AP CALCULUS BC • EXERCISE SHEET

5.5 The Candidates Test for Absolute Extrema

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **the Candidates Test for absolute extrema**.

You must be able to:

- find the **absolute (global) extrema** 绝对极值 on a closed interval

1 Worked examples

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

The Candidates Test

On a closed interval $[a, b]$, evaluate f at **all critical points and both endpoints**. The largest value is the absolute maximum; the smallest is the absolute minimum.

Example

$f(x) = x^2$ on $[-1, 3]$: critical point $x = 0$; candidates $f(-1) = 1$, $f(0) = 0$, $f(3) = 9$; absolute max 9, absolute min 0.

2 Practice

2.1 State what to evaluate for absolute extrema on $[a, b]$. [1]

2.2 For $f(x) = x^2$ on $[-1, 3]$, list the candidate inputs. [2]

2.3 State how to pick the absolute maximum. [1]

3 Exam-style questions

3.1 To find absolute extrema on $[a, b]$, evaluate f at [1]

- **A** only the endpoints
- **B** the critical points and endpoints
- **C** only the critical points
- **D** $x = 0$

3.2 The absolute maximum is the [1]

- **A** smallest candidate value
- **B** largest candidate value
- **C** midpoint
- **D** average

3.3 $f(x) = x^2$ on $[-1, 3]$.

(a) State the critical point. [1]

(b) Evaluate at the candidates $-1, 0, 3$. [1]

(c) State the absolute maximum. [1]

4 Go further

- work through the **5.5 Using the Candidates Test to Determine Absolute (Global) Extrema** lesson on the **Learn** page;
- read the **Analytical Applications of Differentiation** section of the AP Calculus BC handout on the **Know** page.

Solutions

2.1 f at all critical points and the two endpoints.

2.2 $x = -1$, $x = 0$, $x = 3$.

2.3 the largest of the candidate values.

3.1 **B**.

3.2 **B**.

3.3 (a) $x = 0$. (b) $f(-1) = 1$, $f(0) = 0$, $f(3) = 9$. (c) 9.