



F06-test Crude Rate and Rates of Change: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Write down the formula for the crude birth rate of a population.

(Total for Question 1 is 1 mark)

- 2** A crude rate compares the number of events, such as births or deaths, with the size of a population. The crude birth rate formula is:

Crude birth rate = (number of live births / total population) x 1000

This gives the number of births per 1000 people in the population.

- (a) In the formula above, what does multiplying by 1000 tell you the crude birth rate is measured per? (1)
- (b) The town of Ashdene had 240 live births in 2025. The population of Ashdene is 20,000. Calculate the crude birth rate for Ashdene in 2025. (2)

(Total for Question 2 is 3 marks)

- 3** The crude death rate in a region is 7 per 1000. The region has a population of 50,000. Work out the expected number of deaths in a year.

(Total for Question 3 is 2 marks)

4 A council wants to investigate how the crude birth rate in the Rivermead region has changed over 10 years, and how it compares with the national rate for Bregland.

(a) (Plan) State the two pieces of data the council needs to collect in order to calculate the Rivermead region's crude birth rate for a given year. **(1)**

(b) (Collect) Give one suitable source the council could use to obtain reliable data on births and population. **(1)**

(c) (Process) The council collects the following data. In 2015, Rivermead had a population of 210,000 and 2,520 live births. In 2025, Rivermead had a population of 225,000 and 2,925 live births. Calculate the crude birth rate for Rivermead in 2015 and in 2025. **(2)**

(d) (Interpret) The national crude birth rate for Bregland in 2025 was 11 per 1000. Interpret the change in Rivermead's crude birth rate from 2015 to 2025, and compare Rivermead's 2025 rate with the national rate. **(2)**

(Total for Question 4 is 6 marks)

5 The crude birth rate in Northtown is 13 per 1000. Southtown has half the population of Northtown but the same crude birth rate. Northtown has a population of 42,000. Work out the number of births expected in Southtown in a year.

(Total for Question 5 is 2 marks)

6 The national crude death rate is 9 per 1000. Seaford District has a population of 60,000.

- (a) Use the national crude death rate to calculate the number of deaths expected in Seaford District in a year. (2)

- (b) The actual number of deaths recorded in Seaford District that year was 690. Work out how many more deaths occurred than expected. (2)

- (c) Seaford District has a much older population than the national average (it contains several large retirement communities). Explain why this could account for the higher-than-expected number of deaths, and suggest what kind of rate might give a fairer comparison between districts with different age structures. (2)

(Total for Question 6 is 6 marks)

7 The national crude birth rate for the country of Wexland is 12 per 1000 population. Fairview Student Halls has a population of 4,500. Almost all residents at Fairview are university students aged 18 to 22.

- (a) Use the national crude birth rate to estimate the number of births expected at Fairview Student Halls in a year. (2)

- (b) Evaluate whether this estimate is likely to be realistic for Fairview Student Halls. (2)

(Total for Question 7 is 4 marks)

Mark scheme · F06-test Crude Rate and Rates of Change: Test Pack

Question 1

- **B1** (number of live births / total population) x 1000, oe
- **Answer: Crude birth rate = (number of live births / total population) x 1000**

Question 2

- (a) **B1** per 1000 people (of the population), oe
- (a) **Answer: Per 1000 people in the population.**
- (b) **M1** 240 / 20000 (= 0.012), oe
- (b) **A1** 12 (per 1000) cao
- (b) **Answer: 12 per 1000**

Question 3

- **M1** (50000 / 1000) x 7, oe
- **A1** 350 cao
- **Answer: 350 deaths**

Question 4

- (a) **B1** the number of live births in the region that year, and the total population of the region that year, oe
- (a) **Answer: The number of live births in Rivermead that year, and the total population of Rivermead that year.**
- (b) **B1** any valid source, e.g. official birth registration records, or population data from a national statistics agency/census, oe
- (b) **Answer: Official birth registration records, or population figures published by a national statistics agency.**
- (c) **B1** 2015 rate = 12 (per 1000) cao
- (c) **B1** 2025 rate = 13 (per 1000) cao
- (c) **Answer: 2015: 12 per 1000; 2025: 13 per 1000**
- (d) **B1** Rivermead's crude birth rate has risen slightly, from 12 to 13 per 1000, between 2015 and 2025
- (d) **B1** by 2025, Rivermead's rate (13) is higher than the national rate (11), so Rivermead has relatively more births than the country as a whole, oe
- (d) **Answer: Rivermead's crude birth rate rose slightly from 12 to 13 per 1000 between 2015 and 2025, and by 2025 it was higher than the national rate of 11 per 1000, showing Rivermead has proportionally more births than Bregland as a whole.**

Question 5

- **M1** Southtown population = 42000 / 2 = 21000, then (21000 / 1000) x 13, oe
- **A1** 273 cao
- **Answer: 273 births**

Question 6

- (a) **M1** $(60000 / 1000) \times 9$, oe
- (a) **A1** 540 cao
- **(a) Answer: 540 deaths (expected)**
- (b) **M1** $690 - 540$, oe
- (b) **A1** 150 cao
- **(b) Answer: 150 more deaths than expected**
- (c) **B1** an older population naturally has a higher death rate, so Seaford's age structure, not necessarily poor health/care, could explain the extra deaths, oe
- (c) **B1** suggests a rate that adjusts/standardises for age structure (an age-standardised rate) would allow a fairer comparison than the crude rate, oe
- **(c) Answer: Older populations naturally have higher death rates, so Seaford's higher-than-expected total could simply reflect its older age structure rather than poorer health outcomes. An age-standardised rate, which adjusts for age structure, would give a fairer comparison between districts than the crude rate.**

Question 7

- (a) **M1** $(4500 / 1000) \times 12$, oe
- (a) **A1** 54 cao
- **(a) Answer: 54 births**
- (b) **B1** identifies that the estimate is not likely to be realistic/reliable
- (b) **B1** explains that residents are almost all young students, unlikely to reflect the national age structure, so the true number of births is likely to be far lower than 54, oe
- **(b) Answer: Not realistic: Fairview's residents are almost all young students, so the true number of births is likely to be much lower than the estimate of 54, since the national rate assumes a typical age structure.**