Euclidean Geometry

May 11 – May 15

Time Allotment: 40 minutes per day

Student Name: _____

Teacher Name: _____

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Packet Overview

Date	Objective(s)	Page Number
Monday, May 11	Identify the different terms in a proportion	2
Tuesday, May 12	Identify duplicate and triplicate ratios	4
Wednesday, May 13	Alternate a given proportion	6
Thursday, May 14	Invert a given proportion	8
Friday, May 15	Minor Assessment	10

Additional Notes: Hello students!,

This week we will be continuing the going through Book V definitions in Euclid's Elements.

Make sure you are reading carefully as you go through these lessons with a pencil in your hand (NO PENS). You should always be underlining, circling, taking margin notes etc.

Do all of your work on sheet of notebook paper. You can keep your packet, but you will need to turn in/scan the work you do on a piece of notebook paper.
Mr. Bernstein will have Guided Instruction at the following times

- 1st Period 10:00-10:50am Mondays & Wednesdays
- 5th Period 11:00- 11:50 am Tuesdays & Thursdays

Miss McCafferty will hold Guided Instruction at the following times:

- 1st Period 10:00-10:50 am Mondays & Wednesdays
- 3rd Period 1:00- 1:50 pm Mondays & Wednesdays
- 4th Period 10:00-10:50 am Tuesdays & Thursdays
- 6th Period 1:00- 1:50 pm Tuesdays & Thursdays

Love,
Miss McCafferty and Mr. Bernstein
The answer key to each lesson will be at the end of each lesson. The answer keys should only be used when checking work.

Academic Honesty

I certify that I completed this assignment independently in accordance with the GHNO Academy Honor Code.	I certify that my student completed this assignment independently in accordance with the GHNO Academy Honor Code.
Student signature:	*Parent signature:*

_____   _____

Monday, May 11
   Geometry Unit: Ratio & Proportion
   Lesson 1: Ratio and Proportion
Objective: Be able to do this by the end of this lesson.
   1. Identify the different terms in a proportion

Definition 8

A proportion in three terms is the least possible.

In proportions we are equating two (or more) ratios.

In order for there to be a ratio you need at least two terms

$$A : B$$

In the ratio above A is the first term & B is the second term. You need at least two terms, or two magnitudes, for a ratio to exist.

Definition 8 is explaining the minimum requirements for creating a proportion. In order to make a proportion you need a minimum of 3 different terms.

$$G : H :: H : C$$

In the above proportion there are only 3 DIFFERENT terms. Notice that H is repeated in this proportion.

Reminder: The 1st term of a ratio is called the ANTECEDENT

    The 2nd Term of a Ratio is called the CONSEQUENT

Exercise 1: Answer questions 1- 6 on a sheet of notebook paper with the date, lesson number, and your name at the top.

  1. Write a proportion with A as the first term, B as the second term, B as the third term, and C as the fourth term.

  2. Label the 1st, 2nd, 3rd, & 4th terms in the following proportion.

Q : R :: R : T

3. Write Euclid's definition of a ratio (Definition 3).

4. Write Euclid's definition of "in the same ratio"(Definition 6).

5. A magnitude is a part of a magnitude, the less of the greater, when it_____ the greater.

6. The great is a _____ of the less when it is measured by the less.

Tuesday, May 12

      Geometry Unit: Ratio & Proportion

      Lesson 2: Ratio and Proportion

Objective: Be able to do this by the end of this lesson.

      1. Identify duplicate and triplicate ratios

We are going to use the following proportion to refer to during this lesson. When you are labeling the proportion make sure to start counting the different magnitudes moving from left to right.

$$M : N :: N : L$$

Definition 9
When three magnitudes are proportional, the first is said to have to the third the duplicate ratio of that which it has to the second.

      1. Label the 3 different magnitudes of the proportion
      2. Label the antecedents (the first term of the individual ratios)
      3. Label the consequents (the second term of the individual ratios)

Alright! The above proportion has 3 distinct terms

- M
- N
- L

Now M has a ratio to N, and N has the same ratio to L.

If we put M in a ratio with L then the ratio that is made is the duplicate ratio of M : N

Definition 10

When four magnitudes are continuously proportional, the first is said to have to the fourth the triplicate ratio of that which it has to the second, and so on continually, whatever be the proportion.

Definition 10 is very similar to Definition 9 it just take it a little further.

In the illustration *A, B,* and *C* form three terms for the proportion *A : B = B : C,* therefore the ratio *A : C* is the duplicate ratio of *A : B.*
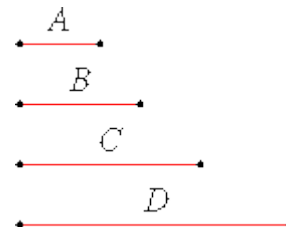
The illustration also shows a continued proportion of four magnitudes, *A, B, C,* and *D,* since *A : B = B : C = C : D.* Also, *A : D* is the triplicate ratio of *A : B.*

Use the following proportion to answer the following questions. Answer questions 1- 5 on a sheet of notebook paper with the date, lesson number, and your name at the top.

E : F :: F : G :: G : H :: H : K

1. Which of the above magnitudes is not used as an antecedent? _____

2. What is the duplicate ratio of F:G? _____

3. What is the triplicate ratio of E:F? _____

4. **Fill in the blank:** A proportion in _____ terms is the least possible.

5. **Fill in the blank:** The greater is a _____ of the less when it is

    measured by the less.

Wednesday, May 13

        Geometry Unit: Ratio & Proportion
        Lesson 3: Ratio and Proportion

Objective: Be able to do this by the end of this lesson.

    1.   Alternate a given proportion

Quick Note: If I tell you to take magnitude A in relation to magnitude B, then I want you to put A & B into a ratio. Like so:

$$A : B$$

Definition 11
Antecedents are said to correspond to antecedents, and consequents to consequents.

When Euclid mentions corresponding magnitudes, he means either all of the antecedents in a proportion or all the consequents in a proportion.

Underline all of the consequents in this proportion:

$$\textbf{E : F :: F : G :: G : H :: H : K}$$

Now circle all of the antecedents in this proportion

$$\text{M : N :: N : L :: L : O}$$

Definition 12

Alternate ratio means taking the antecedent in relation to the antecedent and the consequent in relation to the consequent.

Lets apply this definition to this proportion:

$$N : M :: L : O$$

N & L are the antecedents   M & O are the Consequents

If we take the first Antecedent in relation to the second antecedent then we get the ratio N : L

If we take the first Consequent in relation to the second consequent then we get the ratio M : O

Now if we put those two ratios into a proportion then we get N : L :: M : O

So if we start with

$$N : M :: L : O$$

And then we alternate it we get the proportion

$$N : L :: M : O$$

Using the proportion below answer the following questions. Answer questions 1- 3 on a sheet of notebook paper with the date, lesson number, and your name at the top.

$$\mathbf{A : B :: C : D}$$

1. Name the consequents in the above proportion. _____

2. Name a pair of corresponding magnitudes. _____

3. Alternate ratio means taking the antecedent in relation to the antecedent and the consequent in relation to the consequent. Write out the above proportion alternately.

    _____

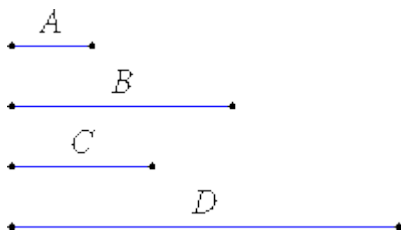## <u>Thursday, May 14</u>

Geometry Unit: Ratio & Proportion
Lesson 4: Ratio and Proportion

Objective: Be able to do this by the end of this lesson.

1. Invert a given proportion

Definition 13

Inverse ratio means taking the consequent as antecedent in relation to the antecedent as consequent.

Guide

The figure illustrates the proportion $A : B = C : D$. Thus, A and C are corresponding terms since they're the antecedents. Also, B and D are corresponding terms since they're the consequents.

The ratio inverse to $A : B$ is $B : A$. It is evident from the definition <u>V.Def.5</u> that $A : B = C : D$ and $B : A = D : C$ reduce to the same conditions on *A, B, C,* and *D.* Therefore, if two ratios are the same, then their two inverse ratios are also the same.

Inverse Ratios are just like inverse fractions. Just flip the ratios around!

Exercise 1: Answer questions 1- 8 on a sheet of notebook paper with the date, lesson number, and your name at the top.

1. What is the inverse ratio of B : A?

2. What is the inverse proportion of Z : Q :: R : T?

3. What is the alternate proportion of Z : Q :: R : T?

4. A magnitude _____ a magnitude, the less of the greater, when it measures the greater.
   a. Is a part of
   b. Measures
   c. Has a ratio to
   d. Is a multiple of

5. Magnitudes are said to have a ratio to one another which can, when _____, exceed one another.
   a. Put next to each other
   b. Divided
   c. They are part of one another
   d. multiplied

6. Let magnitudes which have the same ratio be called _____.
   a. A multiple
   b. In the same ratio
   c. Proportional
   d. continuous

7. The greater _____ the less when it is measured by the less.
   a. Is a part of
   b. Measures
   c. Has a ratio to
   d. Is a multiple of

8. A proportion in _____ terms is the least possible.
   a. One
   b. Two
   c. Three
   d. Four

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Friday, May 15

Geometry Unit: Ratio & Proportion

Lesson 5: Ratio and Proportion

Objective: Be able to do this by the end of this lesson.

1. **Take the minor assessment**

Given the following proportion answer the following questions.

Q : R :: R : S :: S : T :: T : V

1. What is the duplicate ratio of **Q : R** ?

   a. **R:S**
   b. **R:T**
   c. **Q:S**
   d. **Q:T**

2. What is the triplicate ratio of **Q : R** ?

   a. **R:S**
   b. **R:T**
   c. **Q:S**
   d. **Q:T**

Given the following ratio answer the following questions with the best answer.

1 : 3 :: 9 : 27

3. Which of these is the inverse proportion?

   a. 1 : 9 :: 3 : 27
   b. 4 : 3 :: 36 : 27
   c. 9 : 1 :: 27 : 3
   d. 1 : 2 :: 9 : 18
   e. 27 : 9 :: 3 : 1
   f. 3 : 1 :: 27 : 9

4. Which of these is the alternate proportion?

   a. 1 : 9 :: 3 : 27
   b. 4 : 3 :: 36 : 27
   c. 9 : 1 :: 27 : 3
   d. 1 : 2 :: 9 : 18
   e. 27 : 9 :: 3 : 1
   f. 3 : 1 :: 27 : 9

Given the following ratios answer the following questions with the best answer.

81 : 9 :: 36 : 4

5. What are the antecedents?
   a. 81 & 9
   b. 81 & 36
   c. 81 & 4
   d. 9 & 4
   e. None of the above

6. What are the consequents?
   a. 81 & 9
   b. 81 & 36
   c. 81 & 4
   d. 9 & 4
   e. None of the above