

1.12 Confirming Continuity over an Interval

Name: _____ Class: _____ Date: _____

Total: 9 marks

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]

3 Exam-style questions

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

- **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** 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]

4 Go further

- work through the **1.12 Confirming Continuity over an Interval** lesson on the **Learn** page;
- read the **Limits and Continuity** section of the AP Calculus BC handout on the **Know** page.

Solutions

2.1 it is continuous at every point of the interval.

2.2 everywhere (for all real x).

2.3 where its denominator equals 0.

3.1 B.

3.2 B.

3.3 (a) $x = 3$. (b) yes (3 is not in $[0, 2]$). (c) no (3 is in $[0, 4]$).