

4. Functions Involving Parameters, Vectors, and Matrices Starter Quiz · 课前小测

AP Precalculus

Name: _____ Score: _____

1. A **parametric function** describes a curve using...

- ☐ two equations $x(t)$ and $y(t)$ driven by a parameter t
- ☐ a single equation $y = f(x)$
- ☐ only an angle
- ☐ a matrix

2. When parametric functions model motion, the parameter t usually represents...

- ☐ time
- ☐ distance
- ☐ the slope
- ☐ the area

3. For a moving point, $\frac{dx}{dt}$ and $\frac{dy}{dt}$ are the...

- ☐ horizontal and vertical velocity components
- ☐ the total distance travelled
- ☐ the position coordinates
- ☐ the parameter values

4. Which **parametric equations** trace a circle of radius r centred at the origin?

- ☐ $x = r \cos t, y = r \sin t$
- ☐ $x = rt, y = rt$
- ☐ $x = t, y = r$
- ☐ $x = r + t, y = r - t$

5. An **implicitly defined** relationship is one where...

- ☐ x and y appear mixed together, not solved for y
- ☐ y is written alone as $y = f(x)$
- ☐ there is no y at all
- ☐ it uses a parameter t

6. For $\begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$, the determinant is $3 \cdot 2 - 1 \cdot 1$. What is it?

7. A parametric curve can trace a shape that is not a function of x (like a full circle).

- ☐ True ☐ False

8. A ball has $x = 3t$ and $y = 20t - 5t^2$. What is its height y at $t = 2$?

9. A point has $x = 3t$. What is its average horizontal rate of change $\Delta x / \Delta t$ over any interval?

10. A vector-valued function $\vec{r}(t) = \langle x(t), y(t) \rangle$ is closely related to a parametric function.

- ☐ True ☐ False

4. Functions Involving Parameters, Vectors, and Matrices Answers · 答案

AP Precalculus

1. **two equations $x(t)$ and $y(t)$ driven by a parameter t**

A **parametric function** gives x and y each as a function of a **parameter t** : the pair $(x(t), y(t))$ traces the curve.

2. **time**

In a **parametric function** modeling motion, t is time, and $(x(t), y(t))$ is the object's position then.

3. **horizontal and vertical velocity components**

The **rate of change** of each coordinate is a velocity component: dx/dt across, dy/dt up.

4. $x = r \cos t$, $y = r \sin t$

From the unit circle scaled by r : $x = r \cos t$ and $y = r \sin t$ trace the circle as t goes 0 to 2π .

5. x and y appear mixed together, not solved for y

An **implicitly defined** curve, like $x^2 + y^2 = 25$, mixes x and y without isolating y .

6. **5**

The **determinant** of $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is $ad - bc = 3 \cdot 2 - 1 \cdot 1 = 5$.

7. **True**

Because both coordinates depend on t , the path can loop or double back — it need not pass the vertical-line test.

8. **20**

$y = 20(2) - 5(2)^2 = 40 - 20 = 20$; and $x = 3(2) = 6$, so the ball is at $(6, 20)$.

9. **3**

Since $x = 3t$ is linear, $\Delta x / \Delta t = 3$ everywhere — a constant horizontal velocity.

10. **True**

They are two views of the same idea: the components $x(t), y(t)$ are exactly the parametric equations.