Standardised death rates

Grade 7 | Worked solutions

GCSE Statistics topic practice

1 The table shows the crude death rate, per 1000, for each age group in the village of Ashby in one year. It also shows the standard population.

Age group (years)	Crude death rate (per 1000)	Standard population
0 to 24	2	300
25 to 64	5	500
65 and over	40	200

Calculate the standardised death rate for Ashby. (3 marks)

standardised rate = $\frac{\text{crude rate}}{1000} \times$ standard population

$\frac{2}{1000} \times 300 = 0.6$

$\frac{5}{1000} \times 500 = 2.5$

$\frac{40}{1000} \times 200 = 8$

Add the three standardised rates

$0.6 + 2.5 + 8 = 11.1$

11.1 deaths per 1000

2 The table shows the population of a region, split into three age groups.

Age group (years)	Population of the region
0 to 19	1 200 000
20 to 59	2 600 000
60 and over	1 200 000
Total	5 000 000

a. Work out the standard population for each age group. (2)

b. In one town in the region, the crude death rate for the 60 and over age group is 35 per 1000. Work out the standardised death rate for this age group in the town. (2)

(4 marks)

a) standard population = $\frac{\text{group population}}{\text{total population}} \times 1000$

$\frac{1200000}{5000000} \times 1000 = 240$

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$\frac{2600000}{5000000} \times 1000 = 520$

$\frac{1200000}{5000000} \times 1000 = 240$

b) standardised rate = $\frac{\text{crude rate}}{1000} \times$ standard population

$\frac{35}{1000} \times 240 = 8.4$

8.4 deaths per 1000

a) 240, 520, 240 b) 8.4 per 1000

3 The table shows the population and the number of deaths in one year for the town of Harwick, split into three age groups. It also shows the standard population.

Age group (years)	Population	Deaths	Standard population
0 to 39	12 000	18	500
40 to 69	8000	56	350
70 and over	5000	240	150
Total	25 000	314	1000

a. Calculate the standardised death rate for Harwick. (4)

b. Explain why the standardised death rate, rather than the crude death rate, should be used to compare Harwick with another town. (1)

(5 marks)

a) crude rate = $\frac{\text{deaths}}{\text{population}} \times 1000$ for each age group

$\frac{18}{12000} \times 1000 = 1.5$

$\frac{56}{8000} \times 1000 = 7$

$\frac{240}{5000} \times 1000 = 48$

standardised rate = $\frac{\text{crude rate}}{1000} \times$ standard population

$\frac{1.5}{1000} \times 500 = 0.75$

$\frac{7}{1000} \times 350 = 2.45$

$\frac{48}{1000} \times 150 = 7.2$

Add the three standardised rates

$0.75 + 2.45 + 7.2 = 10.4$

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10.4 deaths per 1000

b)

The two towns may have different age structures

A town with more older people has more deaths

The standardised rate allows for this

a) 10.4 per 1000 b) allows for different age structures

4 The table shows the crude death rate and the standardised death rate, per 1000, for two towns in the same year.

Town	Crude death rate	Standardised death rate
Marlow Bay	14.2	9.1
Denton	8.5	10.3

a. Marlow Bay is a seaside town where many people go to live when they retire. Explain why Marlow Bay's crude death rate is higher than Denton's. (2)

b. Once age has been taken into account, which town has the lower death rate? Give a reason for your answer. (1)

c. The population of Denton is 60 000. Work out the number of deaths in Denton in that year. (2)

(5 marks)

a)

Marlow Bay has a higher proportion of older people

Older people are more likely to die

so its crude death rate is higher

b)

Marlow Bay

Its standardised death rate is lower (9.1 < 10.3)

c) $\text{crude death rate} = \frac{\text{deaths}}{\text{population}} \times 1000$

$$8.5 = \frac{\text{deaths}}{60000} \times 1000$$

$$\text{deaths} = \frac{8.5 \times 60000}{1000}$$

$$\text{deaths} = 510$$

a) more older people b) Marlow Bay c) 510

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5 The table shows information about the population and the number of deaths in the town of Oakfield in one year. The number of deaths in the 65 and over age group is missing.

Age group (years)	Population	Deaths	Standard population
0 to 34	10 000	10	450
35 to 64	8000	40	400
65 and over	4000		150

The standardised death rate for Oakfield is 9.2 per 1000.

Work out the number of deaths in the 65 and over age group.

(5 marks)

Crude death rates for the two younger groups

$$\frac{10}{10000} \times 1000 = 1$$

$$\frac{40}{8000} \times 1000 = 5$$

Their standardised rates

$$\frac{1}{1000} \times 450 = 0.45$$

$$\frac{5}{1000} \times 400 = 2$$

Standardised rate for 65 and over

$$9.2 - 0.45 - 2 = 6.75$$

Work back to its crude rate

$$\frac{\text{crude rate}}{1000} \times 150 = 6.75$$

$$\text{crude rate} = \frac{6.75 \times 1000}{150}$$

$$\text{crude rate} = 45$$

Work back to the number of deaths

$$\text{deaths} = \frac{45 \times 4000}{1000}$$

$$\text{deaths} = 180$$

180 deaths

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