

2.9 Logarithmic Expressions

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

KEY WORDS logarithmic 对数 • base 底数

Objective

Build the skills to answer exam questions on **logarithmic expressions**.

You must be able to:

- convert between **logarithmic** 对数 and exponential form
- evaluate simple logarithms

1 Worked examples

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

■ Logarithms

$\log_b(y) = x$ means exactly $b^x = y$. A logarithm answers the question “**what exponent?**”.

- $\log_{10}$ is the **common log**;
- $\ln$ is the **natural log** (base e).

■ Example

$\log_2(8) = 3$ because $2^3 = 8$.

2 Practice

2.1 Rewrite $\log_b(y) = x$ in exponential form. [1]

2.2 Evaluate $\log_2(8)$. [1]

2.3 Evaluate $\log_{10}(1000)$. [2]

3 Exam-style questions

3.1 $\log_b(y) = x$ is equivalent to [1]

- A $b^y = x$
- B $b^x = y$
- C $x^b = y$
- D $y^x = b$

3.2 $\log_3(9)$ equals [1]

- A 2
- B 3
- C 9
- D 27

3.3 Evaluate each.

(a) $\log_5(25)$. [1]

(b) $\log_{10}(100)$. [1]

(c) $\log_2(1)$. [1]

Solutions

2.1 $b^x = y$.

2.2 3.

2.3 $\log_{10}(1000) = 3$ since $10^3 = 1000$.

3.1 B.

3.2 A.

3.3 (a) 2. (b) 2. (c) 0.