

## 2.4 Population Dynamics

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

**Total: 10 marks**

**KEY WORDS** rate of natural increase 自然增长率 • doubling time 倍增时间  
• total fertility rate 总和生育率 • migration 迁移 • infant mortality rate 婴儿死亡率

### Objective

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Build the skills to answer exam questions on **population dynamics** 人口动态 — birth, death, and growth rates.

**You must be able to:**

- define **crude birth rate** 粗出生率 (CBR), **crude death rate** 粗死亡率 (CDR), and **rate of natural increase** 自然增长率 (RNI)
- define **total fertility rate** 总和生育率 (TFR) and **infant mortality rate** 婴儿死亡率 (IMR)
- calculate RNI from CBR and CDR
- explain **doubling time** 倍增时间

### 1 Worked examples

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

#### ■ Key rates

**CBR** = births per 1,000 people per year. **CDR** = deaths per 1,000. **RNI** =  $(\text{CBR} - \text{CDR}) \div 10$ , as a percent (migration excluded).

#### ■ TFR and IMR

**TFR** = average children per woman; a TFR near **2.1** is replacement level. **IMR** = deaths under age 1 per 1,000 live births — a strong indicator of development.

#### ■ Doubling time

**Doubling time**  $\approx 70 \div \text{RNI (in \%)}$ . An RNI of 2% doubles a population in about 35 years.

## 2 Practice

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**2.1** Define the rate of natural increase. [2]

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**2.2** A country has a CBR of 30 and a CDR of 10. Calculate its RNI. [2]

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**2.3** Country Y has a TFR of 1.6.

(a) State whether this is above or below replacement level. [1]

(b) Predict what happens to the population size over time, ignoring migration. [1]

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## 3 Exam-style questions

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**3.1** Replacement-level fertility is a total fertility rate of about [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A** 0.5  
**B** 1.0  
**C** 2.1  
**D** 4.0

**3.2** With an RNI of 2% per year, the population doubles in roughly [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A** 7 years  
**B** 35 years  
**C** 70 years  
**D** 140 years

**3.3** A country's infant mortality rate falls sharply over 20 years.

(a) State what IMR measures. [1]

(b) Explain what the fall suggests about development. [1]

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