DOWNLOAD PDF GREEK ADVANCES IN MATHEMATICS

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The Story of Mathematics - Greek Mathematics. It was the Greeks who first grappled with the idea of infinity, such as described in the well-known paradoxes attributed to the philosopher Zeno of Elea in the 5th Century BCE.

Continue reading for more on each of these contributions by ancient Greece. Democracy According to Merriam-Webster, a democracy is a government by the people "in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation usually involving periodically held free elections. Athens started out with a monarchy and then advanced to an oligarchy until it finally reached a democracy. The democratic government consisted of 6, assembly members, all of whom were adult male citizens. The assembly voted on issues throughout Athens. In order for a law to pass, the number of votes needed to be a majority. But in order to banish or exile someone, all 6, votes were needed. Today, at least in the United States, we use a democratic system. But instead of a direct democracy, we have a representative democracy in which the citizens democratically vote on who should make the decisions in the country. The Alphabet Derived from the earlier Phoenician alphabet, the greek alphabet was the first alphabet in the western sense of the word, featuring distinct letters for vowels and consonants. It was developed after the Dark Ages and consisted of 24 letters, ordered from alpha to omega. Believe it or not, the word "alphabet" originates from the first 2 letters of the Greek alphabet: Today many letters of our modern alphabet originate from the Greek alphabet, including letters such as A, B, E, and O. The Greek originally had a single form of each letter, but created upper case and lower case versions of the letters later. Artistic rendering of the Library of Alexandria, based on some archaeological evidence. Von Corven Source 3. The Library The first library in the world, the library of Alexandria, was actually built in Egypt. The Macedonians started spreading the Greek way of life to all of the conquered lands, including Egypt. Ptolemy ordered the construction of a library which would contain over , scrolls of work. There was also a rule that all ships passing through the Alexandrian harbor had to declare if they had any works of science or philosophy. If they did, the work was copied and placed in the library, and the original copy would be returned to the captain. Because of this accumulation of knowledge, many great discoveries took place in the library. For example, Eratosthenes calculated the circumference of the earth and drew up plans for steam power. Today we have many libraries all over the world with billions of works of literature, but the first library in the world was the library of Alexandria. The participants were the city-states of Ancient Greece and its colonies. The Olympic Games were held every four years in honor of Zeus, the king god. The prizes for winning were fame and glory. Today we still celebrate the Olympic Games and continue some of the old traditions, such as the olive leaf crowns, the lighting of the flame, and the opening and closing celebrations. Greece also held other games such as the Ptythian Games, which were held in honor of Apollo, the sun god, and the Isthmian Games, which were held in honor of Poseidon, the sea god. Coubertin, seeing an opportunity to bring the world together through sport, revived the Olympics by founding the International Olympic Committee IOC on June 23, , and the modern Olympic Games were born. The first games put on by the IOC were held in Athens during the summer of The Summer Olympics brought together 14 nations and athletes who competed in 43 events. What Is the Meaning of the Olympic Rings? The symbol of the rings, which are interlocked and colored yellow, black, green and red with a white background, were designed by Baron Pierre de Coubertin in The colors of the rings along with the white background were intended to represent the five participating continents: Africa, Asia, America, Oceania and Europe. They also composed the colors of the flags of all the participating countries at the time. Upon releasing the design, Coubertin said: The blue and yellow of Sweden, the blue and white of Greece, the tricolor flags of France, England, the United States, Germany, Belgium, Italy and Hungary, and the yellow and red of Spain are included, as are the innovative flags of Brazil and Australia, and those of ancient Japan and modern China. This, truly, is an international emblem. Another common symbol of the Olympic Games is the flame. The tradition of the torch relay and lighting of the Olympic flame to start the games began with the Berlin Games in The flame symbolizes beginning of the Olympic Games. The idea came from ancient Greece, where a sacred fire was kept burning throughout the celebration of the ancient Olympics on the altar of the sanctuary of Hestia. Science and Mathematics Along with being the birthplace of many great mathematicians, Greece was also the mother country of many famous scientists. Eratosthenes This mathematician was the first to calculate the circumference of the Earth. He did this by comparing the altitudes of the mid-day sun at two different locations. Aristarchus This astronomer and mathematician was the first to create a model with a sun at the center of the known universe with the Earth revolving around it. He also placed the planets of the solar system around the sun in the right order, and thought stars to be other bodies like the sun. Nicolaus Copernicus attributed the heliocentric theory to Aristarchus. Archimedes Archimedes is generally considered the greatest mathematician of antiquity and of all time. He anticipated modern calculus, geometrical theorems, and learned to calculate the area geometric shapes, including the circle and sphere. Some of Archimedes other achievements include coming up with an accurate approximation of pi and designing effective levers and pulleys. One of his famous quotes was, "Give me a lever long enough and I will move the Earth! He developed the first models depicting the movement of the sun and the moon, and may have been the first to predict solar eclipses. The Parthenon in Athens Source 6. Architecture One of the most common examples of Greek architecture in the modern world is the column or pillar. The most famous example of Greek architecture is the Parthenon, a grand building with pillars located in Athens. Today, pillars are used in many public buildings such as churches and libraries. There are also pillars in many buildings in Washington D. What Inspired Greek Architecture? The ancient Greeks being an extremely religious people, many of the architectural structures erected in Greece were designed with the gods in mind. The Parthenon and the Erechtheum are two examples of great and thoroughly Greek structures. Some characteristics of Greek design are precision, adornment, largess and synergy. Each aspect and characteristic of Greek architecture was designed to compliment and relate to one another. Because each Greek structure was inspired by the story and unique abilities of a specific god, there is irony in the fact that most buildings that mimic Greek style in the modern world are secular, government centers. An order of architecture is any of several styles of classical architecture defined by the particular type of column of entablature they use as a basic unit. The three orders of classical Greek architecture are Doric, Ionic and Corinthian. Click thumbnail to view full-size Doric Order Source Corinthian Order Source Doric Order Originating on the mainland and western Greece, the Doric order is the simplest of the orders and is characterized by short, faceted columns with unembellished, round capitals tops and no base. The columns are the smallest of the orders and are channelled with 20 flutes. Ionic Order Originating in eastern Greece, the ionic order is characterized by long and slender fluted pillars with a large base and two opposing scrolls built into the capital. The scrolls are often engraved with an egg-and-dart motif, and the pillars feature four more flutes than doric columns. Corinthian Order Considered the most elegant of the three orders, the Corinthian order features ornate fluted columns and capitals studded with two rows of acanthus leaves and four scrolls. The shaft of the Corinthian column has 24 flutes. The oldest known building designed in the Corinthian order is the Choragic Monument of Lysicrates in Athens, which was constructed from to BCE. Mythology Many of us still read Greek myths today. Others read Greek myths without knowing it, the godly characters being replaced by humans. Some of the most famous myths include the tales of Peruses, Theseus, and, of course, Heracles. Greek mythology has pervaded nearly every form of popular culture imaginable. Many Greek myths have been adapted into modern novels, movies, TV shows, video games and even brands. Some well-known instances of Greek mythology in pop culture are: The Lighthouse Like the first library, the first lighthouse in the world was located in the Greek-controlled Egyptian kingdom of Alexandria. The structure was called the Lighthouse of Alexandria, or the Pharos of Alexandria. Taller than the Statue of Liberty, it was the second tallest structure of its day only the Great Pyramid of Giza was taller than it. The lighthouse had three layers: A square-shaped base An octagonal mid section A round beacon on top The lighthouse could be seen by fire at night, and by the smoke of the fire by day. Sadly, the lighthouse was destroyed by earthquakes, but it set the model for all future lighthouses. Standardized Medicine While medicine had been practiced in Babylon, China, India and Egypt, the Greeks were the first to create a standardized system of medicine including medical diagnosis, prognosis, and medical ethics. The manner in which the medical practice is carried out today, in terms of diagnosis and sometimes of treatment, is very similar to that of the ancient Greeks. These ancient advancements in medicine were largely instituted by

Hippocrates, who is often called the "father of medicine. Aside from theories and ethics about how physicians should practice medicine, Hippocrates also made direct contributions to the application of medicine. He taught that all ailments had natural causes in a time when people believed that illnesses were punishments from the gods. Hippocratic Oath A Hippocratic Oath is a historical sworn statement by physicians in which they swear by the names of a number of healing gods to uphold specific ethical standards. These include principles such as medical confidentiality and non-maleficence. Below is a excerpt from the full text of the Hippocratic Oath , which remains a rite of passage for some medical graduates. Neither will I administer a poison to anybody when asked to do so, nor will I suggest such a course. Similarly I will not give to a woman a pessary to cause abortion. But I will keep pure and holy both my life and my art. I will not use the knife, not even, verily, on sufferers from stone, but I will give place to such as are craftsmen therein.

Chapter 2 : Greek Mathematics - The Story of Mathematics

Greek mathematics refers to mathematics texts and advances written in Greek, developed from the 7th century BC to the 4th century AD around the shores of the Eastern Mediterranean.

The First Great Age of Science The most brilliant age in the history of science prior to the seventeenth century a. Indeed, many of the achievements of the modern age would scarcely have been possible without the discoveries of the scientists of Alexandria, Syracuse, Pergamum, and other great cities of the Hellenistic world. Alexander himself had given some financial encouragement to the progress of research. More important was the stimulus provided for intellectual inquiry by the fusion of Chaldean and Egyptian science with the learning of the Greeks. Possibly a third factor was the new interest in luxury and comfort and the demand for practical knowledge which would enable man to solve the problems of a disordered and unsatisfying existence. The sciences which received the major attention in the Hellenistic Age were astronomy, mathematics, geography, medicine, and physics. Chemistry as a pure science was practically unknown. Except for the work of Theophrastus, who was the first to recognize the sexuality of plants, the biological sciences were also largely neglected. Neither chemistry nor biology bore any definite relationship to trade or to the forms of industry then in existence and apparently they were not regarded as having much practical value. The most famous of the earlier astronomers of this time was Aristarchus of Samos B. But his chief title to fame comes from his deduction that the earth and the other planets revolve around the sun. Unfortunately this deduction was not accepted by his successors. It conflicted with the teachings of Aristotle and with the anthropocentric ideas of the Greeks. Besides, it was not in harmony with the beliefs of the Jews and other Orientals who made up so large a percentage of the Hellenistic population. The only other astronomer of much importance in the Hellenistic Age was Hipparchus, who did his most valuable work in Alexandria in the latter half of the second century B. His chief contributions were the invention of the astrolabe, the preparation of the best chart of the heavens known to antiquity, the approximately correct calculation of the diameter of the moon and its distance from the earth, and the discovery of the precession of the equinoxes. His fame was eventually overshadowed, however, by the reputation of Ptolemy of Alexandria, the last of the Hellenistic astronomers. Although Ptolemy made few original discoveries, he systematized the work of others. His principal writing, the Almagest, based upon the geocentric theory, was handed down to medieval Europe as the classic summary of ancient astronomy. Closely allied with astronomy were two other sciences, mathematics and geography. The Hellenistic mathematician of greatest renown was of course Euclid ca. Until the middle of the nineteenth century his Elements of Geometry remained the accepted basis for the study of that branch of mathematics. Much of the material in this work was not original but was compiled as a synthesis of the discoveries of others. The most original of the Hellenistic mathematicians was probably Hipparchus, who laid the foundations of both plane and spherical trigonometry. Hellenistic geography owed most of its development to Eratosthenes ca. By means of sun dials placed some hundreds of miles apart, he calculated the circumference of the earth with an error of less than miles. He produced the most accurate map that had yet been devised, with the surface of the earth divided into degrees of latitude and longitude. He propounded the theory that all of the oceans are really one, and he was the first to suggest the possibility of reaching India by sailing west. One of his successors divided the earth into the five climatic zones which are still recognized and explained the ebb and flow of the tides as due to the influence of the moon. Perhaps none of the Hellenistic advances in science surpassed in importance the progress in medicine. Especially significant was the work of Herophilus of Chalcedon, who conducted his researches in Alexandria about the beginning of the third century. Without question he was the greatest anatomist of antiquity and, according to Galen, the first to practice human dissection. Among his most important achievements were a detailed description of the brain, with an attempt to distinguish between the functions of its various parts; the discovery of the significance of the pulse and its use in diagnosing illness; and the discovery that the arteries contain blood alone, not a mixture of blood and air as Aristotle had taught, and that their function is to carry blood from the heart to all parts of the body. The value of this last discovery in laying the basis for a knowledge of the circulation of the blood can hardly be overestimated. The ablest of the successors of Herophilus was Erasistratus, who nourished in Alexandria about the middle of the third century. He is considered the founder of physiology as a separate science. Not only did he practice dissection, but he is believed to have gained a great deal of his knowledge of bodily functions from vivisection. He discovered the valves of the heart, distinguished between motor and sensory nerves, and taught that the ultimate branches of the arteries and veins are connected. He was the first to reject absolutely the humoral theory of disease and to condemn excessive blood-letting as a method of cure. Unfortunately this theory was revived by Galen, the great encyclopedist of medicine who lived in the Roman Empire in the second century a. Prior to the third century b. It was made a separate experimental science by Archimedes of Syracuse. Archimedes discovered the law of floating bodies or specific gravity and formulated with scientific exactness the principles of the lever, the pulley, and the screw. Among his memorable inventions were the compound pulley, the tubular screw for pumping water, the screw propeller for ships, and the burning lens. Although he has been called the "technical Yankee of antiquity," there is evidence that he set no high value upon his ingenious mechanical contraptions and preferred to devote his time to pure scientific research. Certain other individuals in the Hellenistic Age were quite willing to give all their attention to applied science. Pre-eminent among them was Hero or Heron of Alexandria, who lived in the last century b. The record of inventions credited to him almost passes belief. The list includes a fire engine, a siphon, a force pump, a hydraulic organ, a slot machine, a catapult operated by compressed air, a thermoscope, and even a steam engine. How many of these inventions were really his own is impossible to say, but there appears to be no question that such contrivances were actually in existence in his time or soon thereafter. Nevertheless, the total progress in applied science was comparatively slight, probably for the reason that human labor continued to be so abundant and cheap that it was not worth while to substitute the labor of machines.

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Chapter 3 : Euclid, the Father of Geometry - Greek Mathematics

The most important areas of Greek achievement were math and science. They achieved all kinds of things in the areas of psychology, astronomy, geometry, biology, physics, and medicine. In astronomy they formulated the ideas that the sun was times larger than the earth, the universe was composed of atoms, and they calculated the true size of.

While these civilizations possessed writing and were capable of advanced engineering, including four-story palaces with drainage and beehive tombs , they left behind no mathematical documents. Though no direct evidence is available, it is generally thought that the neighboring Babylonian and Egyptian civilizations had an influence on the younger Greek tradition. Little is known about the life and work of Thales, so little indeed that his date of birth and death are estimated from the eclipse of BC, which probably occurred while he was in his prime. Despite this, it is generally agreed that Thales is the first of the seven wise men of Greece. The former, which states that an angle inscribed in a semicircle is a right angle, may have been learned by Thales while in Babylon but tradition attributes to Thales a demonstration of the theorem. It is for this reason that Thales is often hailed as the father of the deductive organization of mathematics and as the first true mathematician. Thales is also thought to be the earliest known man in history to whom specific mathematical discoveries have been attributed. Although it is not known whether or not Thales was the one who introduced into mathematics the logical structure that is so ubiquitous today, it is known that within two hundred years of Thales the Greeks had introduced logical structure and the idea of proof into mathematics. Pythagoras established an order called the Pythagoreans , which held knowledge and property in common and hence all of the discoveries by individual Pythagoreans were attributed to the order. And since in antiquity it was customary to give all credit to the master, Pythagoras himself was given credit for the discoveries made by his order. Aristotle for one refused to attribute anything specifically to Pythagoras as an individual and only discussed the work of the Pythagoreans as a group. One of the most important characteristics of the Pythagorean order was that it maintained that the pursuit of philosophical and mathematical studies was a moral basis for the conduct of life. Indeed, the words philosophy love of wisdom and mathematics that which is learned are said[by whom? From this love of knowledge came many achievements. It has been customarily said[by whom? Distinguishing the work of Thales and Pythagoras from that of later and earlier mathematicians is difficult since none of their original works survive, except for possibly the surviving "Thales-fragments", which are of disputed reliability. However many historians, such as Hans-Joachim Waschkies and Carl Boyer, have argued that much of the mathematical knowledge ascribed to Thales was developed later, particularly the aspects that rely on the concept of angles, while the use of general statements may have appeared earlier, such as those found on Greek legal texts inscribed on slabs. Thales is supposed to have used geometry to solve problems such as calculating the height of pyramids based on the length of shadows, and the distance of ships from the shore. He is also credited by tradition with having made the first proof of two geometric theoremsâ€"the "Theorem of Thales" and the "Intercept theorem" described above. Some modern historians have questioned whether he really constructed all five regular solids, suggesting instead that it is more reasonable to assume that he constructed just three of them. Some ancient sources attribute the discovery of the Pythagorean theorem to Pythagoras, whereas others claim it was a proof for the theorem that he discovered. Modern historians believe that the principle itself was known to the Babylonians and likely imported from them. The Pythagoreans regarded numerology and geometry as fundamental to understanding the nature of the universe and therefore central to their philosophical and religious ideas. They are credited with numerous mathematical advances, such as the discovery of irrational numbers. Historians credit them with a major role in the development of Greek mathematics particularly number theory and geometry into a coherent logical system based on clear definitions and proven theorems that was considered to be a subject worthy of study in its own right, without regard to the practical applications that had been the primary concern of the Egyptians and Babylonians. Greek became the language of scholarship throughout the Hellenistic world, and Greek mathematics merged with Egyptian and Babylonian mathematics to give rise to a Hellenistic mathematics. Greek mathematics and astronomy reached a rather advanced stage during the

Hellenistic and Roman period , represented by scholars such as Hipparchus , Apollonius and Ptolemy , to the point of constructing simple analogue computers such as the Antikythera mechanism. The most important centre of learning during this period was Alexandria in Egypt , which attracted scholars from across the Hellenistic world, mostly Greek and Egyptian , but also Jewish , Persian , Phoenician and even Indian scholars. The Antikythera mechanism , an ancient mechanical calculator. Archimedes was able to use infinitesimals in a way that is similar to modern integral calculus. Using a technique dependent on a form of proof by contradiction he could give answers to problems to an arbitrary degree of accuracy, while specifying the limits within which the answer lay. In The Sand Reckoner , Archimedes set out to calculate the number of grains of sand that the universe could contain. In doing so, he challenged the notion that the number of grains of sand was too large to be counted, devising his own counting scheme based on the myriad , which denoted 10, Achievements[edit] Greek mathematics constitutes a major period in the history of mathematics , fundamental in respect of geometry and the idea of formal proof. Greek mathematics also contributed importantly to ideas on number theory , mathematical analysis , applied mathematics , and, at times, approached close to integral calculus. The most characteristic product of Greek mathematics may be the theory of conic sections , largely developed in the Hellenistic period. The methods used made no explicit use of algebra , nor trigonometry. Eudoxus of Cnidus developed a theory of real numbers strikingly similar to the modern theory of the Dedekind cut developed by Richard Dedekind , who indeed acknowledged Eudoxus as inspiration. Nevertheless, despite the lack of original manuscripts, the dates of Greek mathematics are more certain than the dates of surviving Babylonian or Egyptian sources because a large number of overlapping chronologies exist. Even so, many dates are uncertain; but the doubt is a matter of decades rather than centuries.

Chapter 4 : Greek mathematics - Wikipedia

Their findings in the area of astronomy, geography and mathematics, pioneered the age of science. The Greek interest in scientific specification of physical world can be seen as further back in the history in the 6th century BC.

Where the attribution is in doubt, I cite the scholar who endorses it. In many cases, the theorem is inferred from the context. In a given circle equal chords form equal angles with the circumference of the circle Prior Analytics i. The angles about a point are two right angles Metaphysics ix 9; Eucl. If two straight-lines are parallel and a straight-line intersects them, the interior angle is equal to the exterior angle Prior Analytics ii. If two straight-lines are parallel and a straight-line intersects them, the alternate angles are equal possibly, but not likely Prior Analytics ii. If a straight-line intersects two straight-lines and makes interior or exterior angles equal to two right angles on the same side with each, then the lines are parallel possibly Posterior Analytics i. To find the mean proportion of two lines De anima ii. If from two points equal lines are drawn to meet and form angles, the locus of points at the angles forms a circle Meteorologica iii. The locus of points formed by taking lines in a given ratio not 1: The circle encompasses the greatest area for a given circumference, possibly Posterior Analytics i. To square a lunule, a figure shaped like a crescent formed by the intersection of two circular arcs Prior Analytics ii 25, Sophistici Elenchi 11, Physics i. A spiral which sort? Two spheres rotating in different directions presumably about axes which do not coincide , with one carrying the other, produce a non-uniform motion De gen. In a parallelogram, a line drawn parallel to a side through two sides cuts the area and the side in the same ratio Topics viii. Olympus, and for reasons evident in the proof, which is otherwise based on a false theory of reflection Meteorologica iii. Of greater interest, 3 and 4 , 5 , 7 , 8 , and possibly 13 form a natural deductive sequence. In proportion theory, he uses many principles, but two are clear favorites: The side and diagonal of a square are incommensurable from showing that odd numbers would otherwise be equal to even numbers ver frequent, but cf. The problem must be as old as Greek mathematics, given that the problem marks a transition from Egyptian to Greek style mathematics. Some have held that there was at least one solution, using a curve called the quadratrix, in the time of Aristotle, a very controversial claim. Aristotle shows no awareness of a solution to the problem, which may well count as evidence that the quadratrix was either not yet discovered or was not used for this purpose. Aristotle discusses the definitions of numerous mathematical entities and properties, such as point, line, plane, solid, circle, commensurate, number, even and odd, three, etc. In this regard, he is the most important source for the development of introductory texts in the 4th. He is also a witness to some important developments. Additionally, Aristotle shows an awareness of the astronomical models of Eudoxus and Callippus and lets their models form the basis of his astronomical model. These models use concentric, uniformly rotating spheres, with the earth as the center of every sphere. Complexity of motion results from the combination of motion, where an outer sphere carries the axis of rotation of the next sphere below it. In these systems, each planetary body has an independent system of spheres. Some commentators have held that Aristotle means by mixed lines, lines that have straight and curved segments. He does not mention, parabolas, ellipses, nor hyperboles, although these were a contemporary discovery. Nor does he mention two of the three major problems in contemporary mathematics, trisecting an angle and doubling the cube. As noted above, the third problem, squaring the circle, is a favorite example. This is also true of mathematics. Some have held that these show that Aristotle did not know contemporary mathematics. Another possibility is that these advances in mathematics were made after Aristotle. Of these, the most striking is a claim made in Physics vii. Hence, rectification of a circumference would be impossible. At least since Archimedes, we know that the problem of rectifying a circumference is equivalent to the problem of squaring a circle. Yet, Aristotle allows that the problem of squaring a circle may have a solution. It seems likely, then, that this equivalence was unknown in the 4th cent. As arguments against infinitely long linear motion, infinite weight, infinite bodies, etc. Typically, Aristotle will assume uniform motion or weight, and will argue along these lines: Then take a finite part CE of CD. X will move a finite part of AB in time CE. Let this be AF. CD, which is impossible. These arguments are perfectly respectable mathematically. However, they will not provide the conclusions which Aristotle needs. Aristotle even recognizes that if we allow that X can vary in its motions, the argument will not show the impossibility; yet he only twice takes this into account. On these two occasions Physics vi. However, one should also note that no one until the late Middle Ages seems to have noticed this. Greek mathematicians wisely avoided non-uniform magnitudes which could not be reduced to uniform magnitudes. The reason for this has partly to do with the difficulty of representing non-uniformity abstractly. Hence, Aristotle needs to consider non-uniform magnitudes for his proofs, but lacks the mathematics to deal with them. The difficulty for Aristotle is conceptualizing a rotation where every distance is finite, so that while the points on the ray move faster as they are further from the center they are still always finite. Aristotle does raise an interesting paradox, if there is an infinite line not going through the center of rotation, there will be no first point where the rotating line and the fixed line meet. The law of reflection used by Aristotle in Meteorologica iii. Since the correct rule appears in pseudo-Aristotle, Problems xiv. Original Mathematics Few today would credit Plato with original mathematics. More can be said for Aristotle. While it may be unlikely that Aristotle is the author of the locus theorem 13 from Meteorologica iii. In his attempt to work out theorems about ratios and infinite magnitudes, Aristotle makes important mathematical observations about infinite magnitudes and may have been the first to attempt them.

Chapter 5 : Ancient Greece for Kids: Science and Technology

Ancient Greek scientists have many inventions and discoveries attributed to them, rightly or wrongly, especially in the areas of astronomy, geography, and mathematics.

This was as true of their mathematics as anything else, and they adopted elements of mathematics from both the Babylonians and the Egyptians. But they soon started to make important contributions in their own right and, for the first time, we can acknowledge contributions by individuals. By the Hellenistic period , the Greeks had presided over one of the most dramatic and important revolutions in mathematical thought of all time. It was a base 10 system similar to the earlier Egyptian one and even more similar to the later Roman system , with symbols for 1, 5, 10, 50, , and 1, repeated as many times needed to represent the desired number. Addition was done by totalling separately the symbols 1s, 10s, s, etc in the numbers to be added, and multiplication was a laborious process based on successive doublings division was based on the inverse of this process. Thales, one of the Seven Sages of Ancient Greece, who lived on the Ionian coast of Asian Minor in the first half of the 6th Century BCE, is usually considered to have been the first to lay down guidelines for the abstract development of geometry, although what we know of his work such as on similar and right triangles now seems quite elementary. To some extent, however, the legend of the 6th Century BCE mathematician Pythagoras of Samos has become synonymous with the birth of Greek mathematics. Indeed, he is believed to have coined both the words "philosophy" "love of wisdom" and "mathematics" "that which is learned". Pythagoras was perhaps the first to realize that a complete system of mathematics could be constructed, where geometric elements corresponded with numbers. But he remains a controversial figure, as we will see , and Greek mathematics was by no means limited to one man. The Three Classical Problems Three geometrical problems in particular, often referred to as the Three Classical Problems, and all to be solved by purely geometric means using only a straight edge and a compass, date back to the early days of Greek geometry: These intransigent problems were profoundly influential on future geometry and led to many fruitful discoveries, although their actual solutions or, as it turned out, the proofs of their impossibility had to wait until the 19th Century. The most famous of his paradoxes is that of Achilles and the Tortoise, which describes a theoretical race between Achilles and a tortoise. By the time Achilles reaches that point, the tortoise has moved on again, etc, etc, so that in principle the swift Achilles can never catch up with the slow tortoise. The paradox stems, however, from the false assumption that it is impossible to complete an infinite number of discrete dashes in a finite time, although it is extremely difficult to definitively prove the fallacy. The ancient Greek Aristotle was the first of many to try to disprove the paradoxes, particularly as he was a firm believer that infinity could only ever be potential and not real. Democritus, most famous for his prescient ideas about all matter being composed of tiny atoms, was also a pioneer of mathematics and geometry in the 5th - 4th Century BCE, and he produced works with titles like "On Numbers", "On Geometrics", "On Tangencies", "On Mapping" and "On Irrationals", although these works have not survived. We do know that he was among the first to observe that a cone or pyramid has one-third the volume of a cylinder or prism with the same base and height, and he is perhaps the first to have seriously considered the division of objects into an infinite number of cross-sections. Plato the mathematician is best known for his description of the five Platonic solids, but the value of his work as a teacher and popularizer of mathematics can not be overstated. Perhaps the most important single contribution of the Greeks, though - and Pythagoras , Plato and Aristotle were all influential in this respect - was the idea of proof, and the deductive method of using logical steps to prove or disprove theorems from initial assumed axioms. Older cultures, like the Egyptians and the Babylonians , had relied on inductive reasoning, that is using repeated observations to establish rules of thumb. It is this concept of proof that give mathematics its power and ensures that proven theories are as true today as they were two thousand years ago, and which laid the foundations for the systematic approach to mathematics of Euclid and those who came after him.

Chapter 6 : Top 10 Greatest Mathematicians - Listverse

Mathematics and Science in Ancient Greece The Greeks produced great advancements in mathematics which are still used today. Euclid was known for the basic rules and terms of geometry.

Share8 Shares 5K Often called the language of the universe, mathematics is fundamental to our understanding of the world and, as such, is vitally important in a modern society such as ours. Everywhere you look it is likely mathematics has made an impact, from the faucet in your kitchen to the satellite that beams your television programs to your home. As such, great mathematicians are undoubtedly going to rise above the rest and have their name embedded within history. This list documents some such people. I have rated them based on contributions and how they effected mathematics at the time, as well as their lasting effect. I also suggest one looks deeper into the lives of these men, as they are truly fascinating people and their discoveries are astonishing â€" too much to include here. As always, such lists are highly subjective, and as such please include your own additions in the comments! Living around to BC, in modern day Greece, he is known to have founded the Pythagorean cult, who were noted by Aristotle to be one of the first groups to actively study and advance mathematics. He is also commonly credited with the Pythagorean Theorem within trigonometry. However, some sources doubt that is was him who constructed the proof Some attribute it to his students, or Baudhayana, who lived some years earlier in India. Nonetheless, the effect of such, as with large portions of fundamental mathematics, is commonly felt today, with the theorem playing a large part in modern measurements and technological equipment, as well as being the base of a large portion of other areas and theorems in mathematics. But, unlike most ancient theories, it played a bearing on the development of geometry, as well as opening the door to the study of mathematics as a worthwhile endeavor. Thus, he could be called the founding father of modern mathematics. A Self-Teaching Guide at Amazon. Besides, his dedication is often admired by most, as he quite literally shut himself away for 7 years to formulate a solution. When it was found that the solution contained an error, he returned to solitude for a further year before the solution was accepted. To put in perspective how ground breaking and new the math was, it had been said that you could count the number of mathematicians in the world on one hand who, at the time, could understand and validate his proof. Nonetheless, the effects of such are likely to only increase as time passes and more and more people can understand it. To start, Leibniz is often given the credit for introducing modern standard notation, notably the integral sign. He made large contributions to the field of Topology. Whereas all round genius Isaac Newton has, because of the grand scientific epic Principia, generally become the primary man hailed by most to be the actual inventor of calculus. Nonetheless, what can be said is that both men made considerable vast contributions in their own manner. Living from to , he is best known for introducing the infamous Fibonacci Series to the western world. Although known to Indian mathematicians since approximately BC, it was, nonetheless, a truly insightful sequence, appearing in biological systems frequently. In addition, from this Fibonacci also contributed greatly to the introduction of the Arabic numbering system. Something he is often forgotten for. Haven spent a large portion of his childhood within North Africa he learned the Arabic numbering system, and upon realizing it was far simpler and more efficient then the bulky Roman numerals, decided to travel the Arab world learning from the leading mathematicians of the day. Upon returning to Italy in , he published his Liber Abaci, whereupon the Arabic numbers were introduced and applied to many world situations to further advocate their use. As a result of his work the system was gradually adopted and today he is considered a major player in the development of modern mathematics. Having worked in the Government Code and Cypher School in Britain during the second world war, he made significant discoveries and created ground breaking methods of code breaking that would eventually aid in cracking the German Enigma Encryptions. Undoubtedly affecting the outcome of the war, or at least the time-scale. After the end of the war he invested his time in computing. Having come up with idea of a computing style machine before the war, he is considered one of the first true computer scientists. Remarkably, he began in working with D. Champernowne, an undergraduate acquaintance on a computer chess program for a machine not yet in existence. Despite this, the Frenchman, who lived to , made ground breaking contributions to mathematics. Alongside Newton and Leibniz, Descartes helped provide the foundations of modern calculus which Newton and Leibniz later built upon , which in itself had great bearing on the modern day field. Alongside this, and perhaps more familiar to the reader, is his development of Cartesian Geometry, known to most as the standard graph Square grid lines, x and y axis, etc. Before this most geometers used plain paper or another material or surface to preform their art. Previously, such distances had to be measured literally, or scaled. With the introduction of Cartesian Geometry this changed dramatically, points could now be expressed as points on a graph, and as such, graphs could be drawn to any scale, also these points did not necessarily have to be numbers. The final contribution to the field was his introduction of superscripts within algebra to express powers. And thus, like many others in this list, contributed to the development of modern mathematical notation. Elements, is one the greatest mathematical works in history, with its being in use in education up until the 20th century. Unfortunately, very little is known about his life, and what exists was written long after his presumed death. Nonetheless, Euclid is credited with the instruction of the rigorous, logical proof for theorems and conjectures. Such a framework is still used to this day, and thus, arguably, he has had the greatest influence of all mathematicians on this list. Alongside his Elements were five other surviving works, thought to have been written by him, all generally on the topic of Geometry or Number theory. There are also another five works that have, sadly, been lost throughout history. Bernhard Riemann Bernhard Riemann, born to a poor family in , would rise to become one of the worlds prominent mathematicians in the 19th Century. The list of contributions to geometry are large, and he has a wide range of theorems bearing his name. To name just a few: However, he is perhaps most famous or infamous for his legendarily difficult Riemann Hypothesis; an extremely complex problem on the matter of the distributions of prime numbers. Largely ignored for the first 50 years following its appearance, due to few other mathematicians actually understanding his work at the time, it has quickly risen to become one of the greatest open questions in modern science, baffling and confounding even the greatest mathematicians. Although progress has been made, its has been incredibly slow. The fallout from such a proof is hypothesized to be large: Major encryption systems are thought to be breakable with such a proof, and all that rely on them would collapse. Many know Gauss for his outstanding mental ability â€" quoted to have added the numbers 1 to within seconds whilst attending primary school with the aid of a clever trick. The local Duke, recognizing his talent, sent him to Collegium Carolinum before he left for Gottingen at the time it was the most prestigious mathematical university in the world, with many of the best attending. After graduating in at the age of 22 , he began to make several important contributions in major areas of mathematics, most notably number theory especially on Prime numbers. He went on to prove the fundamental theorem of algebra, and introduced the Gaussian gravitational constant in physics, as well as much more â€" all this before he was 24! Needless to say, he continued his work up until his death at the age of 77, and had made major advances in the field which have echoed down through time. Living from to , he is regarded as the greatest mathematician to have ever walked this planet. It is said that all mathematical formulas are named after the next person after Euler to discover them. In his day he was ground breaking and on par with Einstein in genius. All of which play a huge bearing on modern mathematics, from the every day to the incredibly complex. As well as this, he also solved the Seven Bridges of Koenigsberg problem in graph theory, found the Euler Characteristic for connecting the number of vertices, edges and faces of an object, and dis proved many well known theories, too many to list. Furthermore, he continued to develop calculus, topology, number theory, analysis and graph theory as well as much, much more â€" and ultimately he paved the way for modern mathematics and all its revelations. It is probably no coincidence that industry and technological developments rapidly increased around this time.

Chapter 7 : Ancient Greek technology - Wikipedia

â€¢ Made advances in mathematics, science, and medicine â€¢ Preserved Greek and Roman learning â€¢ Influenced Spanish architecture and literature These achievements are most closely associated.

Because much of genetics is based on quantitative data, mathematical techniques are used extensively in genetics. The laws of probability are applicable to crossbreeding and are used to predict frequencies of specific genetic constitutions in offspring. Geneticists also use statistical methods to determineâ€¦ Ancient mathematical sources It is important to be aware of the character of the sources for the study of the history of mathematics. The history of Mesopotamian and Egyptian mathematics is based on the extant original documents written by scribes. Although in the case of Egypt these documents are few, they are all of a type and leave little doubt that Egyptian mathematics was, on the whole, elementary and profoundly practical in its orientation. For Mesopotamian mathematics, on the other hand, there are a large number of clay tablets, which reveal mathematical achievements of a much higher order than those of the Egyptians. The tablets indicate that the Mesopotamians had a great deal of remarkable mathematical knowledge, although they offer no evidence that this knowledge was organized into a deductive system. Future research may reveal more about the early development of mathematics in Mesopotamia or about its influence on Greek mathematics, but it seems likely that this picture of Mesopotamian mathematics will stand. This stands in complete contrast to the situation described above for Egyptian and Babylonian documents. Although, in general outline, the present account of Greek mathematics is secure, in such important matters as the origin of the axiomatic method , the pre-Euclidean theory of ratios, and the discovery of the conic sections , historians have given competing accounts based on fragmentary texts, quotations of early writings culled from nonmathematical sources, and a considerable amount of conjecture. Many important treatises from the early period of Islamic mathematics have not survived or have survived only in Latin translations, so that there are still many unanswered questions about the relationship between early Islamic mathematics and the mathematics of Greece and India. In addition, the amount of surviving material from later centuries is so large in comparison with that which has been studied that it is not yet possible to offer any sure judgment of what later Islamic mathematics did not contain, and therefore it is not yet possible to evaluate with any assurance what was original in European mathematics from the 11th to the 15th century. In modern times the invention of printing has largely solved the problem of obtaining secure texts and has allowed historians of mathematics to concentrate their editorial efforts on the correspondence or the unpublished works of mathematicians. However, the exponential growth of mathematics means that, for the period from the 19th century on, historians are able to treat only the major figures in any detail. In addition, there is, as the period gets nearer the present, the problem of perspective. Mathematics, like any other human activity, has its fashions, and the nearer one is to a given period, the more likely these fashions will look like the wave of the future. For this reason, the present article makes no attempt to assess the most recent developments in the subject. Berggren Mathematics in ancient Mesopotamia Until the s it was commonly supposed that mathematics had its birth among the ancient Greeks. What was known of earlier traditions, such as the Egyptian as represented by the Rhind papyrus edited for the first time only in , offered at best a meagre precedent. This impression gave way to a very different view as historians succeeded in deciphering and interpreting the technical materials from ancient Mesopotamia. Existing specimens of mathematics represent all the major erasâ€"the Sumerian kingdoms of the 3rd millennium bce, the Akkadian and Babylonian regimes 2nd millennium , and the empires of the Assyrians early 1st millennium , Persians 6th through 4th century bce , and Greeks 3rd century bce to 1st century ce. The level of competence was already high as early as the Old Babylonian dynasty , the time of the lawgiver-king Hammurabi c. The application of mathematics to astronomy, however, flourished during the Persian and Seleucid Greek periods. The numeral system and arithmetic operations Unlike the Egyptians, the mathematicians of the Old Babylonian period went far beyond the immediate challenges of their official accounting duties. For example, they introduced a versatile numeral system, which, like the modern system, exploited the notion of place value, and they developed computational methods that took advantage of this means of expressing numbers; they solved linear and quadratic problems by methods much like those now used in algebra ; their success with the study of what are now called Pythagorean number triples was a remarkable feat in number theory. The scribes who made such discoveries must have believed mathematics to be worthy of study in its own right, not just as a practical tool. The older Sumerian system of numerals followed an additive decimal base principle similar to that of the Egyptians. But the Old Babylonian system converted this into a place-value system with the base of 60 sexagesimal. The reasons for the choice of 60 are obscure, but one good mathematical reason might have been the existence of so many divisors 2, 3, 4, and 5, and some multiples of the base, which would have greatly facilitated the operation of division. For numbers from 1 to 59, the symbols for 1 and for 10 were combined in the simple additive manner e. But to express larger values, the Babylonians applied the concept of place value. For example, 60 was written as , 70 as , 80 as , and so on. In fact, could represent any power of The context determined which power was intended. By the 3rd century bce, the Babylonians appear to have developed a placeholder symbol that functioned as a zero , but its precise meaning and use is still uncertain. Furthermore, they had no mark to separate numbers into integral and fractional parts as with the modern decimal point. The four arithmetic operations were performed in the same way as in the modern decimal system, except that carrying occurred whenever a sum reached 60 rather than Multiplication was facilitated by means of tables; one typical tablet lists the multiples of a number by 1, 2, 3,â€¦, 19, 20, 30, 40, and To multiply two numbers several places long, the scribe first broke the problem down into several multiplications, each by a one-place number, and then looked up the value of each product in the appropriate tables. He found the answer to the problem by adding up these intermediate results. These tables also assisted in division, for the values that head them were all reciprocals of regular numbers. Regular numbers are those whose prime factors divide the base; the reciprocals of such numbers thus have only a finite number of places by contrast, the reciprocals of nonregular numbers produce an infinitely repeating numeral. In base 10, for example, only numbers with factors of 2 and 5 e. In base 60, only numbers with factors of 2, 3, and 5 are regular; for example, 6 and 54 are regular, so that their reciprocals 10 and 1 6 40 are finite. To divide a number by any regular number, then, one can consult the table of multiples for its reciprocal. An interesting tablet in the collection of Yale University shows a square with its diagonals. The scribe thus appears to have known an equivalent of the familiar long method of finding square roots. They also show that the Babylonians were aware of the relation between the hypotenuse and the two legs of a right triangle now commonly known as the Pythagorean theorem more than a thousand years before the Greeks used it. A type of problem that occurs frequently in the Babylonian tablets seeks the base and height of a rectangle, where their product and sum have specified values. In the same way, if the product and difference were given, the sum could be found. This procedure is equivalent to a solution of the general quadratic in one unknown. In some places, however, the Babylonian scribes solved quadratic problems in terms of a single unknown, just as would now be done by means of the quadratic formula. Although these Babylonian quadratic procedures have often been described as the earliest appearance of algebra , there are important distinctions. The scribes lacked an algebraic symbolism; although they must certainly have understood that their solution procedures were general, they always presented them in terms of particular cases, rather than as the working through of general formulas and identities. They thus lacked the means for presenting general derivations and proofs of their solution procedures. Their use of sequential procedures rather than formulas, however, is less likely to detract from an evaluation of their effort now that algorithmic methods much like theirs have become commonplace through the development of computers. If one selects values at random for two of the terms, the third will usually be irrational , but it is possible to find cases in which all three terms are integers: Such solutions are sometimes called Pythagorean triples. A tablet in the Columbia University Collection presents a list of 15 such triples decimal equivalents are shown in parentheses at the right; the gaps in the expressions for h, b, and d separate the place values in the sexagesimal numerals: The entries in the column for h have to be computed from the values for b and d, for they do not appear on the tablet; but they must once have existed on a portion now missing. In the table the implied values p and q turn out to be regular numbers falling in the standard set of reciprocals, as mentioned earlier in connection with the multiplication tables. Scholars are still debating nuances of the construction and the intended use of this table, but no one questions the high level of expertise implied by it. Mathematical astronomy The sexagesimal method developed by the Babylonians has a far greater computational potential than what was actually needed for the older problem texts. With the development of mathematical astronomy in the Seleucid period, however, it became indispensable. Astronomers sought to predict future occurrences of important phenomena, such as lunar eclipses and critical points in planetary cycles conjunctions, oppositions, stationary points, and first and last visibility. The results were then organized into a table listing positions as far ahead as the scribe chose. Although the method is purely arithmetic, one can interpret it graphically: While observations extending over centuries are required for finding the necessary parameters e. Within a relatively short time perhaps a century or less , the elements of this system came into the hands of the Greeks. Although Hipparchus 2nd century bce favoured the geometric approach of his Greek predecessors, he took over parameters from the Mesopotamians and adopted their sexagesimal style of computation. Through the Greeks it passed to Arab scientists during the Middle Ages and thence to Europe, where it remained prominent in mathematical astronomy during the Renaissance and the early modern period. To this day it persists in the use of minutes and seconds to measure time and angles. Aspects of the Old Babylonian mathematics may have come to the Greeks even earlier, perhaps in the 5th century bce, the formative period of Greek geometry. There are a number of parallels that scholars have noted. Further, the Babylonian rule for estimating square roots was widely used in Greek geometric computations, and there may also have been some shared nuances of technical terminology. Although details of the timing and manner of such a transmission are obscure because of the absence of explicit documentation, it seems that Western mathematics, while stemming largely from the Greeks, is considerably indebted to the older Mesopotamians. Page 1 of 6.

Chapter 8 : Hellenistic Mathematics - The Story of Mathematics

hellenistic mathematics The Sieve of Eratosthenes By the 3rd Century BCE, in the wake of the conquests of Alexander the Great, mathematical breakthroughs were also beginning to be made on the edges of the Greek Hellenistic empire.

Greek philosophers began to look at the world in different ways. They came up with theories on how the world worked and thought that the natural world obeyed certain laws that could be observed and learned through study. Mathematics The Greeks were fascinated with numbers and how they applied to the real world. Unlike most earlier civilizations, they studied mathematics for its own sake and developed complex mathematical theories and proofs. One of the first Greek mathematicians was Thales. Another Greek named Pythagoras also studied geometry. He discovered the Pythagorean Theorem which is still used today to find the sides of a right triangle. Perhaps the most important Greek mathematician was Euclid. Euclid wrote several books on the subject of geometry called Elements. These books became the standard textbook on the subject for years. Astronomy The Greeks applied their skills in math to help describe the stars and the planets. They theorized that the Earth may orbit the Sun and came up with a fairly accurate estimate for the circumference of the Earth. They even developed a device for calculating the movements of the planets which is sometimes considered the first computer. Medicine The Greeks were one of the first civilizations to study medicine as a scientific way to cure illnesses and disease. They had doctors who studied sick people, observed their symptoms, and then came up with some practical treatments. The most famous Greek doctor was Hippocrates. Hippocrates taught that diseases had natural causes and they could sometimes be cured by natural means. The Hippocratic Oath to uphold medical ethics is still taken by many medical students today. Biology The Greeks loved to study the world around them and this included living organisms. Aristotle studied animals in great detail and wrote down his observations in a book called the History of Animals. He heavily influenced zoologists for years by classifying animals according to their different characteristics. Inventions While the Greeks loved to observe and study the world, they also applied their learning to make some practical inventions. Here are some of the inventions that are typically attributed to the Ancient Greeks. Watermill - A mill for grinding grain that is powered by water. The Greeks invented the waterwheel used to power the mill and the toothed gears used to transfer the power to the mill. Alarm Clock - The Greek philosopher Plato may have invented the first alarm clock in history. He used a water clock to trigger a sound like an organ at a certain time. Central Heating - The Greeks invented a type of central heating where they would transfer hot air from fires to empty spaces under the floors of temples. Crane - The Greeks invented the crane to help lift heavy items such as blocks for constructing buildings. Interesting Facts About the Science and Technology of Ancient Greece The word "mathematics" comes from the Greek word "mathema" which means "subject of instruction. Hippocrates is often called the "Father of Western Medicine. The Greeks also made contributions to the study of map making or "cartography. Listen to a recorded reading of this page: Your browser does not support the audio element. For more about Ancient Greece:

Chapter 9 : Top 10 inventions and discoveries of ancient Greece

Other cultures had shown a keen interest in mathematics but perhaps the Greeks' unique contribution to the field was the effort to apply the subject to practical and everyday problems. Indeed, for the Greeks, the subject of maths was inseparable from philosophy, geometry, astronomy, and science in general.

Discoveries in modern science Not so long ago, water mills were a revolutionary invention used all over the world for the purpose of metal shaping, agriculture and most importantly, milling. To mill meant to grind, and that invariably meant to grind grain. This in turn led to production of edible food staple like beaten rice, cereals, pulses, flour and so on. Ever since its origination, water mill has seen a number of subsequent variations, which enabled people to use its milling features into different raw materials. These mills are still used in many parts of the rural world to serve similar purposes. This useful invention takes its roots of origination from the earliest known Perachora wheel, created way back in 3rd century BC Greece, most likely by the contemporary Greek engineer Philo of Byzantium. Earlier, the portions of the mechanical treatise on this particular water mill written by Philo himself were regarded to have Arab origination. But recent researches by British historian M. Lewis proved that water mill has an authentic ancient Greek origin. Odometer One of the most widely used instruments in present day, odometers measures the distance travelled by a vehicle such as bicycle or any other automobile. Even though, the modern odometers are digital, not so long ago they were more mechanical, slowly evolving into electro-mechanical with the rise of technology. This omnipresent instrument was also originated in the time of ancient Greece. Even though, an odometer was used for measuring distance, it was first described by Vitruvius around 27 BC, evidences point towards Archimedes of Syracuse as its inventor sometime around the first Punic war. Some historians also attribute its invention to Heron of Alexandria. Regardless of that, once invented, it was widely used in the late Hellenistic time and by Romans for indicating the distance travelled by a vehicle. It helped revolutionize the building of roads and travelling with it by accurately measuring distance and being able to carefully illustrate it with a milestone. Alarm clock One of the most commonly used gadget these days, an alarm clock also had its origin in ancient Greece. Yes, in due course of time and with the proper sophistication of technology, the alarm clock went through a number of changes from a mechanical alarm to the modern gadgets like cell phone, which come with inbuilt alarm. But the first of alarms used by ancient Greeks were nothing like today. They used to integrate mechanism to time the alarm which would sound off delicate water organs or pebbles into drums. The ancient Greek philosopher Plato â€" BC said to possess a large water clock with an unspecified alarm signal similar to the sound of a water organ; he used it at night, possibly for signaling the beginning of his lectures at dawn. Cartography Cartography is the study and practice of making maps. It has played an important role in travel and navigation since ancient times. Even though the earliest known evidences of cartography points towards the ancient Babylon in a time as early as the 9th century BC, the Greeks took, what they had at their disposal and brought cartography into new light and possibilities. Anaximander was one of the pioneer cartographers to create the map of the world. Born between BC, this map maker of the ancient world made important contributions to the sciences of astronomy and geography. A reputed cartographer, Anaximander presented the inhabited regions in his map of the world. The map appeared in tablet and featured Ionia in the center. The world map bounded on the east by the Caspian Sea. It stretched to the Pillars of Hercules in the west. Middle Europe borders the map in the North while Ethiopia and the Nile featured at the southern end of the map of Anaximander. Anaximander made immense contributions in the field of cartography and geography and his map of the world was indeed a marvelous achievement of that time. Olympics The modern Olympics are one of the greatest spectacle in sports of the modern age. But when Pierre de Coubertin, the founder of the international Olympic committee started the first modern Olympic in , he was extensively inspired by the ancient Olympics that used to be held in ancient Greece more than years ago. According to historical records, the first ancient Olympic Games can be traced back to BC. They were dedicated to the Olympian gods and were staged on the ancient plains of Olympia. The Isthmos game was staged every two years at the Isthmus of Corinth. The Pythian games took place every four years near Delphi.

The most famous games held at Olympia, South- West of Greece, which took place every four years. People from all over the Greek came to witness the spectacle. The victors were given olive leaf wreaths or crowns as a prize. Basis of Geometry Geometry with or without a doubt one of the oldest branches of mathematics, if not older than arithmetic itself. And its practical necessity demanded, use of various geometric techniques much before any recorded history. Yes, the Egyptians, Babylonians and Indus were among the first to incorporate and use many of such techniques but they were never interested in finding out the rules and axioms governing the geometry. The babylonians assumed value of Pi to be 3 and never challenged its accuracy. Then came the age of Greek geometry and changed the entire perception towards it. The Greeks insisted that geometric facts must be established by deductive reasoning, much like how it is done these days. Thales of Miletus, regarded as father of geometry,gave a number of axioms and rules that were true based on reasoning called mathematical truths in the 6th century BC. Then came the likes of Pythagoras, Euclid and Archimedes whose geometrical axioms and rules are still taught in schools today. There were many more Greek mathematicians and geometers, who contributed to the history of geometry, but these names are the true giants, the ones that developed geometry as we know it today. Earliest practice of medicine The ancient world did not fare too well when it came to cure diseases. Born in BC, Hippocrates was an ancient Greek physician of the Classical age and was considered one of the most outstanding figures in the history of medicine. He was referred as the father of western medicine in recognition of his lasting contributions to the field as the founder of the Hippocratic School of Medicine. The most famous of his supposed contributions is the Hippocratic Oath, which bears his name accordingly. It was this document that was first proposed as an ethical standard among doctors, when doing their work. It brings up important concepts, we still use today, such as doctor-patient confidentiality. Modern Philosophy Before the age of ancient Greece, the world did not see philosophy as we see it today. It was more shrouded with superstition and magic than it would be ever after. For instance, if the Nile would rise and flood, making the soil dark and fertile, the Egyptians would believe it happened because their pharaoh commanded the river to do so. But the Greeks approached philosophy from a different direction. They developed philosophy as a way of understanding the world around them, without resorting to religion, myth, or magic. In fact the early Greek philosophers were also scientists who observed and studied the known world, the earth, seas, and mountains here below, and the solar system, planetary motion, and astral phenomena, above. Their philosophy based on reasoning and observation of the known world played a pivotal role in the shaping of the western philosophical tradition. Philosophers like Socrates, Plato, Aristotle gave such influential philosophies that their studies were used to teach in the subsequent ages of Romans and other western cultures. Concept of democracy The idea of every citizen has an equal opportunity of having in turn a share in the government constitutes the concept of democracy. It is one of the widely used styles of governance in the modern world. And even more fascinating is the fact that democracy also had its origins in the ancient Greece. In fact the concept as well as implementation of democracy can be traced back from the present day to ancient classical Athens. Although there are evidences that democratic forms of government, in a broad sense, may have existed in several areas of the world well before the turn of the 5th century, it is generally believed that the concepts of democracy and constitution were created in one particular place and time â€” in Ancient Athens around BC. For this reason, Athens is regarded as the birthplace of democracy and was also considered as an important reference point of democracy. This transition from exploitation of aristocracy to a political system, where all the members of the society have an equal share of formal political power had a significant impact in the civilizations that came down the line. Discoveries in modern science It would be only fair to say that, given the evidences, the ancient Greeks had made some outstanding contributions in various branches of science. They made some astounding discoveries in the field of astronomy, biology and physics among others that broke contemporary stereotypes on those subject matters. The intellects in ancient Greece excelled in mathematics, physics and astronomy. Aristotle gave the idea of earth being a globe. He also classified animals and if often referred to as father of zoology. Theophrastus was the first botanist, we know of in written history. The pythagoreans not only made the earliest of advances in philosophy and geometry, they also proposed the heliocentric hypothesis with the earth revolving around sun and not the other way around as believed at that time. This idea was so ahead in time that it was disregarded as blasphemy. The Greeks had so much so influence in the early concepts of science, that most symbols often used in physics and higher math equations are derived from the Greek alphabet.