



S16-30min Grouped Frequency Tables: 30-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** 25 students in a reading challenge recorded the number of pages they read last weekend. The grouped frequency table shows the results.

Pages read	Frequency
$0 < p \leq 20$	4
$20 < p \leq 40$	9
$40 < p \leq 60$	8
$60 < p \leq 80$	4
Total	25

- (a)** Write down the modal class.

(1)

- (b)** Work out how many students read more than 40 pages.

(2)

(Total for Question 1 is 3 marks)

- 2** A delivery company recorded the mass, in kg, of 30 parcels. The grouped frequency table shows the results.

Mass (kg)	Frequency
$0 < m \leq 5$	6
$5 < m \leq 10$	11
$10 < m \leq 15$	9
$15 < m \leq 20$	4
Total	30

- (a) Write down the modal class. (1)

-
(b) One parcel has a mass of 12 kg. Write down the class interval that contains this parcel. (1)

-
(c) Work out how many parcels weigh 10 kg or less. (2)

.....
(Total for Question 2 is 4 marks)

- 3** A garden centre recorded the amount, in £, spent by 40 customers one Saturday. The grouped frequency table shows the results.

Amount spent (£)	Frequency
$0 < m \leq 10$	7
$10 < m \leq 20$	15
$20 < m \leq 30$	12
$30 < m \leq 40$	6
Total	40

- (a) One customer spent £24. Write down the class interval that contains this customer. (1)

.....

- (b) Work out the number of customers who spent £20 or less. (2)

.....

- (c) Work out the number of customers who spent more than £20. (1)

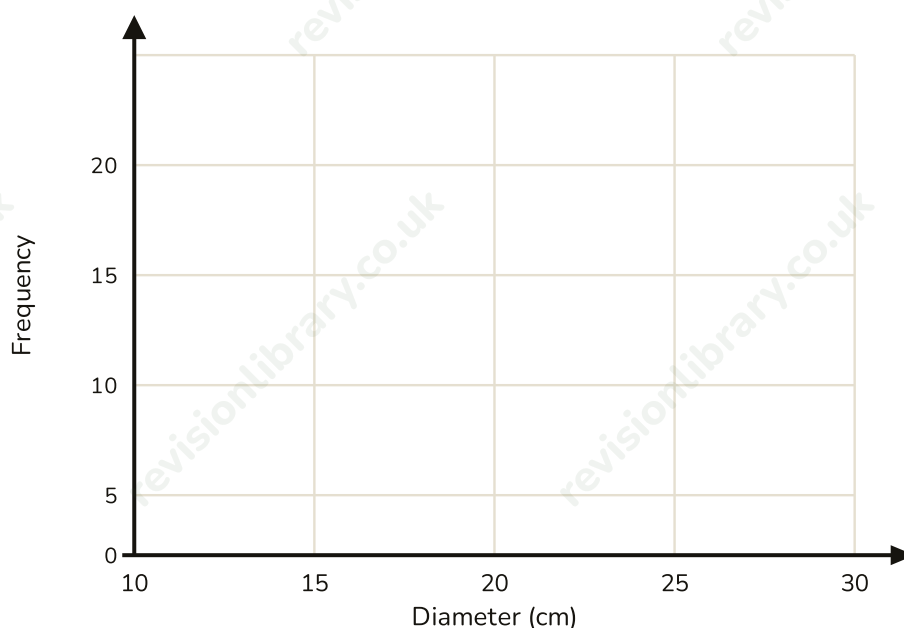
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(Total for Question 3 is 4 marks)

- 4 A garden centre recorded the diameter, in cm, of 50 sunflowers grown from the same batch of seeds. The grouped frequency table shows the results.

Diameter (cm)	Frequency
$10 < d \leq 15$	6
$15 < d \leq 20$	18
$20 < d \leq 25$	20
$25 < d \leq 30$	6
Total	50

A frequency polygon can be drawn by plotting the midpoint of each class against its frequency, and joining the points with straight lines.



- (a) Write down the coordinates of the point that would be plotted for the class $15 < d \leq 20$. (2)
-
- (b) All four class widths in this table are equal, which is why the midpoints can be plotted directly. If the class widths were not all equal, state what quantity would need to be plotted on the vertical axis of a chart instead of frequency, and explain why. (2)

- (c) On the grid provided, plot the midpoint of each class against its frequency and join the points in order with straight lines to draw a frequency polygon. (2)

(Total for Question 4 is 6 marks)

- 5 The grouped frequency table shows the age, in years, of 60 runners in a marathon.

Age (years)	Frequency
$20 < a \leq 30$	8
$30 < a \leq 40$	22
$40 < a \leq 50$	19
$50 < a \leq 60$	11
Total	60

An estimate of the median can be found using linear interpolation:

median approximately $L + ((n \div 2 - F) \div f) \times w$

where L is the lower boundary of the class containing the median, F is the cumulative frequency before that class, f is the frequency of that class, and w is its class width.

- (a) Complete a cumulative frequency column for this table.

(2)

Age (years)	Frequency	Cumulative frequency
$20 < a \leq 30$	8	
$30 < a \leq 40$	22	
$40 < a \leq 50$	19	
$50 < a \leq 60$	11	

- (b) $n \div 2 = 60 \div 2 = 30$. Use your cumulative frequencies to write down the class interval that contains the median age.

(1)

- (c) Use linear interpolation to estimate the median age of the runners.

(2)

(Total for Question 5 is 5 marks)

- 6** The grouped frequency table shows the test scores, as a percentage, of 45 students. The class widths are not all equal.

Score (%)	Frequency
$0 < s \leq 40$	5
$40 < s \leq 60$	14
$60 < s \leq 75$	16
$75 < s \leq 100$	10
Total	45

- (a) One student scored 58%. Write down the class interval that contains this student. (1)

.....

- (b) Work out the number of students who scored 60% or less. (2)

.....

- (c) Work out the number of students who scored more than 75%. (1)

.....

- (d) Explain why it would be misleading to draw a bar chart with bar heights equal to the frequencies in this table, and state what quantity should be used for the bar heights instead. (2)

(Total for Question 6 is 6 marks)

- 7 Two market stalls, Stall A and Stall B, each recorded the amount, in £, spent by 40 customers one Saturday.

Stall A

Amount spent (£)	Frequency
$0 < m \leq 10$	6
$10 < m \leq 20$	10
$20 < m \leq 30$	16
$30 < m \leq 40$	8
Total	40

Stall B

Amount spent (£)	Frequency
$0 < m \leq 10$	14
$10 < m \leq 20$	15
$20 < m \leq 30$	8
$30 < m \leq 40$	3
Total	40

- (a) Write down the modal class for Stall A and the modal class for Stall B. (2)

- (b) By comparing the modal classes, make one comparison between the amount spent at Stall A and at Stall B. (2)

(Total for Question 7 is 4 marks)

Mark scheme · S16-30min Grouped Frequency Tables: 30-minute Pack

Question 1

- (a) **B1** $20 < p \leq 40$ cao
- (a) **Answer: $20 < p \leq 40$**
- (b) **M1** $8 + 4$, oe
- (b) **A1** 12 cao
- (b) **Answer: 12**

Question 2

- (a) **B1** $5 < m \leq 10$ cao
- (a) **Answer: $5 < m \leq 10$**
- (b) **B1** $10 < m \leq 15$ cao
- (b) **Answer: $10 < m \leq 15$**
- (c) **M1** $6 + 11$, oe
- (c) **A1** 17 cao
- (c) **Answer: 17**

Question 3

- (a) **B1** $20 < m \leq 30$ cao
- (a) **Answer: $20 < m \leq 30$**
- (b) **M1** $7 + 15$, oe
- (b) **A1** 22 cao
- (b) **Answer: 22**
- (c) **B1** 18 cao, ft 40 minus their (b)
- (c) **Answer: 18**

Question 4

- (a) **B1** midpoint 17.5 cao
- (a) **B1** (17.5, 18) cao
- (a) **Answer: (17.5, 18)**
- (b) **B1** identifies frequency density (frequency divided by class width)
- (b) **B1** valid reason, e.g. so that the area of each bar (in a histogram) represents the frequency fairly when class widths differ
- (b) **Answer: Frequency density, so that bar area (not height) represents frequency fairly.**
- (c) **B1** all four points plotted correctly: (12.5, 6), (17.5, 18), (22.5, 20), (27.5, 6)
- (c) **B1** points joined in order with straight lines
- (c) **Answer: Points (12.5, 6), (17.5, 18), (22.5, 20), (27.5, 6) joined with straight lines.**

Question 5

- (a) **B1** at least two of the four cumulative frequencies correct
- (a) **B1** all four cumulative frequencies correct: 8, 30, 49, 60
- (a) **Answer: 8, 30, 49, 60**
- (b) **B1** $30 < a \leq 40$ cao
- (b) **Answer: $30 < a \leq 40$**
- (c) **M1** $30 + ((30 - 8) / 22) \times 10$, oe (correct substitution: $L=30$, $F=8$, $f=22$, $w=10$)
- (c) **A1** 40 cao
- (c) **Answer: 40**

Question 6

- (a) **B1** $40 < s \leq 60$ cao
- (a) **Answer: $40 < s \leq 60$**
- (b) **M1** $5 + 14$, oe
- (b) **A1** 19 cao
- (b) **Answer: 19**
- (c) **B1** 10 cao
- (c) **Answer: 10**
- (d) **B1** identifies that a bar for a wider class (e.g. $0 < s \leq 40$ or $75 < s \leq 100$) would look taller/shorter than a fair comparison simply because it covers a wider range of scores, not because scores are more or less common there
- (d) **B1** states that frequency density (frequency divided by class width) should be used for the bar heights instead
- (d) **Answer: Frequency density (frequency divided by class width) should be used instead of frequency.**

Question 7

- (a) **B1** Stall A: $20 < m \leq 30$ cao
- (a) **B1** Stall B: $10 < m \leq 20$ cao
- (a) **Answer: Stall A: $20 < m \leq 30$; Stall B: $10 < m \leq 20$**
- (b) **B1** valid comparison referencing both modal classes, e.g. Stall A's modal class (£20-£30) is higher than Stall B's modal class (£10-£20)
- (b) **B1** comparison made in the context of spending, e.g. suggesting customers at Stall A typically spent more than customers at Stall B
- (b) **Answer: Stall A's modal class is higher than Stall B's, suggesting customers typically spent more at Stall A than at Stall B.**