HIGHER

7.1 The Normal Distribution: 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Harvey scored 33 in French (mean 45, standard deviation 4) and 59 in science (mean 67, standard deviation 5). Work out the standardised score for each subject and state in which subject Harvey did relatively better.

(Total for Question 1 is 4 marks)

2 The masses of tins of beans have mean 88 g and standard deviation 10 g. A tin has a standardised score of 2.5. Work out the mass of the tin.

(Total for Question 2 is 2 marks)

3 A set of 400 daily steps in hundreds taken by walkers is approximately normally distributed with mean 100 and standard deviation 3. Use the 68%, 95% and 99.7% rule. Estimate the number of these values that lie between 100 and 103.

(Total for Question 3 is 3 marks)

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4 The masses of tins of beans have mean 56 g and standard deviation 4 g. A tin has a standardised score of -1. Work out the mass of the tin.

(Total for Question 4 is 2 marks)

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5 The masses of tins of beans have mean 44 g and standard deviation 12 g. A tin has a standardised score of -1.5. Work out the mass of the tin.

(Total for Question 5 is 2 marks)

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6 A set of 2000 masses in grams of bags of flour is approximately normally distributed with mean 50 and standard deviation 15. Use the 68%, 95% and 99.7% rule. Estimate the number of these values that lie between 20 and 80.

(Total for Question 6 is 3 marks)

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7 In a maths test the mean mark is 62 and the standard deviation is 8. Hamza scored 66. Work out Hamza's standardised score, z = (x - mean) / standard deviation.

(Total for Question 7 is 2 marks)

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8 Uma scored 53 in French (mean 53, standard deviation 5) and 40 in history (mean 48, standard deviation 8). Work out the standardised score for each subject and state in which subject Uma did relatively better.

(Total for Question 8 is 4 marks)

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9 A set of 1000 heights in centimetres of adult women is approximately normally distributed with mean 60 and standard deviation 15. Use the 68%, 95% and 99.7% rule. Estimate the number of these values that lie between 60 and 75.

(Total for Question 9 is 3 marks)

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10 In a history test the mean mark is 51 and the standard deviation is 10. Wendy scored 49. Work out Wendy's standardised score, z = (x - mean) / standard deviation.

(Total for Question 10 is 2 marks)

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11 The masses of tins of beans have mean 43 g and standard deviation 5 g. A tin has a standardised score of 1. Work out the mass of the tin.

(Total for Question 11 is 2 marks)

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12 A set of 1000 lengths in millimetres of manufactured bolts is approximately normally distributed with mean 100 and standard deviation 5. Use the 68%, 95% and 99.7% rule. Estimate the number of these values that lie between 100 and 105.

(Total for Question 12 is 3 marks)

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13 Isla scored 49 in history (mean 57, standard deviation 10) and 58 in French (mean 67, standard deviation 8). Work out the standardised score for each subject and state in which subject Isla did relatively better.

(Total for Question 13 is 4 marks)

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14 The masses of tins of beans have mean 40 g and standard deviation 4 g. A tin has a standardised score of 1.5. Work out the mass of the tin.

(Total for Question 14 is 2 marks)

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15 A set of 2500 heights in centimetres of adult women is approximately normally distributed with mean 60 and standard deviation 3. Use the 68%, 95% and 99.7% rule. Estimate the number of these values that lie between 60 and 63.

(Total for Question 15 is 3 marks)

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16 Imani scored 68 in maths (mean 69, standard deviation 10) and 57 in art (mean 66, standard deviation 8). Work out the standardised score for each subject and state in which subject Imani did relatively better.

(Total for Question 16 is 4 marks)

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17 Callum scored 32 in French (mean 44, standard deviation 5) and 51 in art (mean 57, standard deviation 10). Work out the standardised score for each subject and state in which subject Callum did relatively better.

(Total for Question 17 is 4 marks)

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18 A set of 200 lifetimes in hours of a type of bulb is approximately normally distributed with mean 50 and standard deviation 4. Use the 68%, 95% and 99.7% rule. Estimate the number of these values that lie between 50 and 54.

(Total for Question 18 is 3 marks)

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19 Lucas scored 68 in French (mean 62, standard deviation 8) and 53 in music (mean 57, standard deviation 5). Work out the standardised score for each subject and state in which subject Lucas did relatively better.

(Total for Question 19 is 4 marks)

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20 The masses of tins of beans have mean 53 g and standard deviation 6 g. A tin has a standardised score of 1.5. Work out the mass of the tin.

(Total for Question 20 is 2 marks)

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Mark scheme · 7.1 The Normal Distribution: 1-hour Pack

Question 1

(33 - 45) / 4	**M1**
(59 - 67) / 5	**M1**
z = -3 and z = -1.6 cao	**A1**
science (higher standardised score)	**B1**

Answer: French: -3; science: -1.6; better in science

Question 2

mass = 88 + (2.5 x 10)	**M1**
113 cao	**A1**

Answer: 113 g

Question 3

uses the empirical rule percentage that applies	**M1**
34% of 400	**M1**
136 cao	**A1**

Answer: 136

Question 4

mass = 56 + (-1 x 4)	**M1**
52 cao	**A1**

Answer: 52 g

Question 5

mass = 44 + (-1.5 x 12)	**M1**
26 cao	**A1**

Answer: 26 g

Question 6

uses the empirical rule percentage that applies	**M1**
95% of 2000	**M1**
1900 cao	**A1**

Answer: 1900

Question 7

(66 - 62) / 8	**M1**
0.5 cao	**A1**

Answer: 0.5

Question 8

(53 - 53) / 5	**M1**
(40 - 48) / 8	**M1**
z = 0 and z = -1 cao	**A1**
French (higher standardised score)	**B1**

Answer: French: 0; history: -1; better in French

Question 9

uses the empirical rule percentage that applies	**M1**
34% of 1000	**M1**
340 cao	**A1**

Answer: 340

Question 10

(49 - 51) / 10	**M1**
-0.2 cao	**A1**

Answer: -0.2

Question 11

mass = 43 + (1 x 5)	**M1**
48 cao	**A1**

Answer: 48 g

Question 12

uses the empirical rule percentage that applies	**M1**
34% of 1000	**M1**
340 cao	**A1**

Answer: 340

Question 13

(49 - 57) / 10	**M1**
(58 - 67) / 8	**M1**
z = -0.8 and z = -1.13 cao	**A1**
history (higher standardised score)	**B1**

Answer: history: -0.8; French: -1.13; better in history

Question 14

mass = 40 + (1.5 x 4)	**M1**
46 cao	**A1**

Answer: 46 g

Question 15

uses the empirical rule percentage that applies	**M1**
34% of 2500	**M1**
850 cao	**A1**

Answer: 850

Question 16

(68 - 69) / 10	**M1**
(57 - 66) / 8	**M1**
z = -0.1 and z = -1.13 cao	**A1**
maths (higher standardised score)	**B1**

Answer: maths: -0.1; art: -1.13; better in maths

Question 17

(32 - 44) / 5	**M1**
(51 - 57) / 10	**M1**
z = -2.4 and z = -0.6 cao	**A1**
art (higher standardised score)	**B1**

Answer: French: -2.4; art: -0.6; better in art

Question 18

uses the empirical rule percentage that applies	**M1**
34% of 200	**M1**
68 cao	**A1**

Answer: 68

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Question 19

(68 - 62) / 8	**M1**
(53 - 57) / 5	**M1**
z = 0.75 and z = -0.8 cao	**A1**
French (higher standardised score)	**B1**

Answer: French: 0.75; music: -0.8; better in French

Question 20

mass = 53 + (1.5 x 6)	**M1**
62 cao	**A1**

Answer: 62 g

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