

## 11<sup>th</sup> Grade Assignment – Week #2

Announcement: At the end of this document you will find “Excerpts from Descartes’s *Discourse on the Method...*” Try to read through Part I and Part II (the first two pages) before your group meeting.

### Group Assignment:

*For Tuesday*

- Discuss this question: “Where do you see dogma in today’s world?”
- After reading Part II of “Excerpts from Descartes’s *Discourse on the Method...*”, together as a group, write down a summary (in as few words as possible) for each of his four precepts.
- Discuss the following questions in your group.
  - What role does science play in our society?
  - Do you think that science has become our religion?
  - Are there any questions that science can’t answer?

*For Thursday*

- Together, do your best to work through **Worksheet #2**, starting with problem #4 and then problem #2 (from the document *Descartes Worksheets*). *Important Notes:* You need to refer to Descartes’s “Section E” in order to do this. The first time I looked at this, I was very confused! Spend about 20 minutes of your group time trying your best to understand this. You will then go over these problems in your tutorial session.
- **Discuss the following questions in your group.** In today’s world, there are times when someone questions something, and then that person is accused of “not believing in science”. What does it mean to “believe in science”?

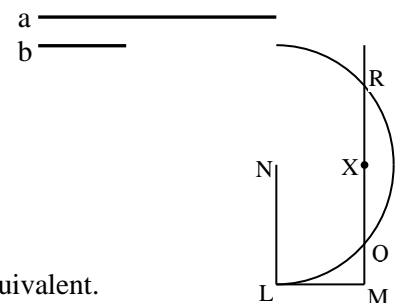
### Individual Work

- Read through Part III of “Excerpts from Descartes’s *Discourse on the Method...*”, and then write down a summary (in as few words as possible) for each of his *Three Maxims*.
- As always, with this main lesson, you should feel free to write about any topic that has interested you. Here are some other ideas to consider:

*What is your World View?*

- Are you a scientist? Does science define all aspects of what you believe?
- Are you a materialist? Do you believe that only material stuff exists and that there is a physical scientific explanation for everything?
- Do you believe that a non-physical or “spiritual world” exists?
- Do you believe in God? Do you believe that the world has purpose and meaning, perhaps guided by God or a spiritual world?
- Do you think that you have all of the answers to the above questions? Are you open to other viewpoints and open to the possibility that over time your viewpoint might change?
- **Challenge!** As I mentioned in the lecture, Descartes gave both the standard Greek geometric solution and the new algebraic solution to the *Square/Rectangle Problem*. Here again is his geometric solution:

- The length of the rectangle is  $a$ , and the side of the known square is  $b$ . ( $b$  must be less than half of the length of  $a$ .)
- Draw segment  $NL$  equal to  $\frac{1}{2}a$ . Draw a semicircle having radius  $NL$ . Draw  $LM$  equal to  $b$  and at a right angle to  $NL$ . Draw a line parallel to  $NL$  passing through  $M$  and through the semicircle in two places.
- The possible solutions for the height of the desired rectangle are then given by  $MQ$  and  $MR$ .
- He then gives an algebraic solution of  $z = \frac{1}{2}a \pm \sqrt{\frac{1}{4}a^2 - b^2}$
- **Your Challenge:** Show that the algebraic and geometric method are equivalent.



## Excerpts from René Descartes'

### *Discourse on the Method of Rightly Conducting One's Reason and Searching for the Truth in the Sciences*

Editor's Note: The main text of Descartes' book consists of six sections for a total of about 60 pages. What appears here is a selection of the key thoughts of the first four sections. The fourth section is arguably the most important. The fifth and sixth sections, which talk about his hesitations to publish this work and a previous work, "*The World*", have not been included here. –Jamie York

#### I. The Aim of this Discourse

Good sense or reason must be better distributed than anything else in the world, for no man desires more of it than he already has. This shows that reason is by nature equal in all men. If there is diversity of opinion, this arises from the fact that we conduct our thought by different ways, and consider not the same things. It does not suffice that the understanding be good—it must be well applied.

My mind is no better than another's, but I have had the great fortune, from my youth up, in pursuing certain paths which have led me to considerations and maxims from which I have formed a Method, by whose assistance it appears to me I have the means of gradually increasing my knowledge and of little by little raising it to the highest possible point which the mediocrity of my talents and the brief duration of my life can permit me to reach. I shall be very glad to make plain in this discourse the paths I have followed, and to present a picture of my life so that all may judge it. Thus my design is not to teach the method which each man ought to follow for the right guidance of his reason, but only to show in what manner I have tried to conduct my own.

I had been nourished on letters since my childhood, but as soon as I had finished the customary course of study, I found myself involved with so many doubts and errors that I became convinced I had advanced no farther in all my attempts at learning, than the discovery of my own ignorance. Yet I was at one of the most celebrated schools in Europe, and I was not held inferior to my fellow students, some of whom were destined to take the place of our instructors; nor did our age seem less fruitful of good wits than any which had gone before.

Though I did not cease to esteem the studies of the schools, I began to think that I had given enough time to languages, enough also to ancient books, their stories and their fables; for when a man spends too much time in traveling abroad he becomes a stranger in his own country; and so, when he is too curious concerning what went on in past ages, he is apt to remain ignorant of what is taking place in his own day.

I set a high price on eloquence, and I was in love with poetry; above all, I rejoiced in mathematics, but I had not as yet a precise knowledge of its true use. I revered our theology, but, since the way to heaven lies open to the ignorant no less than to the learned, and the revealed truths which lead thither are beyond our intelligence, I did not dare to submit them to my feeble reasonings. In philosophy there is no truth which is not disputed, and which, consequently, is not doubtful; and, as to the other sciences, they all borrow their principles from philosophy. Therefore, I entirely gave up the study of letters, and employed the rest of my youth in traveling, being resolved to seek no other science than what I might find within myself, or in the great book of the world.

Here the best lesson that I learned was not to believe too firmly anything of which I had learnt merely by example and custom; and thus I gradually extricated myself from the many errors powerful enough to darken our natural intelligence and diminish our ability to listen to reason. Finally, I resolved one day to make myself an object of study, and to employ all the powers of my mind in choosing the paths I ought to follow. This succeeded much better, it appeared to me, than if I had never departed from either my country or my books.

## II. The Intellectual Crisis

Being in Germany, on my way to rejoin the army after the coronation of the Emperor [Ferdinand II], I found myself alone in a stove-heated room, where, having no society to divert me, I had the opportunity to occupy myself with my own thoughts. One of the first considerations that occurred to me was that often there is less perfection in works composed by different hands than in those which issue from a single hand. Such is the case with buildings, cities, states; for a people which has made its laws from time to time to meet particular occasions will enjoy a less perfect polity than a people which from the beginning has observed the constitution of a far-sighted legislator. Also, it is quite certain that the constitution of the true religion, the ordinances of which are derived from God, must be incomparably superior to any other. In the same way, I thought that the science contained in books, composed as they are of the opinions of many different individuals massed together, do not approach so near the truth as the simple reasoning which a man of good sense can arrive at through his own experiences. And again, I considered that as, during our childhood, we had been governed by our appetites and our tutors, which are often at variance, which neither of them perhaps always gave us the best counsel, it is almost impossible that our judgments should be so pure and so solid as they would have been if we had had the perfect use of our reason from the time of our birth, and had never been guided by anything else.

Although it would not be beneficial to reform the whole body of the sciences, I thought that I could do no better than to completely sweep away all the opinions I had embraced up to this time, so that they might later on be replaced, either by others which were better, or by the same when I had made them conform to a rational scheme. And I firmly believed that by this means I should succeed in directing my life much better than if I had only built on old foundations, and relied on principles which I allowed myself to be in my youth persuaded without having inquired into their truth.

When I was younger I had studied logic, geometry, and algebra. Of these, I found that logic served rather for explaining things we already know; while of geometry and algebra, the former is so tied to the consideration of figures that it cannot exercise the understanding without wearying the imagination, and the latter is so bound down to certain rules that it has been made a confused and obscure art which hampers the mind instead of a science which cultivates it. And just as a state is better governed which has but few laws, and those laws strictly observed, I believed that I should find sufficient the following four precepts.

The first was never to accept anything as true when I did not recognize it clearly to be so—that is to say, carefully to avoid precipitation and prejudice, but to include in my opinions nothing beyond that which should present itself so clearly and distinctly to my mind that I might have no occasion to doubt it.

The second was to divide up each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution.

The third was to conduct my thoughts in order, by beginning with the simplest objects and those most easy to know, thereby proceeding step by step to the most complex knowledge.

And the last was to make everywhere enumerations so complete, and surveys so wide, that I should be sure of omitting nothing.

Exact observation of these precepts gave me such facility in unraveling questions that in two or three months I found my way through many which I had formerly believed to be too hard for me. And so I promised myself that I would apply my system with equal success to the difficulties of other sciences; but since their principles must all be borrowed from philosophy, in which I found nothing certain, I thought it necessary first of all to endeavor to establish its principles.

### III. A Rule of Life

Meanwhile I must have a rule of life as a shelter while my new house was in building, and this consisted of three or four maxims.

The first was to conform myself to the laws and customs of my country, and to follow my religion in which, by God's grace, I had been brought up; guiding myself, for the rest, by the least extreme opinions of the most intelligent.

My second maxim was to be as firm and resolute in my actions as I was able, and not to adhere less steadfastly to the most doubtful opinions, when once adopted, than if they had been highly certain; just as the traveler, lost in some forest, had better walk straight forward, though in a chance direction; for thus he will arrive, if not precisely at the place where he desires to be, at least probably at a better place than the middle of a forest.

My third maxim was to endeavor always to conquer myself rather than fortune, and to change my desires rather than the order of the world, and in general to bring myself to believe that there is nothing completely in our power except our thoughts. And I believe that herein lay the secret of those philosophers who, in the days of old, could withdraw from the domination of fortune, and, despite pain and poverty, enjoy a happiness which their gods might have envied.

Finally, to conclude this code of morals, after looking out upon the diverse occupations of men, with the view of making the best choice for myself, I may state that it my conviction that I could not do better than to continue in that in which I was already engaged, that is to say, in devoting my

whole life to cultivating my reason and in advancing myself as much as possible in the knowledge of the truth in accordance with the method which I had prescribed myself. I had experienced so much satisfaction since beginning to use this method, that I did not believe that anything sweeter or more innocent could be enjoyed in this life.

Having thus assured myself of these maxims, and having set them along side of the truths of faith, I came to the conclusion that I might with freedom set about to rid myself of what remained of my opinions. And I hoped to be better able to accomplish this work by holding conversation with others than in living longer shut up in the stove-heated room where these reflections had come to me. So I once more set myself to travel. In the nine subsequent years, therefore, I went up and down the world a spectator rather than an actor. More especially did I reflect in each matter that came before me as to anything which could make it subject to suspicion or doubt, and I rooted out of my mind all the errors which might have formerly crept in. These nine years slipped away before I had established the foundations of any certain philosophy, at which time I imagined it to be so difficult that possibly I should not have dared to undertake the task. It was then (eight years ago) that I thought that I must try by every means in my power to render myself worthy of the reputation which I had gained, so I resolved to remove myself from all places where any acquaintances were possible, and to retire to a country such as this [Holland] where I can live as solitary and as retired as in the midst of the most remote desert.

#### IV "I Think, Therefore I Am"

I had long since remarked that it is necessary sometimes to follow opinions known to be uncertain, as if they were not subject to doubt; but, because now I was desirous to devote myself to the search after certain truth, I considered that I must do just the opposite, and reject as absolutely false everything about which I could imagine the least doubt to exist.

Thus, because our senses sometimes deceive us I would suppose that nothing is such as they make us to imagine it; and because I was as likely to err as another in reasoning, I rejected as false all the thoughts which I had formerly accepted as demonstrative; and finally, considering that all the thoughts we have when awake can come to us also when we sleep without any of them being true, I resolved to feign that everything which had ever entered into my mind was no more truth than the illusion of my dreams.

But I observed that, while I was thus resolved to feign that everything was false, that it was absolutely that I, who thus thought, must necessarily exist. I observed that this truth – *I think, therefore I am* – was so firm and so assured that all the most extravagant suppositions of the skeptics were unable to shake it, I judged that I could unhesitatingly accept it as the first principle of the philosophy I was seeking. I could feign that there was no world, I could not feign that I did not exist; in order to think, it is necessary to exist.

And I judged that I might take it as a general rule that the things which we conceive very clearly and very distinctly are all true, and that the only difficulty lies in the way of discerning which those things are that we conceive distinctly.

After this, reflecting upon the fact that I doubted, and that consequently my being was not quite perfect (for I saw that to know is a greater perfection than to doubt), I was led to enquire whence I had learned to think of something more perfect than myself; and it was clear to me that this must come from some nature which was in fact more perfect. For other things I could regard as dependencies of my nature if they were real, and if they were not real they might proceed from nothing – that is to say, they might exist in me by way of defect. But it could not be the same with the idea of a being more perfect than myself; for to derive it from nothing was manifestly impossible.

It remained, then, to conclude that it was put into me by a being truly more perfect than was I, and possessing in itself all the perfections of what I could form in an idea – in a word, by God. To which I added that, since I knew some perfections

which I did not possess, I was not the only being who existed, but that there must of necessity be some other being, more perfect, on whom I depended.

Then considering the subject of geometry, with respect to my idea of a Perfect Being, I found that His existence was comprehended in that idea just as, in the idea of a triangle is comprehended the notion that the sum of its angles is equal to two right angles; and that consequently it is as certain that God, this Perfect Being, exists, as any geometrical demonstration could be. That there are many who persuade themselves that there is a difficulty in knowing Him is due to the scholastic maxim that there is nothing in the understanding which has not first been in the senses, where the ideas of God and the soul have never been.

Finally, if there are persons who are still not sufficiently persuaded of the existence of God and of the soul, they should know that all other things that they more assuredly deem as true, such as that we have a body, and that there exists stars and an earth, are less certain; for, although we have a moral assurance of these things, no one, unless his intellect is impaired, can deny that there is sufficient reason to exclude entire assurance, given the observation that when asleep we can imagine ourselves to possess another body or that we see other stars or another earth, when there is nothing of the kind. For how do we know that the thoughts that occur in dreaming are false since they are no less vivid than the thoughts we have while awake? And though men of the highest genius may study this question as long as they please, I do not believe that they will be able to give any reason which can be sufficient to remove this doubt, unless they presuppose the existence of God.

Reason instructs us that all our ideas must have some degree of truth, for it could not be that God should otherwise have put them into us; and because our reasonings are never so evident or so complete when we sleep as when we wake, although sometimes during sleep our imagination may be more vivid and positive, it also instructs us that since not all of our thoughts can be true, because we are imperfect, those thoughts possessing truth must assuredly be found in the experience of our waking moments rather than in that of our dreams.