Anthropometric sizing essay



Geometry: One of the Oldest Mathematical Sciences BY JAMBYI 1 How to Encounter an Aptitude Career Test? Before starting your aptitude session, you shall be offered a solved practice question. The tester shall help you to understand the requirements of the examination. Then you will be delivered with a long multiple choices questionnaire to answer all of the items, within a time limit. Most probably you shall be unable to answer them all.

It is not a problem!

Geometry (Ancient Greek: YEwpErpta; geo- " earth", -metri " measurement") " Earth- measuring" is a branch of mathematics concerned with questions of shape, size, elative position of figures, and the properties of space. Geometry is one of the oldest mathematical sciences. Initially a body of practical knowledge concerning lengths, areas, and volumes, in the 3rd century BC geometry was put into an axiomatic form by Euclid, whose treatment" Euclidean geometry" set a standard for many centuries to follow. Archimedes developed ingenious techniques for calculating areas and volumes, in many ways anticipating modern integral calculus.

The field of astronomy, especially mapping the positions of the stars and planets on the celestial sphere and describing the relationship between movements of celestial odies, served as an important source of geometric problems during the next one and a half millennia. A mathematician who works in the field of geometry is called a geometer.

The introduction of coordinates by Ren© Descartes and the concurrent development of algebra marked a new stage for geometry, since geometric figures, such as plane curves, could now be represented analytically, i. . ,

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with functions and equations. This played a key role in the emergence ofInfinitesimal calculus in the 17th century. Furthermore, the theory of perspective showed that there is more to eometry than Just the metric properties of fgures: perspective is the origin of projective geometry. The subject of geometry was further enriched by the study of intrinsic structure of geometric objects that originated with Euler and Gauss and led to the creation of topology and differential geometry.

In Euclid's time there was no clear distinction between physical space and geometrical space. Since the 19th- century discovery of non-Euclidean geometry, the concept of space has undergone a radical transformation, and the question arose which geometrical space best fits physical space. With the rise of formal mathematics in the 20th century, also ' space' (and ' point', ' line', ' plane') lost its intuitive contents, so today we have to distinguish between physical space, geometrical spaces (in which ' space', ' point' etc. till have their intuitive meaning) and abstract spaces. Contemporary geometry considers manifolds, spaces that are considerably more abstract than the familiar Euclidean space, which they only approximately resemble at small scales. These spaces may be endowed with additional structure, allowing one to speak about length.

Modern geometry has multiple strong bonds with physics, exemplified by the ies between pseudo-Riemannian geometry and general relativity. One of the youngest physical theories, string theory, is also very geometric in tlavour.

W visual nature of geometry makes it initially more accessible than other parts of mathematics, such as algebra or number theory, geometric

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language is also used in contexts far removed from its traditional, Euclidean provenance (for example, in fractal geometry and algebraic geometry). [I] Practical geometry Geometry originated as a practical science concerned with surveying, measurements, areas, and volumes. Among the notable accomplishments one finds formulas or lengths, areas and volumes, such as Pythagorean theorem, circumference and area of a circle, area of a triangle, volume of a cylinder, sphere, and a pyramid.

A method of computing certain inaccessible distances or heights based on similarity of geometric figures is attributed to Thales. Development of astronomy led to emergence of trigonometry and spherical trigonometry, together with the attendant computational techniques. Geometric constructions Main article: Compass and straightedge constructions Ancient scientists paid special attention to constructing geometric objects that had been described in some other way. Classical instruments allowed in geometric constructions are those with compass and straightedge.

However, some problems turned out to be difficult or impossible to solve by these means alone, and ingenious constructions using parabolas and other curves, as well as mechanical devices, were found. [edit]Numbers in geometry The Pythagoreans discovered that the sides of a triangle could haveincommensurable lengths.

In ancient Greece the Pythagoreans considered the role of numbers in geometry. However, the discovery of incommensurable lengths, which contradicted their philosophical views, made them abandon (abstract) umbers in favor of (concrete) geometric quantities, such as length and area of figures.

Numbers were reintroduced into geometry in the form of coordinates by Descartes, who realized that the study of geometric shapes can be facilitated by their algebraic representation. Analytic geometry applies methods of algebra to geometric questions, typically by relating geometric curves and algebraic equations.

These ideas played a key role in the development of calculus in the 17th century and led to discovery of many new properties of plane curves. Modern algebraic geometry considers similar questions on a vastly more abstract evel.

Geometry of position Main articles: Projective geometry and Topology Even in ancient times, geometers considered questions of relative position or spatial relationship of geometric fgures and shapes. Some examples are given by inscribed and circumscribed circles of polygons, lines intersecting and tangent to conic sections, the Pappus and Menelaus configurations of points and lines. In the Middle Ages new and more complicated questions of this type were considered: What is the maximum number of spheres simultaneously touching a given sphere of the same radius (kissing number problem)?

What is the densest packing ot spheres ot equal size in space (Kepler conjecture)? Most of these questions involved ' rigid' geometrical shapes, such as lines or spheres. Projective, convex and discrete geometry are three sub-disciplines within present day geometry that deal with these and related questions.

Leonhard Euler, in studying problems like the Seven Bridges of Konigsberg, considered the most fundamental properties of geometric figures based solely on shape, independent of their metric properties.

Euler called this new branch of geometry geometria situs (geometry of place), but it is now known as topology. Topology grew out of geometry, but turned into a large independent discipline. It does not differentiate between objects that can be continuously deformed into each other. The objects may nevertheless retain some geometry, as in the case of hyperbolic knots. [edit]Geometry beyond Euclid Differential geometry uses tools fromcalculus to study problems in geometry.

For nearly two thousand years since Euclid, while the range of geometrical questions asked and answered inevitably expanded, basic understanding ofspace remained essentially the same. Immanuel Kant argued that there is only one, absolute, eometry, which is known to be true a priori by an inner faculty of mind: Euclidean geometry was synthetic a priori. [2] This dominant view was overturned by the revolutionary discovery of non-Euclidean geometry in the works of Gauss (who never published his theory), Bolyai, and Lobachevsky, who demonstrated that ordinary Euclidean space is only one possibility for development of geometry.

A broad vision of the subject of geometry was then expressed by Riemann in his inauguration lecture ? ber die Hypothesen, welche der Geometrie zu Grunde liegen (On the hypotheses on which geometry is based), published https://assignbuster.com/anthropometric-sizing-essay/ only after his eath. Riemann's new idea of space proved crucial in Einstein's general relativity theory and Riemannian geometry, which considers very general spaces in which the notion of length is defined, is a mainstay of modern geometry.

edit]Dimension Where the traditional geometry allowed dimensions 1 (a line), 2 (a plane) and 3 (our ambient world conceived of as three-dimensional space), mathematicians have used higher dimensions for nearly two centuries. Dimension has gone through stages of being any natural number n, possibly infinite with the introduction of Hilbert space, and any positive real number in fractal geometry. Dimension theory is a technical area, initially within general topology, that discusses definitions; in common with most mathematical ideas, dimension is now defined rather than an intuition.

Connected topological manifolds have a well-defined dimension; this is a theorem (invariance of domain) rather than anything a prior'.

The issue of dimension still matters to geometry, in the absence of complete answers to classic questions. Dimensions 3 of space and 4 of space-time are special cases in geometric topology. Dimension 10 or 11 is a key number in string theory. Exactly why is something to hich research may bring a satisfactory geometric answer. edit]Symmetry A tiling of the hyperbolic plane The theme of symmetry in geometry is nearly as old as the science of geometry itself.

The circle, regular polygons and platonic solids held deep significance for many ancient philosophers and were investigated in detail by the time ot Euclid Symmetric patterns occur in nature and were artistically rendered in a https://assignbuster.com/anthropometric-sizing-essay/ multitude of forms, including the bewildering graphics of M. C. Escher. Nonetheless, it was not until the second half of 19th century that the unifying role of symmetry in foundations of eometry had been recognized.

Felix Klein's Erlangen program proclaimed that, in a very precise sense, symmetry, expressed via the notion of a transformation group, determines what geometry is.

Symmetry in classical Euclidean geometry is represented by congruences and rigid motions, whereas in projective geometry an analogous role is played by collineations, geometric transformations that take straight lines into straight lines. However it was in the new geometries of Bolyai and Lobachevsky, Riemann, Clifford and Klein, and Sophus Lie that Klein's idea to ' define a geometry via itssymmetry group' proved most influential.

Both discrete and continuous symmetries play prominent role in geometry, the former in topology and geometric group theory, the latter in Lie theory and Riemannian geometry. A different type of symmetry is the principle of duality in for instance projective geometry (see Duality (projective geometry)). This is a meta-phenomenon which can roughly be described as: replace in any theorem point by plane and vice versa, Join by meet, lies-in by contains, and you will get an equally true theorem.

A similar and closely related form of duality appeares between a vector space and its ual space. edit]Modern geometry Modern geometry is the title of a popular textbook by Dubrovin, Novikov and Fomenko first published in 1979 (in Russian). At close to 1000 pages, the book has one major thread: geometric structures of various types on manifolds and their applications in https://assignbuster.com/anthropometric-sizing-essay/ contemporary theoretical physics. A quarter century after its publication, differential geometry, algebraic geometry, symplectic geometry and Lie theory presented in the book remain among the most visible areas of modern geometry, with multiple connections with other parts of mathematics and physics.