



F05-test Percentiles: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** The 50th percentile of a data set is the same as its median. State whether this is True or False.

(Total for Question 1 is 1 mark)

- 2** Write down the percentile that corresponds to the upper quartile, Q3.

(Total for Question 2 is 1 mark)

- 3** In a health survey, the resting heart rates of a large group of adults were recorded. The 65th percentile of the resting heart rates was found to be 72 beats per minute (bpm).

(a) Circle the statement that correctly describes what this means.

(1)

- ☐ A) 65% of adults had a resting heart rate of exactly 72 bpm.
☐ B) 65% of adults had a resting heart rate of 72 bpm or below.
☐ C) 72% of adults had a resting heart rate of 65 bpm or below.
☐ D) 65 out of every 72 adults had a slower heart rate.

(b) Explain why statement A is not correct.

(1)

(Total for Question 3 is 2 marks)

- 4** There are 12 values in an ordered list. Work out the position of the 75th percentile.

(Total for Question 4 is 1 mark)

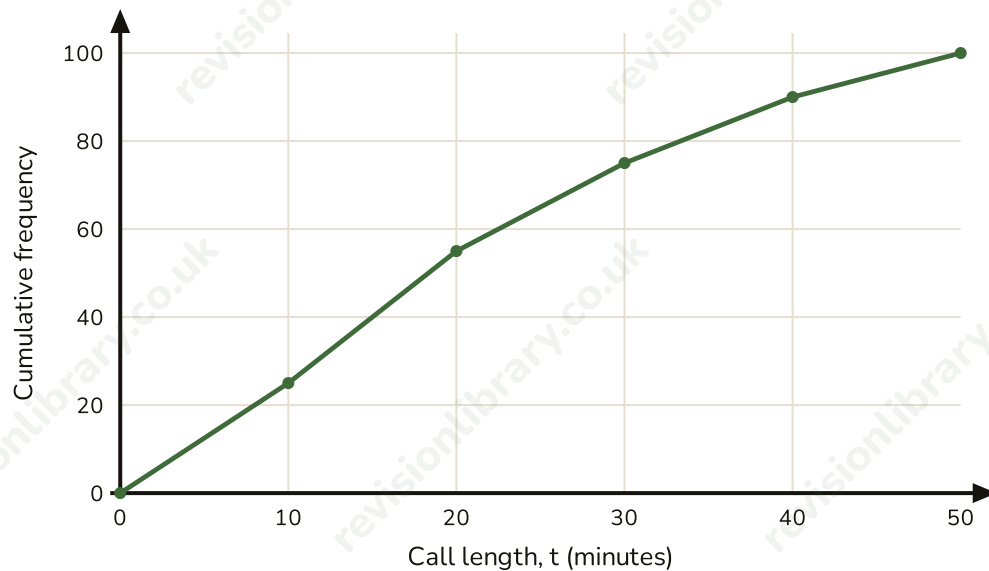
5 Baby growth charts compare a baby's weight with the weights of other babies of the same age, using percentiles. At his 6-month check-up, Noah's weight is on the 91st percentile for his age. At her 6-month check-up, Grace's weight is on the 60th percentile for her age.

(a) Explain what it means for Noah's weight to be on the 91st percentile for his age. (2)

(b) State which baby, Noah or Grace, is heavier compared with other babies of the same age. Give a reason. (2)

(Total for Question 5 is 4 marks)

- 6** The cumulative frequency graph shows the length, in minutes, of 100 calls made to a call centre one morning.



- (a) Use the graph to estimate the 40th percentile of the call lengths. (2)
- (b) A call lasted 24 minutes. Use the graph to estimate what percentile of the call lengths this represents. (2)
- (c) Write down an estimate for the lower quartile, Q_1 , of the call lengths. (1)
- (d) Write down an estimate for the upper quartile, Q_3 , of the call lengths. (1)
- (e) Hence estimate the interquartile range of the call lengths, and explain what this value tells us about the call lengths. (2)

(Total for Question 6 is 8 marks)

- 7 The time, t (minutes), taken by 80 people to complete a jigsaw puzzle is shown in the grouped frequency table.

Time (t minutes)	Frequency	Cumulative frequency
$0 < t \leq 10$	6	6
$10 < t \leq 20$	14	20
$20 < t \leq 30$	22	42
$30 < t \leq 40$	20	62
$40 < t \leq 50$	12	74
$50 < t \leq 60$	6	80

- (a) Work out the position of the 60th percentile within the cumulative frequency total. (2)

- (b) Write down the class interval that contains the 60th percentile. (1)

- (c) Use linear interpolation to estimate the 60th percentile of the completion times. (3)

(Total for Question 7 is 6 marks)

- 8 The prices, in pounds, of 16 items in a shop, listed in order, are:

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

Find the 10th percentile of the prices.

(Total for Question 8 is 2 marks)

- 9** The waiting times, w (minutes), for 100 patients at a clinic are shown in the table. Some of the cumulative frequencies are missing.

Waiting time (w minutes)	Frequency	Cumulative frequency
$0 < w \leq 10$	10	10
$10 < w \leq 20$	20	?
$20 < w \leq 30$	25	?
$30 < w \leq 40$	25	?
$40 < w \leq 50$	20	100

- (a)** Complete the cumulative frequency column of the table. (2)

- (b)** A patient waited 24 minutes. Using linear interpolation, find the percentage of patients who waited 24 minutes or less. (1)

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(Total for Question 9 is 3 marks)

Mark scheme · F05-test Percentiles: Test Pack

Question 1

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

Question 2

- **B1** 75th (percentile) cao
- **Answer: 75th percentile**

Question 3

- (a) **B1** B cao
- (a) **Answer: B) 65% of adults had a resting heart rate of 72 bpm or below.**
- (b) **B1** a percentile does not mean that percentage of people share one exact value; it means that percentage of the data lies at or below that value (oe)
- (b) **Answer: A percentile is about the proportion of data at or below a value, not about everyone sharing that exact value.**

Question 4

- **B1** 9 cao
- **Answer: 9**

Question 5

- (a) **B1** 91% of babies of the same age weigh the same as or less than Noah (oe)
- (a) **B1** so Noah is heavier than (about) 91 out of every 100 babies of his age (oe)
- (a) **Answer: About 91% of babies of Noah's age weigh the same as or less than he does - Noah is one of the heavier babies for his age.**
- (b) **B1** Noah
- (b) **B1** because his percentile (91st) is higher than Grace's (60th), so a greater percentage of babies weigh less than Noah than weigh less than Grace (oe)
- (b) **Answer: Noah, because his percentile (91st) is higher than Grace's (60th).**

Question 6

- (a) **M1** reads across from a cumulative frequency of 40 to the curve, then down to the time axis
- (a) **A1** 15 (accept 14 - 16) minutes
- (a) **Answer: 15 minutes**
- (b) **M1** reads up from $t = 24$ to the curve, then across to the cumulative frequency axis
- (b) **A1** 63rd percentile (accept 60th - 66th)
- (b) **Answer: 63rd percentile**
- (c) **B1** 10 minutes cao
- (c) **Answer: 10 minutes**
- (d) **B1** 30 minutes cao
- (d) **Answer: 30 minutes**
- (e) **B1** $IQR = 30 - 10 = 20$ minutes
- (e) **B1** the middle 50% of calls varied in length by about 20 minutes (oe interpretation in context)
- (e) **Answer: $IQR = 20$ minutes - the middle half of calls lasted between 10 and 30 minutes, a spread of 20 minutes.**

Question 7

- (a) **M1** 0.6×80
- (a) **A1** 48 cao
- (a) **Answer: 48**
- (b) **B1** $30 < t \leq 40$ cao
- (b) **Answer: $30 < t \leq 40$**
- (c) **M1** $(48 - 42) / 20 \times 10$, oe
- (c) **M1** $30 + \dots$
- (c) **A1** 33 cao
- (c) **Answer: 33 minutes**

Question 8

- **M1** position = $0.1 \times 16 = 1.6$, round up to 2
- **A1** 3 cao
- **Answer: £3**

Question 9

- (a) **M1** running totals found (at least 2 of 30, 55, 80 correct)
- (a) **A1** all three correct: 30, 55, 80
- (a) **Answer: 30, 55, 80**
- (b) **B1** 40% cao
- (b) **Answer: 40%**