Math 9 Tripp

Name: _________**KEY**___________

Chapter 1 – Numeracy

Test Date: ____

To do:

1.1 – Number Strategies

- Complete Notes/Activities on Moodle ◯

1.2 – GCF/LCM

- Complete Notes ◯

1.3 – Integers

- Complete Notes ◯

1.4 – Order of Operations Review

- Complete Notes ◯

1.5 – Introduction to Fractions

- Complete Notes ◯
- Quiz 1 ◯

1.6 – Multiplying Fractions

- Complete Notes ◯

1.7 – Dividing Fractions

- Complete Notes ◯

1.8 – Mixed Numbers

- Complete Notes ◯

1.9 – Adding & Subtracting Fractions

- Complete Notes ◯

1.10 – BEDMAS with Fractions

- Complete Notes ◯
- Quiz 2 ◯

Write Unit Test ◯

Proceed through the modules, videos, activities, and games in *Moodle* for this sub-section (1.1) to ensure you have sufficiently reviewed this material

Mental Math

Rounding – rounding involves temporarily adding or subtracting from a number to make it "easier" to work with.

Examples:

52 + 39 = 52 + 40 – 1 = 92 – 1 = 91

756 – 198 = 756 – 200 + 2 = 556 + 2 = 558

Expanding – using place values to break a number down into its parts. With subtraction, start with the ones place value and work your way up.

Examples:

147 + 312 = (100 + 300) + (40 + 10) + (7 + 2) = 400 + 50 + 9 = 459

831 – 348 →

- 1 – 8; we need to borrow from the tens → 11 – 8 = 3
- 20 – 40; we need to borrow from the hundreds → 120 – 40 = 80
- 700 – 300 = 400
- ∴ 831 – 348 = 400 + 80 + 3 = 483

Word Problems:

1. Read the problem
2. Organize yourself

3. Strategize and Solve
4. Confirm your answer

Three friends earned $360 mowing lawns over two days. They decide to split the earnings evenly. How much does each person receive?

$360 total ÷ 3 friends = $120 per friend

Vocab:

Addition	Subtraction	Multiplication	Division
• Plus • Sum • More than • And • Increase • Bigger • Combined	• Minus • Difference • Less than • Loss • Decrease • Smaller	• Product • Times • Double (2x) • Triple (3x) • Of	• Divided by • A portion of • Half • Quotient • Average • Split • Each

Examples:

1. At an amusement park, Aiko wants to ride a rollercoaster that costs 29 tickets, a bumper car that costs 26 tickets, and a merry-go-round that costs 31 tickets. Aiko had 15 tickets, but lost 6 of them on a ride. How many more tickets does she need?

$$29 + 26 + 31 = 86$$
$$15 - 6 = 9$$
$$86 - 9 = 77$$

2. John had 204 deer stickers. John gave 24 stickers to Marcos, 56 stickers to his sister and an additional 45 stickers to Jess. How many stickers does John still have?

$$204 - 24 - 56 - 45 = 79$$

3. Gurtaj wants several different colour plates for his birthday. He wants to get 96 yellow plates, 72 orange plates, and some amount of gold plates. In total, Gurtaj wants 300 plates, so how many gold plates should he get?

$$300 - 96 - 72 = 132$$

4. For lunch, Fred bought a glass of milk for $1.50, a reuben sandwich for $5.50, as well as some brownies for $2.40. The tax was $1.40, and Fred paid with $18.00. How much change should Fred receive?

$$1.50 + 5.50 + 2.40 + 1.40 = 10.80$$
$$18.00 - 10.80 = 7.20$$

Math 9 **Lesson 1.2 – Greatest Common Factor/Lowest Common Denominator** Tripp

A **prime** is a number that is only divisible by 1 and itself.

2, 3, 5, 7, 11, 13, 17, 19, 23, 97, …

A **composite** is a number that has more than 2 factors.

4, 6, 8, 21, 56, 100, …

Factors are all of the numbers that when multiplied result in a value. For example:

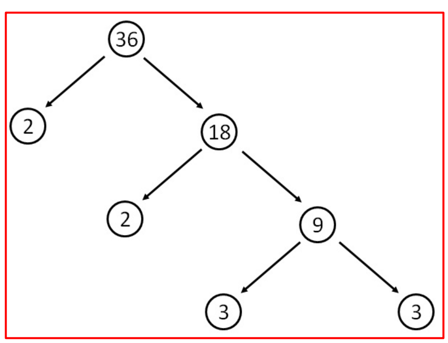
$12 = 1 \times 12 = 2 \times 6 = 3 \times 4$

$39 = 1 \times 39 = 3 \times 13$

$49 = 1 \times 49 = 7 \times 7$

Prime Factorization (Factor Trees):

36



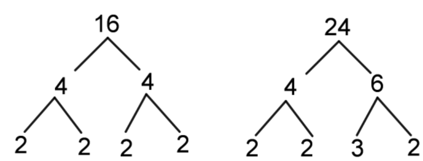
The **greatest common factor** or **GCF** is the largest positive integer that divides evenly into all numbers with zero remainder. For example:

Factors of 24: 1, 2, 3, 4, 6, 8, 12, and 24
Factors of 36: 1, 2, 3, 4, 6, 9, 12, 18, and 36
Common factors: 1, 2, 3, 4, 6, and 12 → the greatest common factor is 12

Examples:

1. Find the GCF of these numbers using prime factorization:

   16, 24



$16 = 2 \times 2 \times 2 \times 2$
$24 = 2 \times 2 \times 2 \times 3$
Prime factors common to both numbers are: $2 \times 2 \times 2$
$2 \times 2 \times 2 = 8$
$\therefore$ The GCF is 8

The **lowest common multiple** or **LCM** is the lowest quantity that is a multiple of two or more given quantities. For example:

Looking at 30 and 45

- Multiples of 30 are 30, 60, 90, 120, ...
- Multiples of 45 are 45, 90, 135, 180, ...
- A common multiple in the list is 90. It is also the lowest one in common → LCM is 90

Examples:

1. Find the LCM of these numbers using prime factorization:

   16, 24

- $16 = 2 \times 2 \times 2 \times 2 = 2^4$ and $24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$
- Multiply each factor the greatest number of times it occurs in either number. If the same factor occurs more than once in both numbers, you multiply the factor the greatest number of times it occurs.
- List of factors: 2 (more "copies" from 16) and 3 (only from 24)
- $2^4 \times 3 = 48$ → the LCM is 48

Math 9 **Lesson 1.3 - Integers** Tripp

An integer is a **positive** or **negative** whole number. For example:

4, –803, 72, 0, –6195

Adding integers with the **same sign**, you add the numbers and keep the same sign.

(–6) + (–2) = –8 or 12 + 5 = 17

Adding integers with **opposite signs**, you subtract the numbers and keep the sign of the larger number. Subtraction is the same, rewrite the question as adding the opposite.

(–8) + 4 = –4 or 14 + (–7) = 7

9 – (–10) = 9 + 10 = 19 or (–16) – 20 = (–16) + (–20) = –36

Examples:

1. $(-4) + (-6)$

   $= -10$

2. $81 + (-9)$

   $= 72$

3. $2 + (-9)$

   $= -7$

4. $4 - (-8)$

   $= 12$

In multiplication or division, if the signs are different the answer always yields a **negative number**. If the signs are the same the answer always yields a **positive number**.

Examples:

1. $4 \times (-6)$

   $= -24$

2. $(-9) \div (-3)$

   $= +3$

3. $(-1) \times (-2)$

   $= +2$

4. $40/(-5)$

   $= -8$

Math 9 **Lesson 1.4 – Order of Operations Review** Tripp

A special order of operations is to be done when there are several operations needed to simplify an expression.

B—brackets

E—exponents

D—division

M—multiplication

A—addition

S—subtraction

Examples:

1. $2 + 4 \times 6 - 6$

 $= 2 + 24 - 6$

 $= 26 - 6$

 $= 20$

2. $\frac{12\times2+8}{(5+8)\times14}$

 $= \frac{24+8}{13 \times 14} = \frac{32}{182} = \frac{16}{91}$

3. $4 \times (7 + 2) - 3$

 $= 4 \times 9 - 3$

 $= 36 - 3$

 $= 33$

4. $5 - 3(5 - 3)(5)$

 $= 5 - 3(2)(5)$

 $= 5 - 30$

 $= -25$

Math 9 **Lesson 1.5 – Review of Fractions** Tripp

A fraction is a **part** of a **whole** and can be visually illustrated with diagrams. For example:

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{8}$

(One-Half) **(One-Quarter)** **(Three-Eighths)**

A fraction is made up of two parts: the top **numerator** and the bottom **denominator**.

Fractions that have the same value are called **equivalent** fractions.

Examples:

$$\frac{4}{6} = \frac{2}{3} = \frac{16}{24} = \frac{400}{600} = \cdots$$

$\frac{2}{5}$ and $\frac{4}{10}$

We can identify that pairs of fractions are equal to each other by **reducing** the fractions to **lowest terms** through identifying a **common factor**.

There are 3 types of fractions:

- Proper Fractions: **numerator is smaller than denominator**.
- Improper Fractions: **numerator is larger than denominator**.
- Mixed Fractions: **consists of a whole number and a proper fraction**.

We can convert between improper fractions and mixed fractions.

Improper to Mixed

In order to convert from improper to mixed, we

1. Divide the numerator by the denominator—this is the whole number in front.
2. Leave the remainder as the new numerator.

Answer	as an Improper Fraction
$\frac{10}{6}$	$1\frac{4}{6} = 1\frac{2}{3}$
$\frac{60}{54}$	$1\frac{6}{54} = 1\frac{1}{9}$
$\frac{650}{150}$	$\frac{650 \div 50}{150 \div 50} = \frac{13}{3} = 4\frac{1}{3}$

Mixed to Improper

In order to convert from mixed to improper, we

1. Multiply the denominator by the whole number in front.
2. Add your result from part (1) to the numerator—this is your new numerator (denominator stays the same).

Answer	Improper Fraction
$7\frac{1}{2}$	$\frac{(2 \times 7) + 1}{2} = \frac{15}{2}$
12	$\frac{(1 \times 12)}{1} = \frac{12}{1}$
$4\frac{2}{3}$	$\frac{(3 \times 4) + 2}{3} = \frac{14}{3}$

Lesson 1.6 – Multiplying Fractions

In order to find the product of fractions, find the product of the **numerators** and the product of the **denominators**. Final answers are reduced by dividing the top and the bottom by a **common factor**.

Examples:

$$\frac{3}{4} \times \frac{14}{15} = \frac{42}{60} = \frac{21}{30} = \frac{7}{10}$$

$$5 \times \frac{3}{8} = \frac{5}{1} \times \frac{3}{8} = \frac{15}{8}$$

When finding the product or quotient of mixed fractions, rewrite them as **improper** fractions first and then find the product.

Examples:

$$3\frac{2}{3} \times 1\frac{1}{2} = \frac{11}{3} \times \frac{3}{2} = \frac{33}{6} = \frac{11}{2}$$

Math 9 **Lesson 1.7 – Dividing Fractions** Tripp

In order to divide fractions, you must multiply the first fraction by the **reciprocal** of the second fraction.

The reciprocal of a number is a number that gives the product of **one**.

Examples:

$$\frac{1}{2} \times 2 = \frac{1}{2} \times \frac{2}{1} = 1$$

A common phrase to remember how to divide fractions is **KEEP, KISS, FLIP**.

Examples:

$$4 \div \frac{1}{5} = \frac{4}{1} \div \frac{1}{5} = \frac{4}{1} \times \frac{5}{1} = \frac{20}{1} = 20$$

$$\frac{3}{7} \div 12 = \frac{3}{7} \div \frac{12}{1} = \frac{3}{7} \times \frac{1}{12} = \frac{3}{84} = \frac{1}{28}$$

$$1\frac{2}{5} \div 1\frac{1}{9} = \frac{7}{5} \div \frac{10}{9} = \frac{7}{5} \times \frac{9}{10} = \frac{63}{50} = 1\frac{13}{50}$$

When finding the product or quotient of mixed fractions, rewrite them as **improper** fractions first and then find the product.

Examples:

$$3\frac{2}{3} \times 1\frac{1}{2} = \frac{11}{3} \times \frac{3}{2} = \frac{33}{6} = \frac{11}{2}$$

$$9\frac{1}{4} \div 3\frac{3}{4} = \frac{37}{4} \div \frac{15}{4} = \frac{37}{4} \times \frac{4}{15} = \frac{37}{15}$$

In order to add or subtract fractions the denominators must be the **same**.

When fractions are over the same denominator just add and/or subtract the **numerators**.

Examples:

$$\frac{3}{7}+\frac{2}{7}=\frac{3+2}{7}=\frac{5}{7}$$

$$\frac{7}{12}-\frac{5}{12}=\frac{7-5}{12}=\frac{2}{12}=\frac{1}{6}$$

When the denominators are not the same, re-write the fractions into **equivalent** fractions with the same denominator first, then add or subtract the numerators.

Examples:

$$\frac{4}{5}+\frac{3}{10}=\frac{8}{10}+\frac{3}{10}=\frac{8+3}{10}=\frac{11}{10}$$

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

$$4\frac{1}{8}-2\frac{3}{7}=\frac{33}{8}-\frac{17}{7}=\frac{231}{56}-\frac{136}{56}=\frac{231-136}{56}=\frac{95}{56}$$

Math 9 **Lesson 1.10 – Order of Operations with Fractions** Tripp

BEDMAS

1. $\frac{2}{3}+\frac{1}{8}\times\frac{2}{9}=\frac{2}{3}+\left(\frac{1\times2}{8\times9}\right)=\frac{2}{3}+\frac{2}{72}=\frac{48}{72}+\frac{2}{72}=\frac{50}{72}=\frac{25}{36}$

2. $\frac{4}{7}\times\left(\frac{1}{2}-\frac{2}{5}\right)\div\frac{3}{10}=\frac{4}{7}\times\left(\frac{5}{10}-\frac{4}{10}\right)\div\frac{3}{10}=\frac{4}{7}\times\frac{1}{10}\div\frac{3}{10}=\frac{4}{70}\div\frac{3}{10}=\frac{4}{70}\times\frac{10}{3}=\frac{40}{210}=\frac{4}{21}$