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Why Study Geometry

Give someone a match and they will make fire. With the creation of fire come many improvements in many aspects of life. You can use fire to kill all the bacteria that are on your meat, and make it taste more delightful. Later fire is used to make steam engines and pioneer many great inventions of today. This is just the case with Geometry. When Euclid wrote his book the Elements he started a revolution. When geometry is learned you not only gain intellectual knowledge and logical reasoning but you learn how to change the future and make the world more beautiful. Geometry challenges our mind to think deeply about what we are learning and where we can apply it in our world. As we look around today we see that Geometry has been applied to everything around us. The structure of the Eiffel tower is one amazing application of Geometry; but one never thinks about it that way. Without the Geometric knowledge that we know today, the Eiffel tower’s structure and satiability could not be as efficient as it is. The application of Geometry is all around us, but we just never take a moment and ponder about what went into building our computers, homes, and even the eye catching buildings in major cities.

Why do we study Geometry? I myself asked this question when I first started reading book I of the Elements by Euclid. But as I went through book I and listened to our class discussion, the answer was quite clear. I was studying Geometry because it lays out the foundation of many things in our world today. The quote,

“Someone who had begun to read geometry with Euclid, when he had learnt the first theorem, asked Euclid, ‘what shall I get by learning these things?’ Euclid called his slave and said, ‘Give this man three *obols*, since he must profit from what he learns.’” Shows a very common question from my point of view that many people would ask when studying Geometry and I myself did as well. Euclid’s answer to this person’s question is a very powerful answer. Euclid says, “he must profit from what he learns” and this to me seems like a very intellectual answer. I think what Euclid is implying here is that there are many benefits from learning Geometry. First and the most common answer which many teacher would say is that Geometry teaches a person how to develop logical reasoning skills by the means of proofs. This I believe to be true, because as I was doing a problem set that involved proofs, it was quite challenging to compile the proofs together and provide all the evidence. But the rewarding part is when you have the proof done and you know that no one can challenge your proof because you have provided a base on where your proof comes from; the Elements and have shown that the proof is in fact correct. This does in fact improve a person’s logical reasoning because you think to yourself, “how do I arrive at this?” and you use the knowledge you have to come to the answer.  
 Secondly a major benefit that Geometry gives us is the ability to construct magnificent inventions. Starting with buildings and now modern inventions such as nanotechnology. Geometry plays a very important part in engineering inventions. Geometry has given us the benefits of construction; we can build sky scrapers that can resist the pressure of winds and minor earthquakes and still remain in perfect condition. Without Geometry this could have never been possible. We have designed many helpful inventions such as pulley’s that drastically reduce the use of physical strength because we can use Geometry and what we have learned from the Elements. Designing gears that go into making a wrist watch work is the use of geometry to make such a useful invention that is common now, but was never imagined centuries ago. The biggest benefit that Geometry plays in building is that using geometry we can construct building that are not only rectangular but we can construction building that involve many precise and unique designs to beautify the construction. A perfect example would be the Seattle Space needle. This beautiful piece of architecture is just fascination to look at but could not have been accomplished without knowledge of Geometry.

To me it seems that this is what Euclid was getting at when he asked his slave to hand the man the equivalent of modern day pennies. To make the many ponder upon the reason we do Geometry. Of course at that time period Geometrical and engineering enhancements were not as great as they are now. But the man must have understood that the reason he is learning Geometry is because it will benefit the world. Around 150-100 B.C.E the Greeks were able to invent what is today known as the Antikythera mechanism which was like a computer that was used to calculate the position of planets, but because of the Roman Empire and the criticism of the mathematicians this mechanism was lost and nothing similar was produced for a very long time. I can only imagine what kind of society we would be living in today if such inventions were improved upon instead of forgot. Today after examining this mechanism there are many rules of Geometry that were applied to make this invention. The parts and gears used to make this device has been created through what Euclid has produced; the Elements. Eratosthenes during 200 B.C.E was able to calculate the circumference of the earth within 1% of what we have been able to calculate today with modern science and computers. This shows how important Geometry is, without the presence of such advanced technology we have today Eratosthenes was able to calculate the circumference of the earth using the Elements that Euclid had written. The Greeks were also able to estimate how far the sun was from the earth using Geometry which just amazes me.

After reading Edna St. Vincent Millay’s poem about Euclid and his Elements, and just realizing what aspects of the world the Elements have affected there is a certain perception of beauty about Geometry. Using the Eiffel tower as in example, whenever the Eiffel tower comes a person automatically things about how beautifully built it is but the Geometry never comes to mind. But when you think about it, the Geometry is what makes the building so beautiful. The usage of the arc and design of the building as it gets tall is just fascinating and it could not have been accomplished if it hadn’t been for geometry. Additionally what makes the Geometry beautiful or as I would more express it as fascinating is how the book one of the Elements leads up to the proof of the Pythagorean Theorem. I had never thought of Geometry as very important but after thinking about the applications and the Elements you cannot resist but say how fascinating the Elements and Euclid proofs are. It seems to be amazing how Euclid had written the Elements.

Oppositions may say that Geometry is strict in its scope and that mathematicians have exact minds. I think people such as those are not opening their minds to a wider scope; the mathematicians of the past were not of exact minds but in fact philosophers, astrologers, and much more. The mathematicians of the past and as a whole have expanded the minds of people. Because of the advancements of mathematics and usage of Geometry we are able to improve our society’s well being as well as how efficiently we perform our tasks with the advanced technology that we have today.

We study Geometry because it allows for us to think in a way that we aren’t ordinarily used to thinking. Geometry makes us use our logic combined with the help of the things we learned from Euclid. It allows for us to further progress our ability of innovation. Because of many people of have learned Geometry we have been able to product many building that still amaze the world we live in today. With the knowledge of Geometry engineers have been able to create innovations such as building that are flexible enough to withstand an enormous amount of wind pressure and still remain in good condition. Because of Euclid and his Elements today, we have a future that has allowed us to prosper in many ways. We have advanced our society so much and that could not have been done if we did not study Geometry.