



S05-test Estimated Mean from Grouped Data: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A call centre recorded the length, in minutes, of 40 phone calls. The frequency table shows the results, with an empty column for the midpoint of each class interval.

Class interval (minutes)	Frequency	Midpoint
$0 < t \leq 10$	6	
$10 < t \leq 20$	14	
$20 < t \leq 30$	12	
$30 < t \leq 40$	8	
Total	40	

- (a)** Complete the table by finding the midpoint of each class interval. **(4)**

- (b)** Write down the class interval that contains the mode. **(1)**

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(Total for Question 1 is 5 marks)

- 2** State whether this is True or False: The modal class is the class interval with the highest frequency.

(Total for Question 2 is 1 mark)

- 3** The length of 20 phone calls made from a shop, in minutes, is grouped below.

Class interval (minutes)	Frequency
$0 < t \leq 4$	5
$4 < t \leq 8$	9
$8 < t \leq 12$	6

Write down (i) the modal class, and (ii) the width of each class interval.

(Total for Question 3 is 2 marks)

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- 4** The heights, in cm, of 24 tomato plants are grouped below.

Class interval (cm)	Frequency
$20 < h \leq 40$	5
$40 < h \leq 60$	11
$60 < h \leq 80$	8

- (a) Calculate an estimate for the mean height of a tomato plant. (2)

- (b) Explain why this value is described as an estimate rather than the exact mean height of the 24 plants. (1)

(Total for Question 4 is 3 marks)

- 5 The tables show the amount spent, in £, by 40 customers at each of two coffee shops, Shop A and Shop B, on the same Saturday.

Shop A

Class interval (£)	Frequency
$0 < x \leq 2$	6
$2 < x \leq 4$	16
$4 < x \leq 6$	14
$6 < x \leq 8$	4
Total	40

Shop B

Class interval (£)	Frequency
$0 < x \leq 2$	10
$2 < x \leq 4$	10
$4 < x \leq 6$	12
$6 < x \leq 8$	8
Total	40

- (a) Work out an estimate for the mean amount spent at Shop A. (3)

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- (b) Work out an estimate for the mean amount spent at Shop B. (3)

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- (c) Using your answers to parts (a) and (b), which coffee shop had the higher mean spend per customer? Give a reason using the figures you have calculated. (2)

(Total for Question 5 is 8 marks)

- 6** The ages, in years, of 50 members of a book club are grouped below. The class widths are not all equal.

Class interval (years)	Frequency
$10 < a \leq 20$	8
$20 < a \leq 30$	16
$30 < a \leq 50$	18
$50 < a \leq 80$	8

- (a) Write down the midpoint of the class interval $30 < a \leq 50$. (1)

- (b) Use midpoints 15, 25, 40 and 65 to calculate an estimate for the mean age. (2)

(Total for Question 6 is 3 marks)

- 7** The table shows the number of hours a group of students spent revising last weekend. The frequency for the class $4 < t \leq 6$ is unknown, shown as y . The estimated mean revision time is 4 hours.

Class interval (hours)	Frequency	Midpoint
$0 < t \leq 2$	6	1
$2 < t \leq 4$	10	3
$4 < t \leq 6$	y	5
$6 < t \leq 8$	4	7

Show that $y = 16$.

(Total for Question 7 is 3 marks)

Mark scheme · S05-test Estimated Mean from Grouped Data: Test Pack

Question 1

- (a) **B1** midpoint 5 for $0 < t \leq 10$, cao
- (a) **B1** midpoint 15 for $10 < t \leq 20$, cao
- (a) **B1** midpoint 25 for $20 < t \leq 30$, cao
- (a) **B1** midpoint 35 for $30 < t \leq 40$, cao
- (a) **Answer: 5, 15, 25, 35**
- (b) **B1** $10 < t \leq 20$ cao
- (b) **Answer: $10 < t \leq 20$**

Question 2

- **B1** True cao
- **Answer: True**

Question 3

- **B1** (i) $4 < t \leq 8$ cao
- **B1** (ii) 4 cao
- **Answer: (i) $4 < t \leq 8$ (ii) 4 minutes**

Question 4

- (a) **M1** $5 \times 30 + 11 \times 50 + 8 \times 70$ (=1260), oe (using midpoints 30, 50, 70)
- (a) **A1** 52.5 cao
- (a) **Answer: 52.5 cm**
- (b) **B1** the exact height of each plant within a class is not known, so the midpoint is used to represent every plant in that class, meaning the calculated value is only an estimate, oe
- (b) **Answer: The exact height of each individual plant is not known, only which class it falls into, so the midpoint has to be used to represent every plant in that class, making the result only an estimate.**

Question 5

- (a) **M1** midpoints 1, 3, 5, 7 used
- (a) **M1** sum of $fx = 152$, oe
- (a) **A1** £3.80 cao
- (a) **Answer: £3.80**
- (b) **M1** midpoints 1, 3, 5, 7 used
- (b) **M1** sum of $fx = 156$, oe
- (b) **A1** £3.90 cao
- (b) **Answer: £3.90**
- (c) **B1** Shop B cao
- (c) **B1** correct comparison referencing both means, e.g. Shop B's estimated mean spend (£3.90) is £0.10 higher than Shop A's (£3.80)
- (c) **Answer: Shop B**

Question 6

- (a) **B1** 40 cao
- (a) **Answer: 40**
- (b) **M1** $8 \times 15 + 16 \times 25 + 18 \times 40 + 8 \times 65$ (=1760), oe
- (b) **A1** 35.2 cao
- (b) **Answer: 35.2 years**

Question 7

- **M1** sum of $fx = 6 \times 1 + 10 \times 3 + 5y + 4 \times 7 = 64 + 5y$ and sum of $f = 20 + y$ set up
- **M1** correct equation formed: $(64 + 5y) \text{ divided by } (20 + y) = 4$, leading to $64 + 5y = 80 + 4y$
- **A1** $y = 16$ shown correctly, cao
- **Answer:** $y = 16$