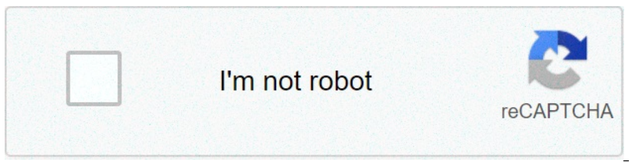

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Eccentricity conic sections pdf

Identify a conical in polar form. Graphics the polar equations of conicals. Define the conical in terms of focus and a directrix. Most of us know the orbital movement, such as the motion of a planet around the sun or an electron around an atomic nucleus. Within the planetary system, orbits of planets, asteroids and comets around a larger celestial body are often elliptical. Comets can instead assume a parabolic or hyperbolic orbit. And, in reality, the characteristics of planet orbits can vary over time. Each orbit is linked to the position of the celestial body that is orbited and to the distance and direction of the planet or other object from that body. As a result, we tend to use polar coordinates to represent these orbits. In an elliptical orbit, periapsis is the point where the two objects are closer, and the apoapsis is the point where they are farther away. Generally, the speed of the orbiting body tends to increase as it approaches the periapsis and decreases as it approaches the apoapsis. Some objects reach an escape rate, which results in an infinite orbit. These bodies expose a parabolic or hyperbolic orbit on a body; the orbiting body breaks without the gravitational force of the celestial body and turns out in space. Each of these orbits can be shaped by a conical section in the polar coordinate system. Any conical can be determined by three characteristics: a single focus, a fixed line calledand the ratio between the distances of each point on the chart. consider the parable \(x=2+y^2\) indicated in the figure \(\PageIndex{2}\). figure \(\PageIndex{2}\) previously we learned how a parable is defined by focus (a fixed point) and directrix (a fixed line). in this section, we will learn to define any conical in the polar coordinate system in terms of fixed point, focus \(P(r,\theta)\)\)\) to the pole, and a line, directrix, which is perpendicular to the polar axis. If (f) is a fixed point, focusing, and (d) is a fixed line, directrix, then we can leave (e) be a fixed positive number, called eccentricity, which we can define as the ratio of distances from one point on the graph on fire and the point on the chart at the directrix. then the set of all points (p) such that \(e=\dfrac{PF}{PD}\) is a conic. in other words, we can define a conical as a set of all points (p) with the property that the distance ratio from (p) to (f) at the distance from (p) to (d) is equal to the constant (e). for a conical with eccentricity (e), if \(0≤ 1\), the conical is a hyperbola with this definition, we can now define a conical in terms of directrix, \(x=\pm p),\ the eccentricity (e), and the Thus, each conical can be written as a polar equation, an equation written in terms of (r) and (theta). polar equation for a cone for a conea focus at the origin, if the directrix is \(x=\pm p),\ where (p) is a positive real number, and eccentricity is a positive real number (e), the conical has a polar equation \r=\dfrac{ep}{1\pm and \cos \theta} for a conical with a focus at the origin, if the directrix is \y= multiply the numberer and the denominator for the mutual of the constant in the denominator to rewrite the equation in standard form. identify eccentricity (e) as the coefficient of trigonometric function in the denominator. compare (e) with (1) to determine the shape of the conical. determine the straight as \(x=p\) if the cosine is in the denominator and \(y=p\) if the sine is in the denominator. set (ep) equal to the standard numberer to be solved by (x) or (y). example \(\PageIndex{1}\): identify a conic given the polar form for each of the following equations, identify the conical with attention to the origin, rectiera and eccentricity. solution for each of the three conicals, we will rewrite the equation in standard form. the standard form has a (1) as constant in the denominator. therefore, inthree parts, the first step will multiply the numberer and the denominator for the mutual of the original equation constant, (dfrac{1}{c), where (c) is the constant one. Multiply the numberer and the denominator (dfrac{1}{3). (R=\dfrac{6}{3+2\s in theta}{\dfrac{\left(\dfrac{1}{3}\right(\dfrac{1}\right)}=\dfrac{6\dfrac{1}\right(\right(\right)}{3\left(\dfrac{1}{3}{) Since \(sin theta) is in the denominator, the directrix is (y=p). By comparing the standard module, note that (e=\dfrac{2}{3}\). Therefore, from the numberer, \[begin{align}* 2&=ep\ 2&=\dfrac{2}{3}{3}p left(\dfrac{3}{2}{2}\right)2&=\left(\dfrac{3}{2}\dfrac{2}{2}{3}{3}{3}{3}{3}{3}{3}{3}{3}{3}{3}{3}{3}{3}p 3&=p=p 3&=p end{align}{align}{align}{align}{align}{3}{align}{\ Since the conical is an ellipse. The eccentricity is (e=\dfrac{2}{3) and the directrix is (y=3). Multiply the numberer and the denominator (dfrac{1}{4). > > >