2.13 Frequency Polygons: Test Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

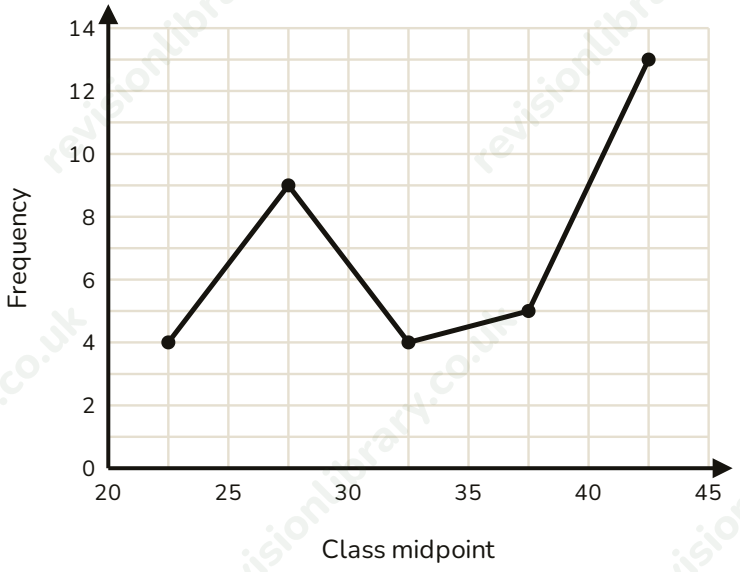
Answer ALL questions. Show all your working.

1 The grouped frequency table shows data about score, x, for a group of people. Class intervals and frequencies: $0 < x \leq 10$: 3; $10 < x \leq 20$: 10; $20 < x \leq 30$: 5; $30 < x \leq 40$: 12. Write down the coordinates of the points you would plot to draw a frequency polygon.

(Total for Question 1 is 2 marks)

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2 The points plotted for a frequency polygon are (22.5, 4), (27.5, 9), (32.5, 4), (37.5, 5), (42.5, 13). All class intervals have the same width. Work out (a) the width of each class interval and (b) the total frequency.



(Total for Question 2 is 3 marks)

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3 The grouped frequency table shows data about length in cm, x. Class intervals and frequencies: $0 < x \leq 20$: 10; $20 < x \leq 40$: 11; $40 < x \leq 60$: 10; $60 < x \leq 80$: 8. Work out the total frequency.

(Total for Question 3 is 2 marks)

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4 The grouped frequency table shows data about length in cm, x. Class intervals and frequencies: $0 < x \leq 5$: 9; $5 < x \leq 10$: 11; $10 < x \leq 15$: 3; $15 < x \leq 20$: 4; $20 < x \leq 25$: 9. Write down the modal class.

(Total for Question 4 is 1 mark)

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5 The grouped frequency table shows data about length in cm, x, for a group of people. Class intervals and frequencies: $0 < x \leq 5$: 14; $5 < x \leq 10$: 9; $10 < x \leq 15$: 9; $15 < x \leq 20$: 15. Write down the coordinates of the points you would plot to draw a frequency polygon.

(Total for Question 5 is 2 marks)

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6 The grouped frequency table shows data about length in cm, x, for a group of people. Class intervals and frequencies: $0 < x \leq 5$: 15; $5 < x \leq 10$: 10; $10 < x \leq 15$: 14; $15 < x \leq 20$: 3. Write down the coordinates of the points you would plot to draw a frequency polygon.

(Total for Question 6 is 2 marks)

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7 The grouped frequency table shows data about time in minutes, x. Class intervals and frequencies: $0 < x \leq 20$: 6; $20 < x \leq 40$: 6; $40 < x \leq 60$: 3; $60 < x \leq 80$: 10. Work out how many values are greater than 60.

(Total for Question 7 is 2 marks)

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8 The grouped frequency table shows data about length in cm, x. Class intervals and frequencies: $0 < x \leq 20$: 9; $20 < x \leq 40$: 15; $40 < x \leq 60$: 4; $60 < x \leq 80$: 13; $80 < x \leq 100$: 8. Work out the total frequency.

(Total for Question 8 is 2 marks)

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9 Given the class 20-30, find the midpoint.

(Total for Question 9 is 1 mark)

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10 A grouped frequency table gives ages of participants in a workshop.
Class intervals (years): 10-14, 15-19, 20-24
Frequencies: 4, 7, 9
Calculate the total number of participants.

(Total for Question 10 is 2 marks)

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11 A bakery recorded the number of loaves sold per day over several weeks, grouped into classes.

Loaves sold: 20-29, 30-39, 40-49, 50-59

Frequency: 5, 13, 9, 3

State the class with the lowest frequency.

(Total for Question 11 is 2 marks)

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12 A grouped frequency table of times taken (minutes) to solve a puzzle is:

0-2: 5

2-4: 9

4-6: 6

Use midpoints to estimate the mean time to solve the puzzle. Give your answer to 1 decimal place.

(Total for Question 12 is 3 marks)

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13 A student drew a frequency polygon using class midpoints 5, 15, 25, 35 with frequencies 3, 9, 6, 2.



(a) What height should the point above midpoint 25 have on the polygon? **(1)**

(b) Explain briefly how to complete a frequency polygon from a histogram. **(3)**

(Total for Question 13 is 4 marks)

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14 Class intervals of daily step counts and frequencies are shown.

0-1999: 2

2000-3999: 5

4000-5999: 8

6000-7999: 5

Estimate the mean number of steps using midpoints. Give your answer to the nearest whole step.

(Total for Question 14 is 3 marks)

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15 The frequencies of marks in a test are grouped as follows.

Marks: 0-9, 10-19, 20-29, 30-39

Frequencies: 1, 4, 9, 6

(a) Calculate the cumulative frequency for the end of class 20-29. **(1)**

(b) Using midpoints estimate the mean mark. Give your answer to 1 decimal place. **(3)**

(Total for Question 15 is 4 marks)

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16 A theatre recorded how long, in minutes, it took each group of latecomers to reach their seats after a show had started.

Time (minutes): 0-5, 5-10, 10-20, 20-40

Frequency: 6, 10, 8, 2

Show that the estimated mean time is 10.4 minutes, to 1 decimal place.

(Total for Question 16 is 3 marks)

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17 A student is estimating the mean number of emails received per day by staff at a small office, from this grouped frequency table.

Emails received: 0-9, 10-19, 20-29, 30-39

Frequency: 3, 7, 8, 2

The student's working is shown below.

Midpoints used: 9, 19, 29, 39

Sum of (midpoint x frequency) = (9 x 3) + (19 x 7) + (29 x 8) + (39 x 2) = 27 + 133 + 232 + 78 = 470

Estimated mean = 470 / 20 = 23.5

Emails received	Frequency
0-9	3
10-19	7
20-29	8
30-39	2

(a) Identify the error in the student's method. **(1)**

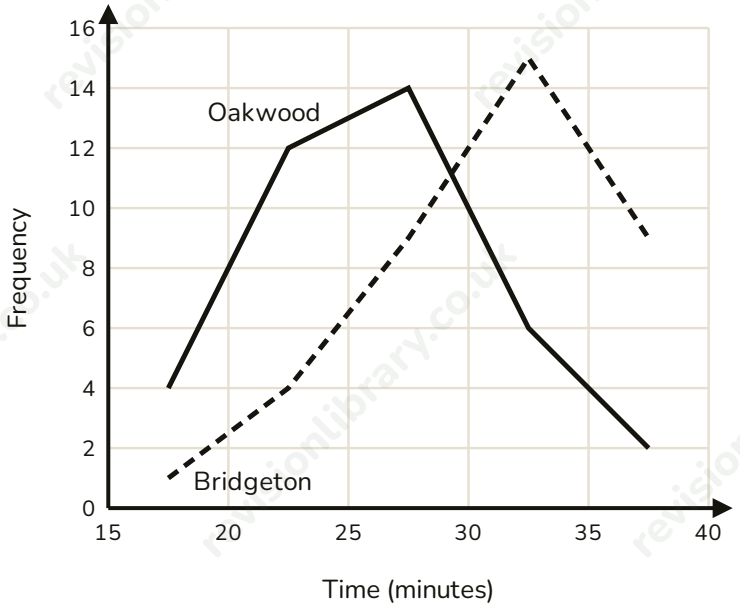
(b) Work out the correct estimate for the mean number of emails received per day. **(3)**

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(Total for Question 17 is 4 marks)

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18 The frequency polygons show the times, in minutes, taken by runners from Oakwood Running Club and Bridgeton Running Club to complete a 5 km parkrun.



(a) Using the frequency polygon, write down the number of Bridgeton Running Club runners who took between 25 and 30 minutes. **(1)**

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(b) Compare the distributions of times for the two running clubs. **(3)**

(Total for Question 18 is 4 marks)

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Mark scheme · 2.13 Frequency Polygons: Test Pack

Question 1

uses midpoints of the class intervals **M1**

(5, 3), (15, 10), (25, 5), (35, 12) cao **A1**

Answer: (5, 3), (15, 10), (25, 5), (35, 12)

Question 2

difference between consecutive midpoints **M1**

5 **A1**

35 **B1**

Answer: (a) 5, (b) 35

Question 3

adds the frequencies **M1**

39 cao **A1**

Answer: 39

Question 4

$5 < x \leq 10$ cao **B1**

Answer: $5 < x \leq 10$

Question 5

uses midpoints of the class intervals **M1**

(2.5, 14), (7.5, 9), (12.5, 9), (17.5, 15) cao **A1**

Answer: (2.5, 14), (7.5, 9), (12.5, 9), (17.5, 15)

Question 6

uses midpoints of the class intervals **M1**

(2.5, 15), (7.5, 10), (12.5, 14), (17.5, 3) cao **A1**

Answer: (2.5, 15), (7.5, 10), (12.5, 14), (17.5, 3)

Question 7

adds the frequencies of the classes above 60 **M1**

10 cao **A1**

Answer: 10

Question 8

adds the frequencies **M1**

49 cao **A1**

Answer: 49

Question 9

25 cao **B1**

Answer: 25 (Recompute: (20 + 30) / 2 = 25)

Question 10

adds frequencies 4 + 7 + 9 **M1**

20 cao **A1**

Answer: 20

Question 11

identifies the smallest frequency, 3 **M1**

50-59 cao **A1**

Answer: 50-59

Question 12

use midpoints 1, 3, 5 and form sum 1*5 + 3*9 + 5*6 **M1**

divide total by 5 + 9 + 6 = 20 (method for mean) **M1**

3.1 awrt **A1**

Answer: 3.1

Question 13

(a) 6 cao **B1**

(a) Answer: 6

(b) plot a point at each class midpoint at the height equal to the class frequency **M1**

(b) join the plotted points with straight lines in order **M1**

(b) the polygon starts at the first plotted point and ends at the last plotted point, with the ends not joined down to the horizontal axis **A1**

(b) Answer: Plot a point at each class midpoint with height equal to the class frequency, join the points with straight lines, and do not extend the ends down to the horizontal axis.

Question 14

use midpoints 999.5, 2999.5, 4999.5, 6999.5 and form sum of midpoint*freq **M1**

divide by total frequency 20 **M1**

4600 awrt **A1**

Answer: 4600

Question 15

(a) 14 cao **B1**

(a) Answer: 14

(b) use midpoints 4.5, 14.5, 24.5, 34.5 and compute sum(midpoint*freq) **M1**

(b) divide by total frequency 20 **M1**

(b) 24.5 awrt **A1**

(b) Answer: 24.5

Question 16

uses midpoints 2.5, 7.5, 15, 30 oe **M1**

forms sum of (midpoint x frequency) = 270 and divides by total frequency 26 **M1**

10.4 (minutes) cso, all working shown correctly **A1**

Answer: 10.4 minutes (shown)

Question 17

(a) states that the student used the upper boundary of each class instead of the midpoint oe **B1**

(a) Answer: The student used the upper boundary of each class (9, 19, 29, 39) instead of the midpoint of each class.

(b) uses correct midpoints 4.5, 14.5, 24.5, 34.5 **M1**

(b) forms sum of (midpoint x frequency) = 380 and divides by total frequency 20 **M1**

(b) 19 cao **A1**

(b) Answer: 19

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Question 18

(a) 9 cao **B1**

(a) Answer: 9

(b) valid comparison of a typical/average time, e.g. Oakwood runners were generally faster than Bridgeton runners oe **M1**

(b) valid comparison of spread or shape, e.g. both clubs have a similar spread of times, but Bridgeton's times are shifted towards the higher end oe **M1**

(b) both comparisons correctly supported by a reference to the graph, e.g. correct modal classes quoted (Oakwood 25-30, Bridgeton 30-35) or correct direction of shift quoted **A1**

(b) Answer: On average, Oakwood runners were faster than Bridgeton runners (Oakwood's modal class is 25-30 minutes, Bridgeton's is 30-35 minutes). The spread of times is similar for the two clubs, but Bridgeton's times are shifted towards the higher times.

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