



Measures of Central Tendency



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TOPIC



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ANSWERS

- 1 A school gives all 120 Year 7 students and all 130 Year 8 students the same maths test.

The maths department wishes to compare the test scores of students in Year 7 ($x\%$) with the test scores of students in Year 8 ($y\%$).

$$\sum x = 8160$$

$$\sum y = 8190$$

- (a) By calculating the mean test score for each year group, compare the test scores of students in Year 7 with those in Year 8. (2)

It is found that some of the Year 7 students cheated in the test and each had scored 100%

- (b) (i) Suggest another measure of central tendency that the maths department could use to compare the test scores in this case. (1)

- (ii) Explain why the measure you have suggested would be more suitable than the mean. (1)

The school also tests Year 9 students.

The following table summarises the test scores, $T\%$, for all of the Year 9 students.

Test Score, $T\%$	$0 \leq T < 20$	$20 \leq T < 40$	$40 \leq T < 60$	$60 \leq T < 80$	$80 \leq T < 100$
Number of students, f	1	17	52	66	44

- (c) Work out an estimate for the mean test score for Year 9 students. (2)

(Total for Question 1 is 6 marks)



- 2 The following table summarises heights, y cm to the nearest centimetre, of the female athletes at an athletics club.

Height (y cm)	$160 \leq y < 170$	$170 \leq y < 180$	$180 \leq y < 190$	$190 \leq y < 200$
Number of athletes (f)	3	7	7	8

- (a) State the modal class for the heights of the female athletes. (1)
- (b) Work out the class interval containing the median female height. (1)
- (c) Work out an estimate for the mean height of the female athletes. (2)

For the heights, x cm to the nearest centimetre, of the male athletes at the club

$$\sum x = 6615 \quad n = 35$$

- (d) Use this data, and your answer to part (c) to estimate the mean height of all of the male and female athletes at the athletics club. (2)

(Total for Question 2 is 6 marks)

- 3 The following tables summarises the annual salaries, £ S to the nearest pound, of staff at a multi-academy trust.

Annual Salary (£ S)	Frequency (f)
$30,000 \leq S < 50,000$	84
$50,000 \leq S < 70,000$	18
$70,000 \leq S < 90,000$	9
$90,000 \leq S < 110,000$	3
$110,000 \leq S < 200,000$	1

- (a) Work out the class interval containing the median annual salary. (1)
- (b) Work out an estimate, to the nearest pound, for the mean annual salary of the staff. (1)
- (c) Explain why your answer to part (b) is an estimate. (1)

It is found that the CEO of the multi-academy trust has an annual salary of £195,000 (yes really)

- (d) Explain what effect, if any, will this information have on
- (i) your answer to part (a)
- (ii) your answer to part (b) (2)

(Total for Question 3 is 5 marks)



- 4 On Monday 12 students were late to school.
The number of minutes late L , to the nearest minute, of the first 8 students are shown below.

Student	A	B	C	D	E	F	G	H
Lateness (L minutes)	1	2	3	3	4	6	8	9

- (a) State the modal number of minutes late for the first 8 students. (1)
- (b) Work out the median number of minutes late for the first 8 students. (1)
- (c) Work out the mean number of minutes late for the first 8 students. (1)

Any student who is 10 or more minutes late receives a detention.
On Monday 4 students received a detention for being late.

- The mean number of minutes late for all 12 students on Monday was 10.5 minutes.
(d) Work out the mean of minutes late for the 4 students who received a detention on Monday. (2)

(Total for Question 4 is 5 marks)

- 5 The table below summarises the number of fillings of 20 patients randomly sampled at a dentist.

Number of Fillings	0	1	2	3	4	5	6
Frequency (f)	7	4	3	3	0	2	1

- (a) State the modal number of fillings. (1)
- (b) Work out the median number of fillings. (1)
- (c) Work out the mean number of fillings. (2)

Another patient is added to the sample. They have 2 fillings.

- (d) Explain what affect, if any, this will have on
- (i) your answer to part (a)
- (ii) your answer to part (b)
- (iii) your answer to part (c) (3)

(Total for Question 5 is 7 marks)



- 6 Mark's internet provider claims that the average internet speed that he will receive will be at least 100 Mbps.

Mark tests his internet speed S , to the nearest Mbps, at 12 different times during the day. The table below summarises the results.

Internet Speed (S Mbps)	90-99	100-109	110-119	120-129
Frequency (f)	4	6	1	1

- (a) Work out an estimate of the mean internet speed.
Give your answer to 4 significant figures. (2)
- (b) Explain why your answer to part (a) is only an estimate. (1)
- (c) Does your answer to part (a) support the claim made by the internet provider? (1)
- Mark works out the exact value for the mean using his recorded values.
- (d) Is it possible that Mark's mean internet speed is below 100 Mbps?
Give a reason for your answer. (2)

(Total for Question 6 is 6 marks)

- 7 The speeds, S mph to the nearest mph, of some vehicles on a motorway are recorded.

Lane of Motorway	Lane 1	Lane 2	Lane 3
Number of Vehicles	124	148	165
Mean Speed (mph)	55.2	67.8	71.3

Work out the mean speed of all vehicles across all lanes of the motorway.
Give your answer to 3 significant figures. (2)

(Total for Question 7 is 2 marks)

- 8 The following tables summarises the ages, A years, of people taking a driving test at a test centre.

Age (A years)	10-19	20-29	30-39	40-49	50-59	60-69
Frequency (f)	21	4	1	2	1	1

- (a) Work out the class interval containing the median age. (1)
- (b) Work out an estimate for the mean age of the people taking a driving test at the test centre. (2)
- The minimum age for taking a driving test is 17 years old.
- (c) Comment on whether the true mean age of the drivers at the test centre likely to be different to your answer to part (b). Give a reason for your answer. (1)

(Total for Question 8 is 4 marks)

