

# 1.13 Function Model Selection and Assumption Articulation

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 8 marks

**KEY WORDS** function model 函数模型 • assumptions 假设 • limitations 局限性 • extrapolation 外推  
• function 函数

## Objective

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Build the skills to answer exam questions on **function model selection and assumption articulation**.

**You must be able to:**

- select an appropriate **function model** 函数模型 (linear, quadratic, polynomial, rational) from how a quantity changes
- articulate the **assumptions** 假设 and **limitations** 局限性 of a model

## 1 Worked examples

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

### ■ Choosing a model

- **constant** rate of change → linear;
- constant **second difference** → quadratic;
- several turning points → higher-degree polynomial;
- a horizontal asymptote → rational.

### ■ Assumptions and limitations

State the **domain** over which the model is valid, and note that predictions far outside the data (**extrapolation** 外推) may be invalid.

## 2 Practice

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**2.1** State the type of function that has a constant rate of change. [1]

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**2.2** State the type of function whose graph can have a horizontal asymptote. [1]

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**2.3** A data set has a constant second difference. State the best model type. [1]

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### 3 Exam-style questions

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**3.1** A quantity changes at a constant rate. The best model is [1]

- **A** linear
  - **B** exponential
  - **C** rational
  - **D** constant
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**3.2** A model built from data should state its [1]

- **A** colour
  - **B** domain of validity and assumptions
  - **C** author
  - **D** title
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**3.3** A population is recorded each year for 5 years, and the yearly increases are equal.

(a) State the best model type. [1]

(b) State one assumption in using it to predict year 20. [1]

(c) State one limitation. [1]

## Solutions

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**2.1** a linear function.

**2.2** a rational function.

**2.3** quadratic.

**3.1** A.

**3.2** B.

**3.3** (a) linear. (b) that the constant yearly increase continues unchanged. (c) extrapolating far beyond the 5 years of data may be unreliable.