

Exercise walk-through

Parametric Functions Modeling Planar Motion ■ 4.2

eXercise

You must be able to

- read an object's **position** 位置 $(x(t), y(t))$ at time t
- find the **direction of motion** 运动方向 as t increases

Method — Planar motion

Parametric equations model a moving object's position at time t : $(x(t), y(t))$.
Increasing t traces the curve in the **direction of motion**.

Method — Example

$x = t, y = t^2$: at $t = 0$ the object is at $(0, 0)$; as t grows it moves right and up.

Practice 2.1 ■ 1 mark

State what $(x(t), y(t))$ represents in a motion problem.

Solution 2.1

Worked steps

the object's position in the plane at time t **B1**.

Practice 2.2 ■ 1 mark

State how you find the direction of motion.

Solution 2.2

Method: Planar motion

Worked steps

trace the curve in the direction of increasing t **B1**.

Practice 2.3 ■ 2 marks

For $x = t$, $y = 3t$, find the positions at $t = 0$ and $t = 1$.

Solution 2.3

Worked steps

$t = 0: (0, 0); t = 1: (1, 3)$ **B1** **B1**.

Exam-style 3.1 ■ 1 mark

Parametric equations of motion give an object's

- A** speed only
- B** position at each time
- C** mass
- D** energy

Solution 3.1

Method: Planar motion

A speed only

B position at each time



C mass

D energy

Worked steps

B.

Exam-style 3.2 ■ 1 mark

The direction of motion is found by

A increasing t

B decreasing x

C setting $t = 0$

D the amplitude

Solution 3.2

Method: Planar motion

A increasing t



B decreasing x

C setting $t = 0$

D the amplitude

Worked steps

A.

Exam-style 3.3 ■ 1 mark

An object has $x = t$, $y = 4 - t$.

- (a) State the position at $t = 0$.
- (b) State the position at $t = 4$.
- (c) Describe the horizontal motion.

Solution 3.3

Method: Planar motion

Worked steps

(a) $(0, 4)$ **B1**. (b) $(4, 0)$ **B1**. (c) it moves to the right, since $x = t$ increases with t **B1**.