FOUNDATION

3.2 Percentiles: 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Here are speeds in km/h of 19 cars.

68, 79, 18, 77, 87, 74, 57, 55, 10, 30, 96, 33, 66, 70, 35, 38, 61, 98, 17

Use position (n + 1) x p/100 for the pth percentile, where n is the number of values.

(a) Find the 10th percentile.

(b) Find the 70th percentile.

(c) Work out the interpercentile range between the 10th and 70th percentiles.

(d) The value 57 is in the data. What percentile is it?

(Total for Question 1 is 5 marks)

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2 Here are marks scored by 19 candidates.

28, 32, 34, 69, 89, 64, 90, 24, 52, 88, 68, 85, 76, 91, 44, 81, 87, 35, 46

Use position $(n + 1) \times p/100$ for the pth percentile, where n is the number of values.

(a) Find the 20th percentile.

(b) Find the 90th percentile.

(c) Work out the interpercentile range between the 20th and 90th percentiles.

(d) The value 64 is in the data. What percentile is it?

(Total for Question 2 is 5 marks)

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3 Here are the number of minutes 11 trains were late.

10, 21, 6, 12, 20, 3, 14, 19, 22, 16, 10

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the median.

(b) Work out the range.

(Total for Question 3 is 3 marks)

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4 Here are times in seconds of 19 runners.

99, 58, 70, 23, 96, 40, 16, 18, 26, 42, 53, 94, 44, 19, 80, 55, 51, 64, 91

Use position (n + 1) x p/100 for the pth percentile, where n is the number of values.

(a) Find the 20th percentile.

(b) Find the 30th percentile.

(c) Work out the interpercentile range between the 20th and 30th percentiles.

(d) The value 40 is in the data. What percentile is it?

(Total for Question 4 is 5 marks)

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5 Here are marks scored by 19 candidates.

51, 88, 13, 93, 31, 49, 41, 17, 96, 44, 78, 43, 68, 60, 18, 34, 86, 54, 57

Use position (n + 1) x p/100 for the pth percentile, where n is the number of values.

(a) Find the 30th percentile.

(b) Find the 90th percentile.

(c) Work out the interpercentile range between the 30th and 90th percentiles.

(d) The value 93 is in the data. What percentile is it?

(Total for Question 5 is 5 marks)

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6 Here are the lengths, in centimetres, of 7 pencils collected from a classroom.

5, 20, 9, 21, 14, 12, 24

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the median.
(b) Work out the range.

(Total for Question 6 is 3 marks)

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7 Here are speeds in km/h of 19 cars.

74, 19, 53, 89, 48, 43, 24, 22, 69, 23, 11, 31, 14, 91, 47, 83, 54, 37, 30

Use position $(n + 1) \times p/100$ for the pth percentile, where n is the number of values.
(a) Find the 25th percentile.
(b) Find the 40th percentile.
(c) Work out the interpercentile range between the 25th and 40th percentiles.
(d) The value 53 is in the data. What percentile is it?

(Total for Question 7 is 5 marks)

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8 Here are marks scored by 19 candidates.

76, 24, 41, 23, 63, 87, 25, 58, 46, 94, 60, 19, 97, 36, 80, 84, 22, 47, 37

Use position (n + 1) x p/100 for the pth percentile, where n is the number of values.

(a) Find the 20th percentile.

(b) Find the 80th percentile.

(c) Work out the interpercentile range between the 20th and 80th percentiles.

(d) The value 58 is in the data. What percentile is it?

(Total for Question 8 is 5 marks)

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9 Here are the lengths, in centimetres, of 15 pencils collected from a classroom.

24, 18, 22, 8, 6, 11, 10, 23, 15, 4, 5, 20, 17, 6, 7

Use position (n + 1)/4 for the lower quartile and 3(n + 1)/4 for the upper quartile, where n is the number of values.

(a) Find the median.

(b) Find the lower quartile.

(c) Find the upper quartile.

(Total for Question 9 is 6 marks)

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10 Here are times in seconds of 19 runners.

78, 43, 20, 81, 42, 46, 12, 33, 97, 47, 41, 24, 34, 52, 15, 18, 37, 23, 89

Use position $(n + 1) \times p/100$ for the pth percentile, where n is the number of values.

(a) Find the 40th percentile.

(b) Find the 90th percentile.

(c) Work out the interpercentile range between the 40th and 90th percentiles.

(d) The value 46 is in the data. What percentile is it?

(Total for Question 10 is 5 marks)

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11 Here are the daily rainfall, in millimetres, on 15 days in a town.

4, 27, 17, 10, 24, 3, 6, 12, 20, 23, 9, 15, 25, 5, 21

Use position $(n + 1)/4$ for the lower quartile and $3(n + 1)/4$ for the upper quartile, where n is the number of values.

(a) Find the median.

(b) Find the lower quartile.

(c) Find the upper quartile.

(Total for Question 11 is 6 marks)

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12 Here are speeds in km/h of 19 cars.

99, 65, 87, 49, 68, 98, 83, 17, 21, 46, 72, 90, 93, 80, 29, 66, 22, 84, 10

Use position (n + 1) x p/100 for the pth percentile, where n is the number of values.

(a) Find the 25th percentile.

(b) Find the 70th percentile.

(c) Work out the interpercentile range between the 25th and 70th percentiles.

(d) The value 83 is in the data. What percentile is it?

(Total for Question 12 is 5 marks)

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13 The times, in seconds, taken by 12 runners in a fun run, listed in order, are:

40, 42, 45, 47, 49, 50, 52, 54, 56, 58, 60, 63

Find the 75th percentile of the times.

(Total for Question 13 is 2 marks)

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Mark scheme · 3.2 Percentiles: 1-hour Pack

Question 1

values in order; position 2 used	**M1**
17	**A1**
74	**A1**
57	**B1**
45th percentile (position 9 of 20)	**B1**

Answer: (a) 17; (b) 74; (c) 57; (d) 45th percentile

Question 2

values in order; position 4 used	**M1**
34	**A1**
90	**A1**
56	**B1**
45th percentile (position 9 of 20)	**B1**

Answer: (a) 34; (b) 90; (c) 56; (d) 45th percentile

Question 3

values put in order	**M1**
14 cao	**A1**
19 cao	**B1**

Answer: (a) 14; (b) 19

Question 4

values in order; position 4 used	**M1**
23	**A1**
40	**A1**
17	**B1**
30th percentile (position 6 of 20)	**B1**

Answer: (a) 23; (b) 40; (c) 17; (d) 30th percentile

Question 5

values in order; position 6 used	**M1**
41	**A1**
93	**A1**
52	**B1**
90th percentile (position 18 of 20)	**B1**

Answer: (a) 41; (b) 93; (c) 52; (d) 90th percentile

Question 6

values put in order	**M1**
14 cao	**A1**
19 cao	**B1**

Answer: (a) 14; (b) 19

Question 7

values in order; position 5 used	**M1**
23	**A1**
31	**A1**
8	**B1**
65th percentile (position 13 of 20)	**B1**

Answer: (a) 23; (b) 31; (c) 8; (d) 65th percentile

Question 8

values in order; position 4 used	**M1**
24	**A1**
84	**A1**
60	**B1**
55th percentile (position 11 of 20)	**B1**

Answer: (a) 24; (b) 84; (c) 60; (d) 55th percentile

Question 9

values put in order	**M1**
11 cao	**A1**
values in order; position 4 used	**M1**
6 cao	**A1**
values in order; position 12 used	**M1**
20 cao	**A1**

Answer: (a) 11; (b) 6; (c) 20

Question 10

values in order; position 8 used	**M1**
34	**A1**
89	**A1**
55	**B1**
65th percentile (position 13 of 20)	**B1**

Answer: (a) 34; (b) 89; (c) 55; (d) 65th percentile

Question 11

values put in order	**M1**
15 cao	**A1**
values in order; position 4 used	**M1**
6 cao	**A1**
values in order; position 12 used	**M1**
23 cao	**A1**

Answer: (a) 15; (b) 6; (c) 23

Question 12

values in order; position 5 used	**M1**
29	**A1**
84	**A1**
55	**B1**
65th percentile (position 13 of 20)	**B1**

Answer: (a) 29; (b) 84; (c) 55; (d) 65th percentile

Question 13

position = 0.75 x 12 = 9 (a whole number, so average the 9th and 10th values)	**M1**
57 cao	**A1**

Answer: 57 seconds

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