Schaum's outline of geometry 6th edition pdf

Dear Twitpic community - Thank you for all the wonderful photos you took over the years. We have now placed twitpic in a stored state. For more information click here. Wise store. Geometry study using a coordinate system This article is about coordinate geometry. For the study of analytical variety, see Algebraic geometry analytical geometry ÂÂ§â ,. Geometryprojecting a sphere to an outlinhistory branches euclido non euclidee elliptical hyperbolic spherical nonchimede geometry projective similar synthetic analytical algebraic arithmetic diophantine differential riemannian simpleptic discreet complex finished discreet / combinator digital convex computational fractal incidence conceptsfeaturesdimension row and construction compass from the top diagonal curve orthogonality (perpendicular) parallel vertex congruency resemblance symmetry zero-dimensional point one-dimensional segment line ray length two-dimensional airplane area polygon triangle altitude hypotenuse pythagoral parallelogram square rectangle rhomboid quadrilateral trapezoidal kite circle diameter circumference three-dimensional volume cube cube pyramid sphere cylinder four Ã, / other-dimensional Tesseract Hypersphere Surveyors by name Aida Aryabhata Ahmes Alhazen Apollonio Archimede Atiyah Baudha Yana Bolyai BrahmaguTa Cartan C Oxeter Cartesio Euler Gauss Gromov Hilbert JyeÃ¡â â â Ã¡Â¹hadeva KÃ¡â "Tya Yana KhayyÃƒÂ¡m Klein Loba evskij Manava Minkowski Mindgatatu Pascal Pitagora Parameshvara PoincarÃ © Riemann Sakabe Sijzi Al-Tusi Veblen Virasena Yang Hui Al-Yasamin Zhang List of Surveyors For Period AC Ahmes Baudhayana Manava Pitagora Euclide Archimede Apollonio 1ã, 1400. Zhang KÃ "Tya Yana Aryabhata Brahmaguy Virasena Alhazen Sijzi KhayyÃƒÂ¡m Al-Yasamin Al-Tusi Yang Hui Parameshvara 1400SÃ ¢ 1700 JyeÃ¡â Â £ Ã¡ôoShadeva Descales Pascal Mindgatu Euler Sakabe Aida 1700SÃ ¢ 1900 Gauss Lobachevskij Bolyai Riemann Klein PoincarÃƒ © Hilbert Minkowski Cartan Veblen Coxeter Day Present Atiyah Gromov Tev in Classical Mathematics, Analytical Geometry, also known how to coordinate geometry or Cartesian geometry is the study of geometry using a coordinate system. This contrasts with synthetic geometry. Analytical geometry is used in physics and engineering, and also in aeronautics, missile, spatial science and spatial flight. It is the foundation of the most modern fields of geometry, between algebraic, differential, discreet and computational geometry. Usually the Cartesian coordinate system is applied to manipulate equations for aircraft, straight lines and squares, often in two and sometimes three dimensions. Geometrically, the Euclidean Plan (two sizes) is studied and the Euclidean space (three dimensions). As taught in school books, analytical geometry can be explained more simply: it deals with defining and representing geometric shapes in a numeric way and the extraction of numerical information from the numerical forms and representations. That the algebra of real numbers can be used to produce results about the linear continuity of geometry is based on an axiom Cantora Dedekind. Ancient History Greece Mathematician Greek Menaecmo solved certain problems and theorems using a method that had a strong resemblance to the use of coordinates and is sometimes claimed that he had introduced analytical geometry. [1] PERGA APOLLONIO, in determined section, addressed problems in a way that can be called an analytical geometry of a dimension; With the question of finding points on a line that were in a relationship with others. [2] Apollonium in the conical further developed a method that is so similar to analytical geometry that the work of him is sometimes thought to have anticipated the work of Descartes for about 1800 years. Its application of reference lines, a diameter and a tangent is other than our modern use of a coordinate frame, where the distances measured along the diameter from the point of They are the abscissions and segments parallel to tangent and intercepted between the axis and the curve are the order. He further developed relationships between the Ascissas and the ordinate correspondents that are equivalent to the rhetorical curves equations. However, although Apollonio approached the development of analytical geometry, he has not succeeded in doing so since he did not take into account the negative magnitudes and in any case the coordinate system was superimposed on a specific curve a posteriori instead of a priori. That is, the equations were determined by curves, but the curves were not determined by the equations. The coordinates, variables and equations have been the subsidiary notions applied to a specific geometric situation. [3] Persia The Persian Mathematician of the 11th century Omar Khayyam saw a strong relationship between geometry and algebra and moved in the right direction when he helped close the gap between numerical and geometric algebra [4] with his geometric solution of the Cubic General Equations, [5] But the decisive step has arrived later with Descartes. [4] Omar Khayyam is accredited to identify the foundations of algebraic geometry and his book Treaty on the demonstrations of problems of Algebra (1070), which established the principles of analytical geometry, is part of the body of the Persian mathematics that at the end Ã It was transmitted to Europe. [6] Due to its accurate geometric approach to algebraic equations, Khayyam can be considered a precursor to Descartes in the invention of analytical geometry. [7]: Ã ¢ â,¬ Ã Å Å¡248Ã ¢ â,¬ å¡ Western Europe part of a series of © Descartes Philosoly Cartesianism Rationalism Fundamental Mechanism Mechanism and certainty Dream Topic Cogito, Ergo Summ Demon Demon Demon Topic Cause Principle Geometry Geometry Geometry Geometry Analian Geometry Coordinated System Cernesian Certicolo Â · FOLIUM RULEO The Signs Crescent Underwater PALONIST Theory Theory of Wax Theory Topic Res Cogitans Res Extensa Work The Speech of the World On The Method The GÃƒ Â Â omÃƒ Â © Trie Meditations On the first philosophy principles of philosophy passions of the soul People Christina, Queen of Sweden Baruch Spinoza Gottfried Wilhelm Leibniz Francine Descartes Vte Analytical Geometry was unnecessarily invented by RiÃƒ Â © Descartes and Pierre de Fermat, [8] [9] Although Descartes Sometimes the unique credit is given. [10] [11] Cartesian geometry, the alternative term used for analytical geometry, takes its name from Descartes. The Descartes made significant progress with the methods in an essay entitled the geometries (geometry), one of the three accompanying essays (appendages) published in 1637 with his speech on the method to correctly recite his reason and in search of truth in science , commonly referred to as the speech on the method. The geometries, written in its French native language, and its philosophical principles provided a foundation for calculating in Europe. Initially the work was not well received, due, partly, to the numerous gaps in the subjects and complicated equations. Only after the Latin translation and the addition of the comment from Van Schooten in 1649 (and more work from then on) The Descartes masterpiece received the recognition due. [12] Pierre de Fermat also pioneer the development of analytical geometry. Although not published in the lives of him, a manuscript form of announcements of locomored Planos et Solidos Isagoge (introduction to the Plan and Solid Loci) was circulating in Paris in 1637, just before the publication of the Descartes speech. [13] [14] [15] Clearly written and well received, the introduction also laid the basis of analytical geometry. The key difference between the Treatments of Fermat and Descartes is a matter of point of view: Fermat has always started with an algebraicequal equation and therefore The geometric curve that satisfied him, while the dictates started with geometric curves and produced their equations as one of the different properties of the curves. [12] As a result of this approach, Descartes had to face more complicated equations and had to develop develop Methods for working with polynomial upper degree equations. It was Leonhard Eulero who applied for the first time the coordinate method in a systematic study of curves and spatial surfaces. Coordinates Main article: Coordinate systems Illustration of a Cartesian coordinate plane. Four points are marked and labeled with their coordinates: (2.3) in green, (Ã ¢ '3.1) in red, (Ã ¢ 1.5, Ã ¢' 2.5) in blue, and the origin (0 , 0) in purple. In the analytical geometry, the plan is assigned a coordinate system, with which each point has a coordinate pair of the real number. Likewise, the Euclidean space is given coordinates in which each point has three coordinates. The value of the coordinates depends on the choice of the initial point of origin. There are a variety of coordinate systems used, but the most common are the following: [16] Cartesian coordinates (in a plan or space) Main article: Cartesian coordinate system The most common coordinate system to use is the system of Cartesian coordinates, where each the point has a coordinate X which represents its horizontal position and a co-coordinate Y which represents its vertical position. These are typically written as an ordered pair (X, Ã ¢ y). This system can also be used for three-dimensional geometry, where each point of the Euclidean space is represented by an orderly triple of coordinates (X, Ã ¢ y, Ã ¢ z). Polar coordinates (in an airplane) Main article: Polar coordinates in polar coordinates, every point of the plan is represented by its distance R from the origin and from its corner ÃžÂ,, with ÃžÂ¸ normally measured counterclockwise by Positive X axis. Using this notation, points are typically written as an ordered pair (R, ÃžÂ¸). You can transform back and forth between the coordinates from Cartesiane two-dimensional and polars using these formulas: x = r cos Ã¡â¸, y = r sin Ã¡ÃžÂ¸; r = x 2 + y 2, Ã®Â¸ = arctan Ã ¢ â¡ (y / x) {displaystyle x = r, so theta, y = r, si theta; , R = {sqrt {x ^ {2} + y ^ {2}}}, theta = arctan (y / x)}. This system can be generalized to three-dimensional space through the use of cylindrical or spherical coordinates. Cylindrical coordinates (in a space) Main article: Cylindrical coordinates in cylindrical coordinates, each space point is represented by its height Z, its radius R from the Z axis and from the corner ÃžÂ¸ its projection on the XY plane It does compared to the horizontal axis. Spherical coordinates (in a space) Main article: Spherical coordinate system in spherical coordinates, each point in the space is represented by its distance Ã¨ from the origin, the angle Ã®Â¸ its projection on the XY level makes it compared to 'Horizontal axis. And the corner Ã¨ â € which does compared to the Z axis. The names of the corners are often reversed in physics. [16] Equations and curves Main items: Set of solutions and locus (mathematics) in analytical geometry, any equation that involves the coordinates specifies a subset of the plan, ie the solution set for the equation or locus. For example, the equation y = Ã ¢ corresponds to the set of all points on the plane whose coordinate X and a y coordinate are the same. These points form a line, and yÃ ¢ = Ã, x is said to be the equation for this line. In general, linear equations involving X and Y specify lines, quadratic equations specify conical sections and more complicated equations describe more complicated figures. [17] Usually, a single equation corresponds to a curve on the floor. This is not always the case: the banal equation xÃ ¢ = Ã ¢ x specifies the entire plan and equation x2 + Ã ¢ y2 = Ã ¢ 0 specifies only the single point (0, 0). In three dimensions, a single equation usually provides a surface and a curve must be specified as an intersection of two surfaces (see below) or as a system of equations [18] The X2 + equation Ã ¢ y2Ã ¢ = Ã Ã ¢ y2Ã ¢ = Ã, R2 is the equation for any circle centered on the origin (0, 0) with a radius of r. Lines and planes Main items: Line (geometry) and airlines (geometry) in a Cartesian plan, or more generally, in the Affine coordinates, can be described described From linear equations. In two sizes, the equation for non-vertical lines is often administered in the shape of an intercepted slope: y = m x + b {displaystyle y = mx + b,} where: m is the slope or slope of the line. B is the intercept y of the line. X is the independent variable of the Y = F (X) function. In a similar way to streets in a two-dimensional space they are described using a point-slope module their equations, planes in a three-dimensional space have a natural description using a plane point and an orthogonal vector to it (normal vector) to indicate the his "inclination". Specifically, both r 0 {displaystyle mathbf {r} _ {0}} via the position vector of a certain point p 0 = (x 0, y 0, z 0) {p_ displaystyle {0} = (x_ { 0}, {0} y_, z_ {0})}, and both n = (a, b, c) {displaystyle mathbf {} n = (a, b, c)} is a different vector from zero. The plane determined by this point and carrier consisting of those Points P {DisplayStyle P}, with vector position R {DisplayStyle Mathbf {R}}, such that the vector traced by P 0 {p_ DisplayStyle {0}} For P {DisplayStyle P} is perpendicular n {displaystyle mathbf {n}}. Remembering that two carriers are perpendicular if and only if their scalar product is null, it follows that the desired plane can be described as the set of all points r {displaystyle mathbf {r}} that n Ã ¢ (r Ã ¢ r 0) = 0. {displaystyle mathbf {n} cdot (mathbf {r} -. mathbf {r} _ {0}) = 0} (the point here means that a scalar product , not scale multiplication.) Expanded this becomes a (x ¢ x 0) + B (y Ã ¢ y 0) + C (z Ã ¢ z 0) = 0, {displaystyle a (x-x_ {0}) + B (Y-Y_ {0}) + C (Z-Z_ {0}) = 0,} which is the normal point shape of the aircraft equation. [19] This is just a linear equation: a x + y b + c + d z = 0, ã, whereas d = a (x 0 + b + c y 0 z 0). {DisplayStyle AX + by + CZ + D = 0, {text {where}} D = -. (Ax_ {0} + by_ {0} + cz_ {0})} On the contrary, it is easily demonstrated that if a, b, ced are constant and, b, and ced are not all zero, then the graph of the ax + by equation + CZ + D = 0, {DisplayStyle AX + by + CZ + D = 0,} It is a plane having the carrier N = (A, B, C) {DisplayStyle Mathbf {N} = (A, B , c)} as normal. [20] This family equation for an airplane is called the general form of the plan equation. [21] In three dimensions, the lines cannot be described by a single linear equation, so they are often described by parametric equations: x = x 0 + a {displaystyle x = x_ {0} + a,} y = y 0 + bt {displaystyle y = y_ {0} + bt,} z = z 0 + ct {displaystyle z = z_ {0} + ct,} where: x, y, z are all the functions of the variable Independent T who goes beyond real numbers. (X0, Y0, Z0) is any point on the line. A, B, EC are correlated to the slope of the line, so that the carrier (A, B, C) is parallel to the line. Conical main article: conical in the Cartesian coordinate system, the graph of a quadratic equation in two variables is always a conical section how much it can be degenerate, and all the conical sections arise in this way. The equation will be of the X 2 + b shape x y + y 2 c + d x + y + and f = 0 Ã, served a, b, c Ã, not all zero. {Displaystyle ax ^ {2} + bxy + cy ^ {2} + dx + eye + f = 0 {text {with}} a, b, c {text {not all zero.}}} As Climbing all and six constants itself locus of Zeri, you can consider as conical points of the five-sized projective space p 5. {displaystyle mathbf {p} ^ {5}.} The conical sections described by this equation can be classified Using the discriminating [22] b 2 to 4 a c. {displaystyle b ^ {2} -4AC.} if the conical is not degenerate, then: if b 2 to 4 ac 0}, the equation represents a hyperbole; if we also have a + c = 0 {displaystyle a + c = 0}, the equation represents one one hyperbole. Quadrica Surfaces Main article: Quadrica Surface with quadrica, or quadric surface, is a 2-dimensional surface in the 3-dimensional space defined as the place of zeros of a quadratic polynomial. In coordinates x1, x2, x3, the general quadrar is defined by the algebraic equation [23] to i, j = 1 3 xi q ijxj + Ã ¢ i = 1 3 p ixi + r = 0. {displaystyle sum _ {i, j = 1} ^ {3} x_ {i} q_ {ij} x_ {j} + _ {i = 1} ^ {3} p_ {i} x_ {i} + r = 0. } Quadric surfaces include ellipsoids (including sphere), paraboloids, hyperbolooids, cylinders, cones, and aircraft. Distance and corner Main items: distance and angle The distance formula on the floor refers to the Pythagoras theorem. In analytical geometry, geometric notions such as distance and measuring angle are defined by formulas. These definitions are designed to be compatible with underlying Euclidea geometry. For example, using the Cartesian coordinates on the floor, the distance between two points (X1, Y1 Ã,) and (x2, y2 Ã,) is defined by the formula d = (x 2 Ã ¢ x 1) 2 + (y 2 Ã ¢ y 1) 2, {displaystyle d = {sqrt {(x_ {2} -x_ {1}) ^ {2} + (y_ {2} -Y_ {1}) ^ {2}}}, !}, which can be seen as a version of the Pythagoras theorem. Similarly, the angle that a line shape with the horizontal can be defined by the formula i = arctan Ã ¢ â¡ (m), {displaystyle theta = arctan (m),} where m is the slope of the line . In three dimensions, the distance is given by the generalization of the Pythagoras theorem: D = (x 2 Ã ¢ x 1) 2 + (y 2 y 1) 2 + (z 2 z 1) 2, {displaystyle d = { sqrt {(x_ {2} -x_ {1}) ^ {2} + (y_ {2} -Y_ {1}) ^ {2} + (z_ {2} {1 -z_}) {2} }},!}, while the angle between two carriers is given by the scalar product. The scalar product of two Euclidean vectors A and B is defined by [24] AAB = def aaaaba so â¡i, {displaystyle mathbf {a} cdot mathbf {b} {stackrel {mathrm {def }} {=}} | MATHBF {A} | , mathbf {b} Cos Theta} where I am Ã¸ is the angle between A and B. transformations a) y = f (x) = | X | Ã, Ã, Ã, Ã, Ã, b) y = f (x + 3) Ã, Ã, Ã, Ã, ã, c) y = f (x) -3 ã, Ã, Ã, ã, ã, d) y = 1/2 f (x) transformations are applied to a parent function to transform it into a new function with similar characteristics. The graph of r (x, y) {displaystyle r (x, y)} is changed by standard transformations as follows: change x {displaystyle x} for x Ã ¢ h {displaystyle xh} moves the right ah graph { DisplayStyle H} Unit. Changing y {displaystyle y} next to y k Ã ¢ {displaystyle y-k} Move the graph up k {DisplayStyle K} Unit. Changing X {DisplayStyle X} for X / B {DisplayStyle X / B} Stretches the graph horizontally of a factor B {DisplayStyle B}. (Think of X {DisplayStyle X} How to be dilated) Edit Y {DisplayStyle y} AY / A {y DisplayStyle / A} extends the graph vertically. Change x {displaystyle x} for x so a Â¡a + y sin a Â¡a {displaystyle x cos a + y sin a} and change y {displaystyle y} to an x pity Ã ¢ â¡ A + Y COS A Â¡A {DisplayStyle -X SEN A + Y COS A} Rotates the graph of a corner to {DisplayStyle A}. There are other principle transformations not typically studied in elementary analytical geometry because the transformations change the shape of objects in ways that are not usually considered. Inclination is an example of transformation not usually not considered. For more information, see the Wikipedia article on related transformations. For example, the parent function y = 1 / x {displaystyle y = 1 / x} has a horizontal and a vertical asymptote, and occupies the first and third quadrant, and all its transformed shapes have a horizontal and vertical asymptote, and It occupies both the 1st and 3rd or 2 Â ° and 4 Â ° quadrant. In general, if y = f (x) {displaystyle = f (x)}, then it can be transformed into y = af (b (x Ã ¢ k)) + h {displaystyle y = af (b (xk (xk)) + H}. In the new transformed function, a {DisplayStyle A} is the factor that you vertically the function if it is greater than 1 or vertically compresses the function if it is less than 1, and for a negative values {DisplayStyle A}, the function function Reflected in the X {DisplayStyle X} -Axis. The value B {DisplayStyle B} Compresses the graph of the function horizontally if greater than 1 and extends the function horizontally if less than 1, and as a {DisplayStyle A}, reflects the function in the Y {DisplayStyle y} - Axis when It's negative. The values K {DisplayStyle K} and H {DisplayStyle H} Introduce translations, H {DisplayStyle H}, vertical and k {DisplayStyle K} Horizontal. The positive values H {DisplayStyle H} and K {DisplayStyle K} Values means that the function is translated into the positive end of its axis and negative meaning with the translation towards negative end. The transformations can be applied to any geometric equation regardless of whether or not the equation represents a function. The transformations can be considered as individual transactions or in combinations. Suppose that R (X, Y) {DisplayStyle R (X, Y)} is a report in the X Y plane {DisplayStyle XY}. For example, x 2 + y 2 Ã ¢ '1 = 0 {displaystyle x ^ {2} + y ^ {2} -1 = 0} is the relationship that describes the circle of the unit. Find intersections of geometric objects Main article: Intersection (geometry) for two geometric objects P and Q represented by reports P (X, Y) {DisplayStyle P (X, Y)} EQ (X, Y) {DisplayStyle Q (X , y)} The intersection is the collection of all points (x, y) {displaystyle (x, y)} which are in both relationships. [25] For example, p {DisplayStyle P} It could be the circle with radius 1 and center (0, 0) {DisplayStyle (0.0)}: P = {(X, Y) | x 2 + y 2 = 1} {displaystyle p = {(x, y) | x ^ {2} + y ^ {2} = 1}} and q {displaystyle q} could be the circle with radius 1 and center (1, 0): q = {(x, y) | (x Ã, 1) 2 + y 2 = 1} {displaystyle (1.0): q = {(x, y) | (x-1) ^ {2} + y ^ {2} = 1}}. The intersection of these two circles is the collection of points that make the Equations true. The point (0, 0) {DisplayStyle (0.0)} make both equations True? Using (0, 0) {DisplayStyle (0.0)} for (x, y) {displaystyle (x, y)}, the equation for q {displaystyle q} becomes (0 ã, '1) 2 + 0 2 = 1 {DisplayStyle (0-1) ^ {2} + 0 ^ {2} = 1} or (Ã, '1) 2 = 1 {DisplayStyle (-1) ^ {2} = 1} Which is true, then (0, 0) {DisplayStyle (0.0)} is in the Q {DisplayStyle Q} report. On the other hand, still using (0, 0) {displaystyle (0.0)} for (x, y) {displaystyle (x, y)} the equation for p {displaystyle p} becomes 0 2 + 0 2 = 1 {DisplayStyle 0 ^ {2} + 0 ^ {2} = 1} or 0 = 1 {DisplayStyle 0 = 1} which is fake. (0, 0) {DisplayStyle (0.0)} is not in P {DisplayStyle P} so it is not in the intersection. The intersection of p {displaystyle p} eq {displaystyle q} can be found solving the simultaneous equations: x 2 + y 2 = 1 {displaystyle x ^ {2} + y ^ {2} = 1} (x Ã, '1) 2 + y 2 = 1. {displaystyle (x-1) ^ {2} + y ^ {2} = 1.} The traditional methods for searching for intersections include replacement and elimination. Replacement: resolve the first equation for y {displaystyle y} in terms of x {displaystyle x} and then replace the expression for y {displaystyle y} in the second equation: x 2 + y 2 = 1 {displaystyle x ^ {2} + y ^ {2} = 1} y 2 = 1 Ã, 'x 2 {displaystyle y ^ {2} = 1-x ^ {2}}. Then replace this value for y 2 {displaystyle y ^ {2}} in the other equation and proceed to resolve x {displaystyle x}: (x ã, '1) 2 + (1 ã,' x 2) = 1 {Displaystyle (x-1) ^ {2} + (1-x ^ {2}) = 1} x 2 ã, '2 x + 1 + 1 ã,' x 2 = 1 {displaystyle x ^ {2 } -2x + 1 + 1-x ^ {2} = 1}, '2 x = Ã,' 1 {displaystyle -2x = -1} x = 1 / 2. {displaystyle x = 1/2. } Subsequently, we set this value of x {displaystyle x} in equations and solve the original equations for y {displaystyle y}: (1/2) 2 + y 2 = 1 {displaystyle (1/2) ^ {2 } + y ^ {2} = 1} y 2 = 3/4 {displaystyle y ^ {2} = 3/4} y = Ã ± 3 2. {displaystyle y = {frac {pm {sqrt {3}}} {2}}.} So our It has two points: (1/2, + 3 2) and (1/2, ã, '3 2). {DisplayStyle (1/2, {frac {+ {sqrt {3}}}} {3}}} Over mathrm {and}; Over Left (1/2, {frac {- {sqrt {3}}} {2}}}}} {2}}).} Deleting: Add (or subtract) A multiple of equation to the other equation so that one of the variables is eliminated. For our current example, if we submit the first equation from the second we get (x ¢ 1) 2 to x 2 = 0 {displaystyle (x-1) {2} -x ^ {2} = 0}. Y 2 {y DisplayStyle ^ {2}} In the first equation it is subtracted from Y 2 {y DisplayStyle ^ {2}} in the second equation not leaving Y {DisplayStyle y} term. Variable Y {DisplayStyle y} has been deleted. We then resolve the remaining equation for x {displaystyle x}, in the same way as in the replacement method: x 2 to 2 x + 1 + 1 Ã ¢ x 2 = 1 {displaystyle x ^ {2} -2x + 1 + 1-x ^ {2} = 1} Ã ¢ 2 x = a 1 {displaystyle -2x = -1} x = 1 / 2. {DisplayStyle x = 1/2.} We then place this value of x {displaystyle x} in one of the two original equations and solve for y {displaystyle y}: (1/2) 2 + y 2 = 1 {displaystyle (1/2) ^ {2} + y ^ {2 } = 1} y 2 = 3/4 {displaystyle y ^ {2} = 3/4} y = Ã, Ã ± 3 2. {displaystyle y = {frac {pm {sqrt {3}} } {2}}.} So our intersection has two points: (1/2, + 3 2) and (1/2, ã, '3 2). {DisplayStyle Left (1/2, {frac {{+ sqrt {3}}} {2}} right); Over mathrm {and}; Over Left (1/2, {frac {- {sqrt {3}}} {2}} right)} for conical sections, 4 points could be under the intersection .. find intercepted main items: x - Intercept and intercepts a type of intersection that is widely studied is the intersection of a geometric object with the x {displaystyle x} and {y DisplayStyle y} coordinated axes. The intersection of a geometric object and y {DisplayStyle y} -Axis is called y {displaystyle y} intercept of the object. The intersection of a geometric object and the X {DisplayStyle X} -Axis is called X {DisplayStyle X} intercepting of the object. For the Y = MX + B line {DisplayStyle Y = MX + B}, parameter B {DisplayStyle B} Specifies the point where the line crosses y {DisplayStyle y} Axis. Depending on the context, both b {displaystyle b} or point (0, b) {displaystyle (0, b)} is called y {displaystyle y} intercepts. Bribes and normal bribes and planes main article: tangent geometry in, the tangent line (or simply tangent) to a flat curve at a given point is the straight line that "just touches" the curve at that point. Informal, it's a line through a pair of strict points infinitely on the curve. More specifically, a straight line is said that it is a tangent of a y = f (x) curve at a point x = c on the curve if the passing line for the point (c, f (c)) on the curve and has slope f '(C) where F' is the derivative of f. A similar definition applies to spatial curves and n-dimensional curves EUCLIDEO space. Which passes through the point where the tangent line and the curve meet, called the point of tangency, the tangent line is "going in the same direction" of the curve, and is therefore the best straight approximation of the curve at that point. Similarly, the tangent plane to a surface at a given point is the plan that "just touches" surface at that point. The concept of a tangent is one of the most fundamental concepts of differential geometry, it has been widely generalized; See Space Tangent. Normal line and vector Main article: Normal (geometry) in geometry, a normal is an object as a line or vector that is perpendicular to a given object. For example, in the two-dimensional case, the normal line to a curve at a given point is the perpendicular line to the tangent line to the curve at the point. In the three-dimensional case a normal surface, or simply normal, to a surface in a point P is a carrier that is perpendicular to the tangent plane to the surface that in P. The word "normal" is also used as an adjective: a normal line On a plane, the normal force component, the normal vector, etc. The concept of generalizes orthogonality normality. See also Product Cross axle rotation Of Axles Space Vector Notes ^ Boyer, Carl B. (1991). "The ages of Plato and Aristotle". At History of Mathematics (second ed.). John John & Sons, Inc. pp.ã, 94 Ã7 "95. ISBN 0-471-54397-7. Apparently these properties also derives these properties of conical sections and others too. Because this material has a strong resemblance to use Of the coordinates, as illustrated above, sometimes it was maintained that Menaechmus had analytical geometry. This judgment is justified only partly, because certainly Menaechmus was not aware that any equation in two unknown quantities determines a curve. In fact, the General concept of an equation in unknown quantities was the alien of Greek thought. It was deficiencies in the algebraic notations which, more than anything else, operated against the Greek achievement of a full coordinated geometry. ^ Boyer, Carl B. (1991) . "APOLLONIUS DI PERGA". A story of mathematics (second ed.). John Wiley & Sons, Inc. pp.ã, 142. IsbnÃ, 0-471-54397-7. The Apollonian Treaty on the determined section treated with what It could be called an analyt geometry ICA of a dimension. Given the following general problem, using the typical Greek algebraic analysis in geometric form: four points data A, B, C, D on a straight line, determine a fifth point P on it such that the rectangle on AP and CP is in A given the rectangle ratio on BP and DP. Here too the problem is easily reduced to the solution of a quadratic; And, as in other cases, Apollonio has dealt with the exhaustive question, including the limits of the possibility and the number of solutions. ^ Boyer, Carl B. (1991). "Pergaus apollonius". A history of mathematics (second ed.). John Wiley & Sons, Inc. pp.ã, 156. IsbnÃ, 0-471-54397-7. The Apollonius method in the conical many aspects is so similar to the modern approach that the work of him sometimes has judged an analytical geometry that anticipates that of Descartes within 1800 years. The application of the reference lines in general, and of a diameter and tangent to end in particular, is, of course, not essentially different from the use of a coordinate frame, both rectangular or more generally oblique. The distances measured along the diameter from the tangency point are the abscissions and segments parallel to the tangent and intercepted between the axis and the curve are the order. The Apollonian relationship between these Ascissas and the corresponding orders are nothing else than the rhetorical forms of the curves equations. However, Greek geometric algephric has not provided negative allergies; Furthermore, the coordinate system was in any case overlapping a posteriori on a particular curve to study its properties. It seems that there are no cases in the ancient geometry in which a coordinated reference framework has been established for graphic representation purposes of an equation or relationship, both symbolically or retorically expressed. Of Greek geometry we could say that the equations are determined by curves, but not that the curves are determined by the equations. The coordinates, variables and equations have been derived from a specific geometric situation; [...] that Apollonius, the biggest geometer of antichathery, has not succeeded in developing analytical geometry, was probably the result of a poverty of curves rather than thought. General methods are not necessary when problems always concern one of a limited number of particular cases. ^ A B Boyer (1991). "Arabian hegemony". A story of mathematics. Pp.- 241 - 242. Omar Khayyam (approx. 1050 "1123), the" tendrix "wrote a algebra that went beyond that of Al-Khwarizmi to include third-degree equations. Like its Arab predecessors, Omar Khayyam provided for quadratic equations to both arithmetic and geometric solutions; for general cubic equations, he believed (mistakenly, as he demonstrated the 16th century), arithmetic solutions were impossible; therefore he only gave geometric solutions. The diagram of use of intersecting conical Solving Cubids had previously been used by Menaechmus, Archimedes and Alhazan, but Omar Khayyam took the commendable step of generalization generalization Method to cover all cubic equations (having positive roots). For higher degree equations of the three, Omar Khayyam evidently has not imagined similar geometrical methods, © because the space does not contain more than three dimensions, ... one of the most fruitful contributions Arab eclecticism was a tendency to close the gap between digital Algebra and geometry. The decisive step in this direction has arrived much later Descartes, but Omar Khayyam was moving in this direction when he wrote: "Whoever thinks algebra is a trick in getting unknowns thought in vain. No attention should be It paid to the fact that algebra and geometry is different in appearance. the algebras are geometric facts which are proven. " ^ Glen M. Cooper (2003). "Omar Khayyam, mathematician", the Journal of the American Oriental Society 123. ^ Mathematical Masterpieces: Further Chronicles by explorers, p. 92 ^ Cooper, G. (2003). Journal of the American Oriental Society, 123 (1), 248-249. ^ Stillwell, John (2004). "Analytic geometry". Mathematics and its history (second ed.). Springer Science + Business Media Inc. P.00. ISBN. 0-387-95336-1. The two founders of analytic geometry, Fermat and Descartes, were both strongly influenced by these developments. ^ Boyer 2004 P. 74 ^ â â Cooke, Roger (1997). "The calculation." The history of mathematics: a short course. Wiley-Interscience. PP.Ã 326. ISBNÃ 0-471-18082-3. The person who is popularly credited with being the discoverer of analytic geometry was the philosopher RenÃ Â © Descartes (1596 "1650), one of the most influential thinkers of the modern era. ^ Boyer 2004, P. 82 ^ ab katz 1998 PG. 442 ^ Katz 1998 PG. 436 ^ Pierre de Fermat, Varia Opera Mathematica d. Petri de Fermat, Senatoris of Toulouse (Toulouse, France: Jean Pech, 1679), "Ad Locos Planos et sólidos Isagoge," PP.Ã 91 - 103. ^ "Eloge de Monsieur de Fermat" (in Praise of Mr. de Fermat), Le Journal des hollow out, February 9, 1665, PP.Ã 69 â ¬ 72. p. 70: "Introduction to UNE Aux Lieux , Plans & Solides; Here East A TraaitÃ Â © Analytique Project Solution Des probles Plans & Solides, Here Avoit EstÃ © Veu Devan M. Des Cartes EUT Dant Que Rien Sur Publia © Sujet EC. "(An Introduction to loci, plane and solid; that is an analytical Treaty concerning the solution of plane and solid problems, which has been seen before Mr. Des Cartes had published anything on this topic.) ^ AB Stewart, James (2008). Calculus: the first trascentals, 6 Â ° Ed., Brooks Cole Cengage Learning. ISBNÃ 978-0-495-01166-8 ^ Percey Franklyn Smith, Arthur Sullivan Gale (1905) Introduction to analytic geometry, Atheeneum Press ^ William H. 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