Parametric Equations, Polar Coordinates, and Vector-Valued Functions

AP Calculus BC · Vocabulary in context

Word	Example
parametric equations /ˌpærəˈmetrɪk ɪˈkweɪʒnz/	In **parametric equations**, x and y are both written in terms of t. x y t
parameter /pəˈræmɪtə/	In $x = 2t$ and $y = t^2$, t is the **parameter**. $x = 2t$ $y = t^2$ t
second derivative /ˈsekənd dɪˈrɪvətɪv/	The **second derivative** tells us how the gradient changes.
concavity /kənˈkævɪti/	The second derivative tells you the **concavity**: which way the curve bends.
arc length /ɑːk leŋθ/	Measure the **arc length** along the curved edge.
speed /spiːd/	The bus moves at a **speed** of 15 m/s. 15 m/s
slope /sləʊp/	A steeper line has a larger **slope**.
vector-valued function /ˈvektə ˈvæljuːd ˈfʌŋkʃn/	A **vector-valued function** gives a position vector for each time t. t
position vector /pəˈzɪʃn ˈvektə/	The **position vector** of point A tells you where A is from the origin. A A
velocity /vəˈlɒsɪti/	The ball's **velocity** is 5 m/s to the left. 5 m/s
acceleration /əkˌselə'reɪʃn/	The car speeds up quickly, so its **acceleration** is large.
constant vector	A **constant vector** does not change with time.

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initial condition /ɪ'nɪʃl kən'dɪʃn/	The **initial condition** $y(0) = 5$ gives the starting value. $y(0) = 5$
displacement /dɪ'spleɪsmənt/	After walking 3 km east, your **displacement** is 3 km east. 3 km 3 km
distance traveled	The **distance traveled** is the integral of speed.
polar coordinates /'pəʊlə kəʊ'ɔ:dɪnəts/	Use **polar coordinates** to give position as distance and angle.
pole /pəʊl/	The **pole** is the centre point in polar coordinates.
Cartesian /kɑ:'ti:zɪən/	In **Cartesian** coordinates, a point is written (x, y). (x, y)
tangent slope	The **tangent slope** of a polar curve is dy/dx. dy/dx
sector /'sektə/	A **sector** is a slice of a circle, like a piece of pizza.
petal	Each **petal** of the rose curve starts and ends at the pole.
symmetry /'sɪmətri/	The rose curve has **symmetry**: each petal looks the same.
outer polar radius	The **outer polar radius** is the larger r in an area between two polar curves. r
inner polar radius	The **inner polar radius** is the smaller r in an area between two polar curves. r
intersection /ˌɪntə'sekʃn/	At the **intersection**, both graphs have the same point.
magnitude /'mægnɪtju:d/	The **magnitude** of a vector is its length.

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• **particle** /ˈpɑːtɪkl/	Modelling the ball as a **particle** means we ignore its size and any rotation.
rose curve	$r = \sin(3\theta)$ draws a **rose curve** with three petals. $r = \sin(3\theta)$

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