MathPath 2013 Closing Ceremony
Address by Executive Director

Students, parents, staff and faculty:

After the Bible, it is hard to find anything in Western literature that contains so much in so short a passage as Plato's <u>Divided Line Analogy</u>, which appears at the end of Book 6 of the *Republic*. The Analogy … is perhaps the most famous explanation of Epistemology.

Epistemology from <u>Greek</u> *epistēmē*, meaning "knowledge, understanding", and <u>*logos*</u>, meaning "study of" is concerned with the nature and scope of <u>knowledge</u>.

So Epistemology is concerned with the nature and scope of <u>knowledge</u>. Some call it the "theory of knowledge" in that Epistemology deals in three questions: What is knowledge, how it can be acquired, and the extent to which any given subject or entity can be known.
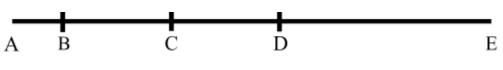
(Pause)

I have read the Bible and the Khoran and the scriptures of the Hindus and the books of various religions of India, but none has succeeded in describing the nature of God to the extent Plato has through his 'Ideals'.

In *The Republic,* Book 6, Plato has Socrates explain the literary device of a **divided line,** to teach basic philosophical ideas about the four levels of existence and the corresponding knowledge that goes with that existence.

Plato here divides human knowledge into four kinds, using the analogy of a line divided into segments.

Socrates tells Glaucon:

 "Now take a line which has been cut into two unequal parts, and divide each of them <u>again in the same proportion</u>, and suppose the two main divisions to answer, one to the visible and the other to the intelligible, and then compare the subdivisions in respect of their clearness and want of clearness, and you will find that …" etc.

A   B   C   D   E

AC = Visible World

CE = Intelligible World

When I first read the analogy I tarried a short while, for there is an interesting piece of beautiful mathematical fact we can extract. That is, if a line segment is divided in a certain ratio in to two unequal segments x and y with x > y, and then x and y are each divided in the original ratio, the smaller segment from x will equal the larger segment from y. In the diagram on the board, AC = x and CE = y. You can easily prove that BC = CD. Wow! Plato's Divided Line Analogy is a piece of real math, not just a computation!

[Pause]

But the Analogy is mainly known not for the mathematics in it, and it is not about the relative lengths of the line segments.

So what is the Analogy about? The Analogy is explaining the difference between the visible world and the intelligible world.

Let us look in to Plato's passage again: " … and suppose the two main divisions to answer, one to the visible and the other to the intelligible …"

The line segment **AB** represents shadows and reflections of physical things, and **BC** the physical things themselves. These correspond to two kinds of <u>knowledge</u>, the **illusion** (*<u>eikasia</u>*) of our ordinary, everyday experience, and **<u>belief</u>** (*pistis*) about discrete physical objects which cast their shadows. In the *<u>Timaeus</u>*, the category of illusion includes all the "opinions of which the minds of ordinary people are full."

The purpose of this talk is to draw your attention to the intelligible world which is the line segment CE.

Plato describes CD as involving **mathematical reasoning** (*<u>dianoia</u>*), where abstract <u>mathematical objects</u> such as <u>geometric lines</u> are discussed. Such objects are outside the physical world (and are not to be confused with the *drawings* of those lines, which fall within the physical world BC). However, they are less important to Plato than the subjects of philosophical **understanding** (*<u>noesis</u>*), the "higher" subdivision (**DE**):

Plato here is using the familiar relationship between ordinary objects and their shadows or reflections in order to illustrate the relationship between the physical world as

a whole and the world of **Ideas (Forms)** as a whole. The former is made up of a series of passing reflections of the latter, which is eternal, more real and "true." Moreover, the knowledge that we have of the Ideas – when indeed we do have it – is of a higher order than knowledge of the mere physical world.

Apart from explaining to us the intelligible world, the Divided Line Analogy serves a philosophical role. That has to do with what can be called higher physics - metaphysics, which is the inquiry of what ultimately is there and what it is like.

Here is the opinion of Wikipedia: "The allegory of the Divided Line is the cornerstone of Plato's metaphysical framework. This structure, well hidden in the middle of the *Republic*, a complex, multi-layered dialogue, illustrates the grand picture of Plato's metaphysics, epistemology, and ethics, all in one. It is not enough for the philosopher to understand the Ideas (Forms), he must also understand the relation of Ideas to all four levels of the structure to be able to having the understanding of the Idea. In the *Republic*, the philosopher must understand the Idea of Justice to live a just life or to organize and govern a just state."

What has all this to do with this occasion of our going away from camp – from MathPath 2013.

[Pause]

Your life juts in to the third level in Plato's Analogy. That is you are beginning to understand the world in terms of mathematics, for the physical world rests on mathematics – for physics sits on mathematics, chemistry on physics, and biology on chemistry, physics and mathematics. But it is still relative truth that you are dealing with in mathematics. It is hypothesis-driven truths and hypothetical principles like the Law of the Excluded Middle.

It is the higher level, the one beyond hypotheses, that we should also be mindful of. For those who are so mindful would live a better life. Why?

If you live only in the second level in Plato's Analogy, you would be like the vast majority of mankind. Concerned too much with living itself to live. You will become information fodder, and various other fodders. What do I mean?

In the World Wars past, countries in Europe hired foreigners as conscripts who would be sent to the front lines – and they generally became cannon fodder. Yes, cannon fodder – hay for the cattles of cannon. The modern version of that I call, information fodder. Overuse of Internet is one example.

Go to any nation today and what do you see? Young people, and even the older, walking, looking at their internet-connected cell phones. Wow, what a design of the human hand. God can now say, yes they have started using the thumbs for the other purpose I designed them for. The less creative human has become fodder for the information stream.

What else are the less creative doing? They are the consumers, the fashion conscious, readers of the latest NY Times Bestselling Thrillers, and those that are too much

affected by the common emotions of man – because they live only in the first three segments of the line in Plato's Analogy.

"The world is too much with us; late and soon,

Getting and spending, we lay waste our powers,"

is how the great sonnet of William Wordsworth begins.

The main purpose of education is to do good . It is not to get but to give, to do good. How so? Read Plato's Allegory of the Cave, which is just a few pages after the Divided Line Allegory.

You are not common minds; you are the givers. I ask you to think of Plato's third and fourth levels. You belong there.

Go, multiply!