AP PRECALCULUS • EXERCISE SHEET

2.10 Inverses of Exponential Functions

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

KEY WORDS logarithm 对数 • exponential function 指数函数 • root 方根

Objective

Build the skills to answer exam questions on **inverses of exponential functions**.

You must be able to:

- use that the inverse of b^x is $\log_b(x)$
- solve an exponential equation by taking a logarithm

1 Worked examples

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

■ **Log inverts exponent**

The inverse of $f(x) = b^x$ is $f^{-1}(x) = \log_b(x)$. To solve $b^x = y$, take $\log_b$ of both sides: $x = \log_b(y)$.

■ **Example**

$2^x = 16 \Rightarrow x = \log_2(16) = 4$.

2 Practice

2.1 State the inverse of $f(x) = 10^x$. [1]

2.2 Solve $3^x = 81$. [2]

2.3 State the inverse of e^x. [1]

3 Exam-style questions

3.1 The inverse of $f(x) = b^x$ is [1]

A B C D

A b^{-x}
B $\log_b(x)$
C $1/b^x$
D x^b

3.2 To solve $5^x = 125$, take [1]

A B C D

A $\log_5$ of both sides
B the square root
C the reciprocal
D the derivative

3.3 Solve $2^x = 32$.

(a) Rewrite 32 as a power of 2. [1]

(b) Equate the exponents. [1]

(c) State x. [1]