

# 1.12 Confirming Continuity over an Interval

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 9 marks

**KEY WORDS** interval 区间 • continuous on an interval 在区间上连续 • exponential 指数  
• continuous 连续 • rational function 有理函数

## Objective

Build the skills to answer exam questions on **confirming continuity over an interval**.

**You must be able to:**

- state what it means for a function to be continuous on an **interval** 区间
- know where standard functions are continuous

## 1 Worked examples

Study these first. Each one shows the method for a question type used later.

### ■ Continuity over an interval

$f$  is continuous on an interval if it is continuous at **every** point in it.

- polynomials, exponentials, sin, cos are continuous **everywhere**;
- a rational function is continuous except where its denominator is 0.

### ■ Example

$f(x) = \frac{1}{x-3}$  is continuous everywhere except at  $x = 3$ .

## 2 Practice

**2.1** State what continuity over an interval means. [1]

**2.2** State where a polynomial is continuous. [1]

**2.3** State where a rational function may be discontinuous. [2]

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### 3 Exam-style questions

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**3.1** A function is continuous on an interval if it is continuous [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A** at one point  
**B** at every point of the interval  
**C** at the endpoints only  
**D** nowhere

**3.2** Polynomials are continuous [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A** nowhere  
**B** everywhere  
**C** only at 0  
**D** only for  $x > 0$

**3.3**  $f(x) = \frac{1}{x-3}$ .

- (a) Where is it discontinuous? [1]  
(b) Is it continuous on  $[0, 2]$ ? [1]  
(c) Is it continuous on  $[0, 4]$ ? [1]