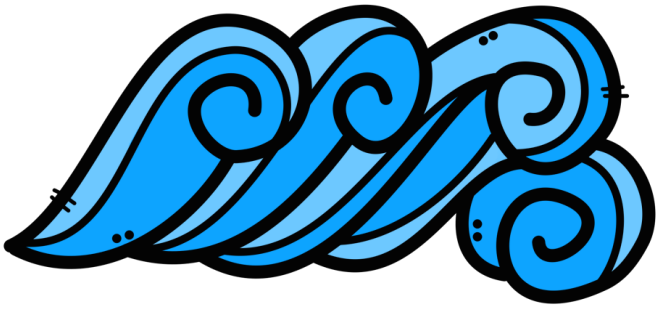
4. $\frac{1}{2} - \frac{3}{8} =$

5. $\frac{5}{12} - \frac{1}{4} =$

6. $\frac{3}{5} - \frac{1}{3} =$

7. $10\frac{1}{3} - 2\frac{1}{4} =$

8. $14\frac{1}{3} - 8\frac{1}{2} =$



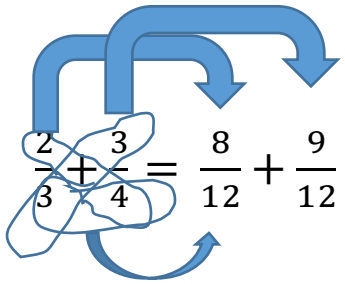
TIP FOR ADDING AND SUBTRACTING FRACTIONS

While I would prefer for you to add and subtract fractions by finding the least common denominator, it is absolutely necessary that you be able to add and subtract fractions to be successful in pre-algebra. So, I'm going to show a different way. Use this if you can't do it any other way! This way still finds a common denominator but not necessarily the least common denominator.

Steps:

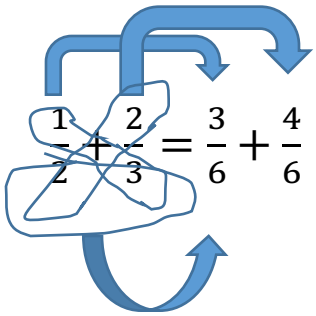
- Multiply the numerator of the first fraction by the denominator of the second fraction – cross multiply.
- Multiply the denominator of the first fraction by the numerator of the second fraction – cross multiply.
- Multiply the denominators. This is your common denominator – not necessarily the LCM.
- Add or subtract the numerators.
- Keep the denominator the same.
- Simplify if necessary.

Examples:



$$\frac{2}{3}+\frac{3}{4}=\frac{8}{12}+\frac{9}{12}=\frac{17}{12}=1\frac{5}{12}$$

Multiply 2 • 4 = 8; 8 becomes the numerator of the first fraction.
Multiply 3 • 3 = 9; 9 becomes the numerator of the second fraction.
Multiply 3 • 4 = 12; 12 becomes the denominator of both fractions.
Add 8 + 9 (the numerators) = 17
Keep the denominator, 12, the same.
Simplify.



$$\frac{1}{2}+\frac{2}{3}=\frac{3}{6}+\frac{4}{6}=\frac{7}{6}=1\frac{1}{6}$$

Name: _____ **Pre-Algebra**

Hour: _____ **Date:** _____ **Adding/Subtracting Fractions Using the Tip**

Directions: Use the tip on the previous page to add/subtract fractions. If this way is easier for you, go back and rework the problems in the Adding Fractions Practice and the Subtracting Fractions Practice to try to get a better score.

1. $\frac{3}{7} + \frac{5}{9} =$

2. $\frac{2}{5} + \frac{3}{8} =$

3. $\frac{1}{12} + \frac{4}{9} =$

4. $\frac{9}{10} - \frac{3}{5} =$

5. $\frac{3}{5} - \frac{1}{3} =$

6. $\frac{1}{2} - \frac{1}{8} =$

MULTIPLYING FRACTIONS

Steps for Multiplying Fractions:

- Multiply the numerators – straight across (no cross multiplying here).
- Multiply the denominators – straight across (no cross multiplying here).
- Simplify, if necessary.

Examples:

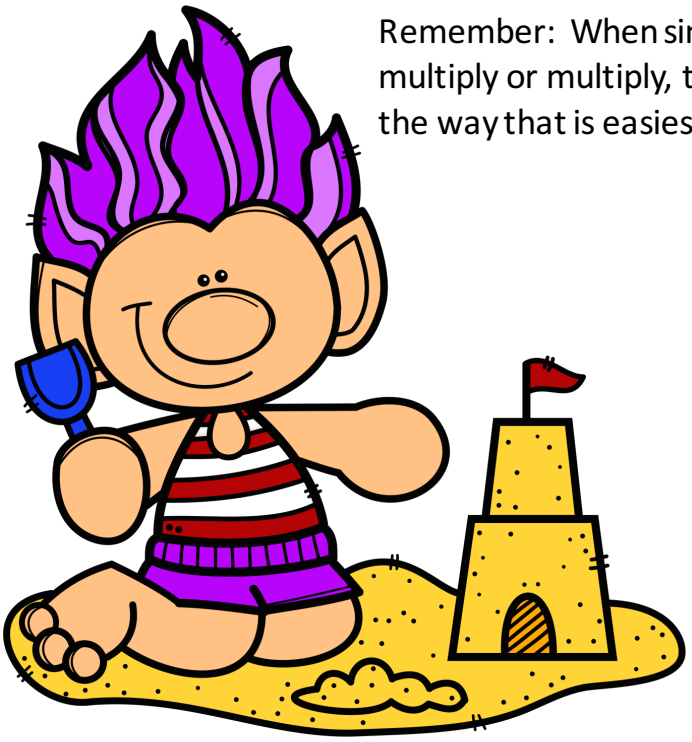
$$\frac{2}{3} \bullet \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$$

Multiplying a fraction by a whole number. Just remember to change the whole number to a fraction first by giving it a denominator of 1.

$$\frac{1}{2} \bullet 10 = \frac{1}{2} \bullet \frac{10}{1} = \frac{10}{2} = 5$$

Multiplying fractions and mixed numbers. Change the mixed number to an improper fraction first.

$$\frac{2}{3} \bullet 3\frac{1}{2} = \frac{2}{3} \bullet \frac{7}{2} = \frac{14}{6} = 2\frac{2}{6} = 2\frac{1}{3}$$



Remember: When simplifying fractions, you can simplify, then multiply or multiply, then simplify. Do it the way that you learned or the way that is easiest for you.

Name: _____ Pre-Algebra

Hour: _____ Date: _____ Multiplying Fractions Practice

Directions: Find the product. Simplify, if necessary.

1. $\frac{3}{8} \bullet \frac{5}{6} =$

2. $\frac{1}{4} \bullet \frac{2}{7} =$

3. $5 \bullet \frac{4}{5} =$

4. $10\frac{1}{3} \bullet \frac{1}{2} =$

5. $8\frac{1}{5} \bullet 2\frac{3}{4} =$

DIVIDING FRACTIONS

Steps for Dividing Fractions:

- Keep the first fraction the same.
- Change the division to multiplication.
- Change the second fraction to its reciprocal (flip it).
- Multiply the numerators. Multiply the denominators. Simplify.

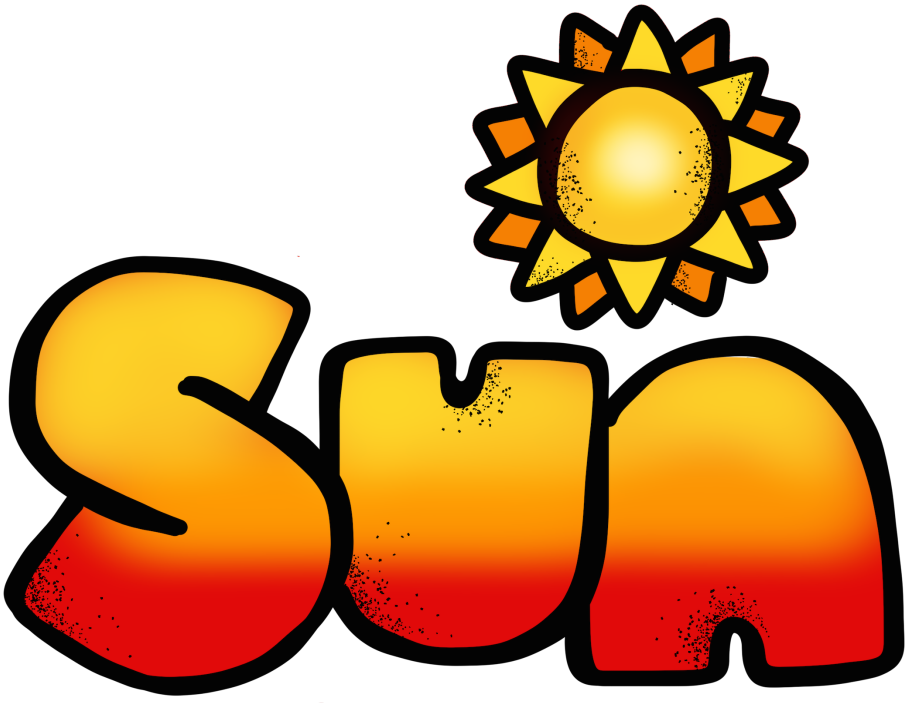
Examples:

1. $\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \bullet \frac{2}{1} = \frac{4}{3} = 1\frac{1}{3}$

2. $\frac{7}{8} \div \frac{2}{3} = \frac{7}{8} \bullet \frac{3}{2} = \frac{21}{16} = 1\frac{5}{16}$

3. $6\frac{1}{8} \div 2\frac{1}{4} = \frac{49}{8} \div \frac{9}{4} = \frac{49}{8} \bullet \frac{4}{9} = \frac{196}{72} = 1\frac{52}{72} = 1\frac{13}{24}$

Remember: When reducing fractions, you can simplify, then multiply or multiply, then simplify. Do it the way that you learned to do it or the way that is easiest for you.



Name: _____ Pre—Algebra

Hour: _____ Date: _____ Dividing Fractions Practice

Directions: Find the quotient. Simplify, if necessary.

1. $\frac{3}{5} \div \frac{1}{8} =$

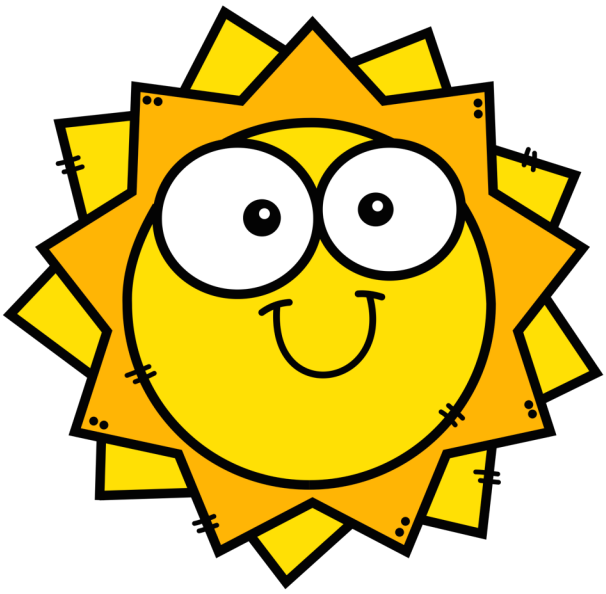
2. $\frac{1}{3} \div \frac{1}{6} =$

3. $\frac{5}{9} \div \frac{1}{4} =$

4. $\frac{3}{4} \div \frac{1}{8} =$

5. $4\frac{1}{2} \div 1\frac{5}{6} =$

6. $10\frac{2}{3} \div 5\frac{1}{5} =$



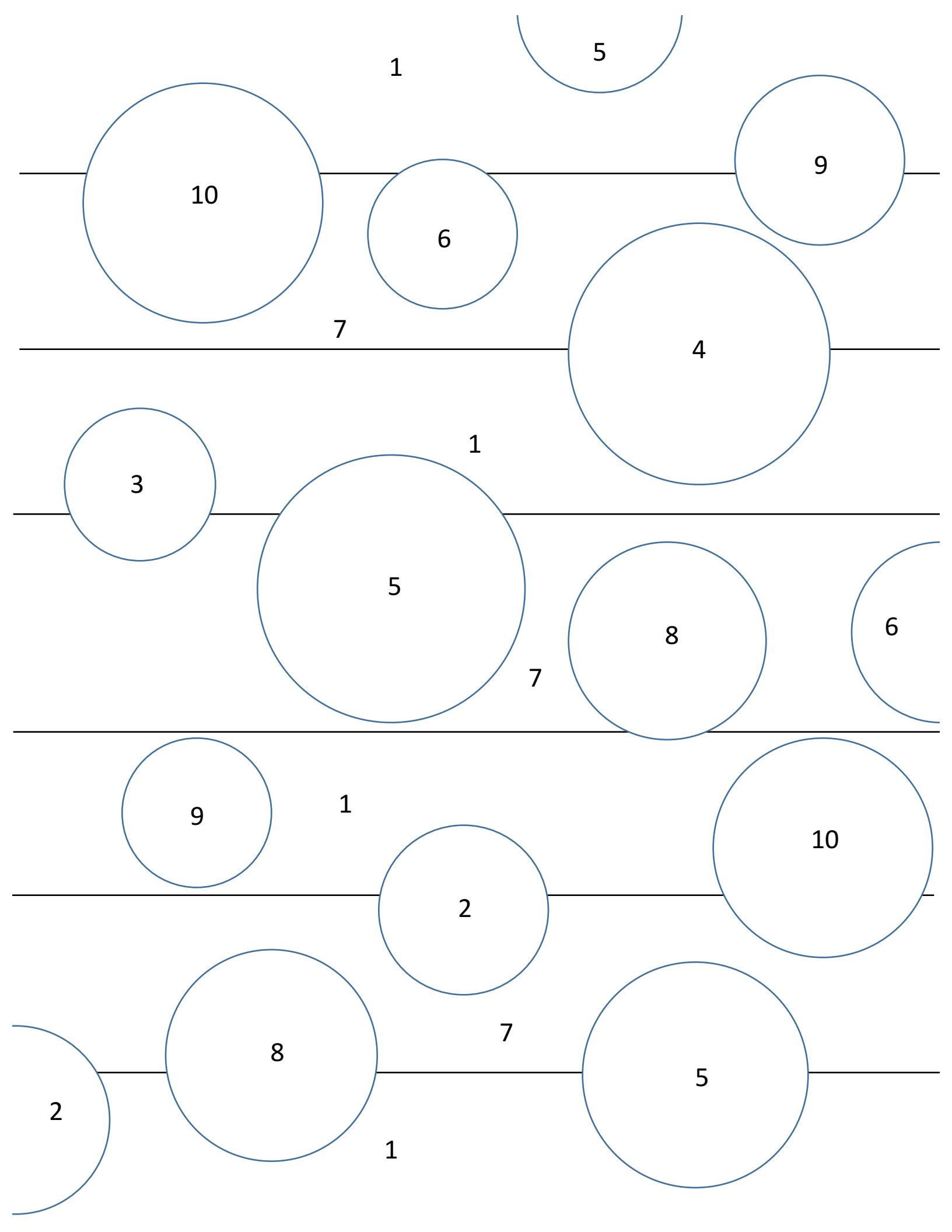
Name: _____ Pre-Algebra

Hour: _____ Date: _____ Fraction Operations Review

Fraction Operations Review

Solve each problem. Find your answer in one of the three answer boxes. Find the problem number on the coloring page and color each section with that number the color that corresponds to your answer.

#		Answer 1	Answer 2	Answer 3
1	$\frac{5}{8}+\frac{8}{9}$	$\frac{13}{17}$ Orange	$1\frac{37}{72}$ Yellow	$1\frac{13}{17}$ Black
2	$\frac{2}{7}\bullet\frac{3}{5}$	$\frac{6}{35}$ Blue	$\frac{10}{21}$ Green	$2\frac{1}{10}$ Red
3	$\frac{4}{5}-\frac{1}{3}$	$\frac{7}{15}$ Orange	$\frac{3}{2}$ Pink	$\frac{2}{3}$ Blue
4	$\frac{5}{9}\div\frac{6}{7}$	$\frac{10}{21}$ Brown	$\frac{35}{54}$ Black	$1\frac{19}{35}$ Purple
5	$2\frac{1}{2}+3\frac{1}{6}$	$5\frac{2}{3}$ Purple	5 Pink	$5\frac{1}{3}$ Green
6	$1\frac{1}{4}\bullet 6\frac{7}{8}$	$6\frac{7}{32}$ Green	$6\frac{2}{7}$ Orange	$8\frac{19}{32}$ Red
7	$12\frac{2}{3}-5\frac{2}{5}$	$7\frac{1}{3}$ Blue	$6\frac{4}{15}$ Purple	$7\frac{4}{15}$ Green
8	$8\frac{1}{2}\div 2\frac{5}{6}$	$3\frac{3}{5}$ White	$4\frac{3}{5}$ Pink	3 Brown
9	$7\frac{1}{11}+9\frac{1}{3}$	16 Orange	$16\frac{14}{33}$ White	$17\frac{14}{33}$ Red
10	$3\frac{1}{2}\bullet 4\frac{5}{7}$	$12\frac{5}{14}$ White	$16\frac{1}{2}$ Pink	$12\frac{1}{2}$ Brown


5
1
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