AP CALCULUS AB • EXERCISE SHEET

1.10 Exploring Types of Discontinuities

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

Objective

Build the skills to answer exam questions on **types of discontinuities**.

You must be able to:

- classify a **discontinuity** 不连续点 as removable, jump, or infinite

1 Worked examples

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

> ■ **Three types of discontinuity**
> - **removable** (a **hole**): the limit exists but $\neq f(a)$, or $f(a)$ is undefined;
> - **jump**: the left and right limits differ;
> - **infinite**: a vertical asymptote (the function blows up).

2 Practice

2.1 Name the three types of discontinuity. [1]

2.2 State which type is a ”hole”. [1]

2.3 State which type occurs at a vertical asymptote. [2]

3 Exam-style questions

3.1 A discontinuity where the left and right limits differ is a [1]

- **A** removable discontinuity
- **B** jump discontinuity
- **C** infinite discontinuity
- **D** point of continuity

3.2 A hole in a graph is a [1]

- **A** jump discontinuity
- **B** removable discontinuity
- **C** infinite discontinuity
- **D** point of continuity

3.3 Classify each.

(a) A vertical asymptote. [1]

(b) A single missing point. [1]

(c) A step where the graph jumps. [1]

4 Go further

- work through the **1.10 Exploring Types of Discontinuities** lesson on the **Learn** page;
- read the **Limits and Continuity** section of the AP Calculus AB handout on the **Know** page.

Solutions

2.1 removable, jump, and infinite.

2.2 removable.

2.3 infinite.

3.1 B.

3.2 B.

3.3 (a) infinite. (b) removable. (c) jump.