HIGHER

H18-test Percentiles and Interpercentile Range: Test Pack

Total Marks

EDEXCEL 1ST0 · Calculator allowed · about 20 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 For each statement about percentiles and the interpercentile range, write down whether it is True or False.

(i) It is possible to find the median of a data set by locating its 50th percentile. **(1)**

.....

(ii) If a value lies at the 40th percentile of a data set, then 60% of the data lies below it. **(1)**

.....

(iii) The 10-90 interpercentile range is also known as the interdecile range. **(1)**

.....

(iv) Extreme outliers affect the interpercentile range in exactly the same way as they affect the range. **(1)**

.....

(Total for Question 1 is 4 marks)

2 The mass, m grams, of 150 apples picked from an orchard is shown in the grouped frequency table.

Mass (m grams)	Frequency	Cumulative frequency
$100 < m \leq 120$	10	10
$120 < m \leq 140$	25	35
$140 < m \leq 160$	55	90
$160 < m \leq 180$	40	130
$180 < m \leq 200$	20	150

(a) Use linear interpolation to estimate the 10th percentile of the apple masses. **(3)**

(b) Use linear interpolation to estimate the 90th percentile of the apple masses. **(3)**

(c) Hence calculate the 10-90 interpercentile range (the interdecile range) of the apple masses. **(2)**

.....

(Total for Question 2 is 8 marks)

3 The scores out of 100 for 12 contestants in a general knowledge quiz are listed below, in order from lowest to highest.

8, 52, 55, 58, 60, 62, 64, 66, 68, 70, 73, 76

Contestant L, who scored 8, had a technical fault with their buzzer for most of the quiz.

(a) Calculate the range of the quiz scores. **(1)**

.....

(b) Calculate the interquartile range of the quiz scores. **(2)**

.....

(c) Calculate the 10-90 interpercentile range (the interdecile range) of the quiz scores. **(2)**

.....

(d) Contestant L's low score of 8 was due to a technical fault, not a lack of general knowledge. Explain which of the three measures - range, IQR or interdecile range - best describes how spread out the genuine scores were, and why. **(2)**

(Total for Question 3 is 7 marks)

Mark scheme · H18-test Percentiles and Interpercentile Range: Test Pack

Question 1

- (i) **B1** True cao
- **(i) Answer: True**
- (ii) **B1** False cao
- **(ii) Answer: False**
- (iii) **B1** True cao
- **(iii) Answer: True**
- (iv) **B1** False cao
- **(iv) Answer: False**

Question 2

- (a) **M1** position = 0.1 x 150 = 15, identifying the class $120 < m \leq 140$
- (a) **M1** 120 + ((15 - 10) / 25) x 20, oe
- (a) **A1** 124 cao
- **(a) Answer: 124 g**
- (b) **M1** position = 0.9 x 150 = 135, identifying the class $180 < m \leq 200$
- (b) **M1** 180 + ((135 - 130) / 20) x 20, oe
- (b) **A1** 185 cao
- **(b) Answer: 185 g**
- (c) **M1** 185 - 124, oe (ft from (a) and (b))
- (c) **A1** 61 cao
- **(c) Answer: 61 g**

Question 3

- (a) **B1** 68 cao
- **(a) Answer: 68**
- (b) **M1** Q1 = (55+58)/2 = 56.5 and Q3 = (68+70)/2 = 69
- (b) **A1** IQR = 12.5 cao
- **(b) Answer: 12.5**
- (c) **M1** P10 = 52 (position 1.2 rounds up to the 2nd value) and P90 = 73 (position 10.8 rounds up to the 11th value)
- (c) **A1** interdecile range = 21 cao
- **(c) Answer: 21**
- (d) **B1** the interdecile range (21) gives the best description (accept IQR with valid justification)
- (d) **B1** because it excludes the affected outlier score of 8, while still using more of the data than the IQR does, unlike the range, which is entirely determined by the faulty score (oe)
- **(d) Answer: The interdecile range (21) is the most reliable, since it excludes the faulty outlier score (8) but still reflects more of the spread of genuine scores than the IQR, unlike the range, which is dictated entirely by the fault.**