

Exercise walk-through

Change in Linear and Exponential Functions ■ 2.2

eXercise

You must be able to

- describe how a **linear function** 线性函数 changes over equal intervals
- describe how an **exponential function** 指数函数 changes over equal intervals

Method — Linear vs exponential

- a **linear** function changes by equal **differences** over equal intervals (it **adds** a constant);
- an **exponential** function changes by equal **ratios** over equal intervals (it **multiplies** by a constant).

Linear change matches an arithmetic sequence; exponential change matches a geometric sequence.

Method — Spotting the pattern in a table

x	0	1	2	3
A	3	5	7	9
B	3	6	12	24

A **adds** 2 each step, so it is **linear**; B **multiplies** by 2 each step, so it is **exponential**.
Test which stays constant: the difference (linear) or the ratio (exponential).

Practice 2.1 ■ 1 mark

State how a linear function changes over equal intervals.

Solution 2.1

Method: Linear vs exponential

Worked steps

by equal differences (it adds a constant amount) **B1**.

Practice 2.2 ■ 1 mark

State how an exponential function changes over equal intervals.

Solution 2.2

Method: Linear vs exponential

Worked steps

by equal ratios (it multiplies by a constant factor) **B1**.

Practice 2.3 ■ 1 mark

A function multiplies by 3 each step. Is it linear or exponential?

Solution 2.3

Worked steps

exponential **B1**.

Exam-style 3.1 ■ 1 mark

A function that adds a constant each unit is

A exponential

B linear

C quadratic

D rational

Solution 3.1

Method: Linear vs exponential

A exponential

B linear



C quadratic

D rational

Worked steps

B.

Exam-style 3.2 ■ 1 mark

A function that multiplies by a constant each unit is

- A** linear
- B** exponential
- C** constant
- D** polynomial

Solution 3.2

Method: Linear vs exponential

- A linear
- B exponential**
- C constant
- D polynomial



Worked steps

B.

Exam-style 3.3 ■ 1 mark

The values 4, 12, 36, 108, ... are recorded at equal intervals.

- (a) Is the change by equal difference or equal ratio?
- (b) State the constant.
- (c) State the model type.

Solution 3.3

Method: Linear vs exponential

Worked steps

(a) equal ratio **B1**. (b) 3 **B1**. (c) exponential **B1**.