AP PRECALCULUS • EXERCISE SHEET

2.13 Exponential and Logarithmic Equations and Inequalities

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

KEY WORDS domain 定义域 • logarithm 对数 • base 底数 • root 方根

Objective

Build the skills to answer exam questions on **exponential and logarithmic equations and inequalities**.

You must be able to:

- solve $b^x = c$ by taking a **logarithm** 对数
- solve $\log_b(x) = c$ by rewriting in exponential form, and check the **domain** 定义域

1 Worked examples

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

■ **Solving**

- $b^x = c \Rightarrow x = \log_b c$;
- $\log_b(x) = c \Rightarrow x = b^c$.

Always check a log solution lies in the domain (the argument must be > 0).

■ **Example**

$\log_2(x) = 5 \Rightarrow x = 2^5 = 32$ (and $32 > 0$, so it is valid).

2 Practice

2.1 Solve $10^x = 1000$. [1]

2.2 Solve $\log_2(x) = 5$. [2]

2.3 State the domain restriction to check for a log equation. [1]

3 Exam-style questions

3.1 To solve $2^x = 20$, you take [1]

A	B
C	D

A log base 2 of both sides
B the square root
C the reciprocal
D nothing

3.2 The solution of $\log_3(x) = 2$ is [1]

A	B
C	D

A 6
B 8
C 9
D 5

3.3 Solve $\log_5(x) = 3$.

(a) Rewrite in exponential form. [1]

(b) Evaluate. [1]

(c) Confirm the domain is satisfied. [1]