Exercise walk-through

Exponential Functions ▪ 2.3

eXercise

You must be able to

- read the **initial value** 初始值 a and **base** 底数 b from $f(x) = a \cdot b^x$
- decide whether the function models **growth** 增长 or **decay** 衰减

Method — Exponential form

$f(x) = a \cdot b^x$ with base $b > 0$, $b \neq 1$.

- a is the **initial value** — the output at $x = 0$;
- $b > 1$ gives **growth**; $0 < b < 1$ gives **decay**.

Method — Example

$f(x) = 3 \cdot 2^x$: $f(0) = 3$, $f(2) = 3 \cdot 4 = 12$; growth since $b = 2 > 1$.

Practice 2.1 ▪ 1 mark

In $f(x) = a \cdot b^x$, state what a represents.

Solution 2.1

Worked steps

the initial value (the output at $x = 0$) B1.

Practice 2.2 ▪ 1 mark

State the condition on b for growth.

Solution 2.2

Worked steps

$b > 1$ B1.

Practice 2.3 ▪ 2 marks

For $f(x) = 3 \cdot 2^x$, find $f(0)$ and $f(2)$.

Solution 2.3

Worked steps

$f(0) = 3;\ f(2) = 3 \cdot 2^2 = 12$ B1 B1.

Exam-style 3.1 ▪ 1 mark

In $f(x) = a \cdot b^x$, the value a is the

A base

B initial value

C exponent

D asymptote

Solution 3.1

A base

B initial value ✓

C exponent

D asymptote

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

The function $f(x) = 5 \cdot (0.5)^x$ represents

A growth

B decay

C linear change

D a constant

Solution 3.2

A growth

B decay ✓

C linear change

D a constant

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

$f(x) = 4 \cdot 3^x$.
(a) State $f(0)$.
(b) State $f(1)$.
(c) Is it growth or decay?

Solution 3.3

Method: Exponential form

Worked steps

(a) 4 B1. (b) 12 B1. (c) growth B1.