1.11 Sampling Methods: 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A stratified sample is taken from 240 customers. There are 60 adults in the population, and 5 adults are in the sample.

(a) Work out the sampling fraction in its simplest form.

(b) Work out the total size of the sample.

(Total for Question 1 is 4 marks)

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2 A teacher numbers 50 employees in a factory from 1 to 50 and wants a simple random sample of 3. Using the list of two-digit random numbers below, reading from the left, select the sample. Ignore numbers that are not between 1 and 50 and ignore repeats.

82 64 42 23 6 97 53 1 41 25 28 68

(a) Write down the numbers selected.

(b) Why must repeats be ignored?

(Total for Question 2 is 3 marks)

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3 A stratified sample is taken from 300 farm animals. There are 120 sheep in the population, and 12 sheep are in the sample.

(a) Work out the sampling fraction in its simplest form.

(b) Work out the total size of the sample.

(Total for Question 3 is 4 marks)

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4 A random sample of 40 members of a gym was taken. 12 of them use a bike. There are 1000 members of the gym altogether. Estimate the number of members of the gym who use a bike. Give your answer to the nearest whole number.

(Total for Question 4 is 3 marks)

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5 A survey of 200 staff uses a stratified sample of 20. The numbers in each group are in the table.

Group	Number
teachers	40
technicians	80
administrators	50
cleaners	30

Work out how many should be sampled from each group.

(Total for Question 5 is 3 marks)

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6 Two surveys estimate the proportion of students in a school who cycle. Survey A: 10 of 50 cycle. Survey B: 17 of 100 cycle.

(a) Work out the proportion who cycle in each survey as a percentage, to 1 decimal place if needed.

(b) Which survey is likely to give the more reliable estimate, and why?

(Total for Question 6 is 4 marks)

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7 A teacher numbers 90 employees in a factory from 1 to 90 and wants a simple random sample of 3. Using the list of two-digit random numbers below, reading from the left, select the sample. Ignore numbers that are not between 1 and 90 and ignore repeats.

83 1 15 49 27 44 35 41 44 80 83 64

(a) Write down the numbers selected.

(b) Why must repeats be ignored?

(Total for Question 7 is 3 marks)

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8 A random sample of 80 visitors to a museum was taken. 26 of them use a bike. There are 2500 visitors to the museum altogether. Estimate the number of visitors to the museum who use a bike. Give your answer to the nearest whole number.

(Total for Question 8 is 3 marks)

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9 There are 40 members of a sports club, numbered 1 to 40. A systematic sample of 10 is to be taken.

(a) Work out the interval between selected items.

(b) The first item is chosen at random from the first interval and is number 1. Write down the next two numbers selected.

(c) Write down the last number selected.

(Total for Question 9 is 4 marks)

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10 A survey of 300 customers uses a stratified sample of 30. The numbers in each group are in the table.

Group	Number
students	80
adults	60
pensioners	100
children	60

Work out how many should be sampled from each group.

(Total for Question 10 is 3 marks)

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11 A teacher numbers 50 houses on a long road from 1 to 50 and wants a simple random sample of 5. Using the list of two-digit random numbers below, reading from the left, select the sample. Ignore numbers that are not between 1 and 50 and ignore repeats.

3 22 85 14 1 80 8 70 30 36 94 77

(a) Write down the numbers selected.
(b) Why must repeats be ignored?

(Total for Question 11 is 3 marks)

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12 A survey of 160 staff uses a stratified sample of 40. The numbers in each group are in the table.

Group	Number
teachers	40
technicians	80
administrators	40

Work out how many should be sampled from each group.

(Total for Question 12 is 3 marks)

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13 A random sample of 10 of the 200 parcels sent by a firm last week had a mean mass of 30 kg. Estimate the total mass of all 200 parcels.

(Total for Question 13 is 2 marks)

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14 A survey of 250 students uses a stratified sample of 50. The numbers in each group are in the table.

Group	Number
Year 7	80
Year 8	100
Year 9	20
Year 10	50

Work out how many should be sampled from each group.

(Total for Question 14 is 3 marks)

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15 A random sample of 10 of the 200 parcels sent by a firm last week had a mean mass of 82 kg. Estimate the total mass of all 200 parcels.

(Total for Question 15 is 2 marks)

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16 A teacher numbers 60 students in a year group from 1 to 60 and wants a simple random sample of 5. Using the list of two-digit random numbers below, reading from the left, select the sample. Ignore numbers that are not between 1 and 60 and ignore repeats.

11 48 73 54 84 92 78 90 12 40 53 48

(a) Write down the numbers selected.
(b) Why must repeats be ignored?

(Total for Question 16 is 3 marks)

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17 A random sample of 10 of the 1000 parcels sent by a firm last week had a mean mass of 55 kg. Estimate the total mass of all 1000 parcels.

(Total for Question 17 is 2 marks)

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18 There are 100 books on a library shelf, numbered 1 to 100. A systematic sample of 20 is to be taken.

(a) Work out the interval between selected items.

(b) The first item is chosen at random from the first interval and is number 1. Write down the next two numbers selected.

(c) Write down the last number selected.

(Total for Question 18 is 4 marks)

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19 A charity has 240 volunteers. A simple random sample of 15 volunteers is chosen so that every volunteer has an equal chance of selection. Work out the probability that a particular volunteer, Aisha, is chosen.

(Total for Question 19 is 2 marks)

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Mark scheme · 1.11 Sampling Methods: 1-hour Pack

Question 1

5/60	M1
1/12 oe	A1
240 x 1/12	M1
20 cao	A1

Answer: (a) 1/12; (b) 20

Question 2

ignores numbers over 50, 0 and repeats	M1
42, 23, 6 cao	A1
so each item can only be chosen once (no item is selected twice)	B1

Answer: (a) 42, 23, 6; (b) each item can only be selected once

Question 3

12/120	M1
1/10 oe	A1
300 x 1/10	M1
30 cao	A1

Answer: (a) 1/10; (b) 30

Question 4

12/40	M1
3/10 x 1000	M1
300 cao	A1

Answer: 300

Question 5

sample size / population = 20/200	M1
group size x sampling fraction for at least one group	M1
4, 8, 5, 3 cao	A1

Answer: 4, 8, 5, 3

Question 6

10/50 x 100 or 17/100 x 100	M1
20% and 17% cao	A1
Survey B	B1
it has a larger sample (100 compared with 50)	B1

Answer: (a) 20% and 17%; (b) Survey B, larger sample

Question 7

ignores numbers over 90, 0 and repeats	M1
83, 1, 15 cao	A1
so each item can only be chosen once (no item is selected twice)	B1

Answer: (a) 83, 1, 15; (b) each item can only be selected once

Question 8

26/80	M1
13/40 x 2500	M1
813 cao	A1

Answer: 813

Question 9

40 / 10	M1
4 cao	A1
5 and 9	B1
37 cao	B1

Answer: (a) 4; (b) 5, 9; (c) 37

Question 10

sample size / population = 30/300	M1
group size x sampling fraction for at least one group	M1
8, 6, 10, 6 cao	A1

Answer: 8, 6, 10, 6

Question 11

ignores numbers over 50, 0 and repeats	M1
3, 22, 14, 1, 8 cao	A1
so each item can only be chosen once (no item is selected twice)	B1

Answer: (a) 3, 22, 14, 1, 8; (b) each item can only be selected once

Question 12

sample size / population = 40/160	M1
group size x sampling fraction for at least one group	M1
10, 20, 10 cao	A1

Answer: 10, 20, 10

Question 13

200 x 30	M1
6000 kg cao	A1

Answer: 6000 kg

Question 14

sample size / population = 50/250	M1
group size x sampling fraction for at least one group	M1
16, 20, 4, 10 cao	A1

Answer: 16, 20, 4, 10

Question 15

200 x 82	M1
16400 kg cao	A1

Answer: 16400 kg

Question 16

ignores numbers over 60, 0 and repeats	M1
11, 48, 54, 12, 40 cao	A1
so each item can only be chosen once (no item is selected twice)	B1

Answer: (a) 11, 48, 54, 12, 40; (b) each item can only be selected once

Question 17

1000 x 55	M1
55000 kg cao	A1

Answer: 55000 kg

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Question 18

100 / 20	**M1**
5 cao	**A1**
6 and 11	**B1**
96 cao	**B1**

Answer: (a) 5; (b) 6, 11; (c) 96

Question 19

correct method, 15/240	**M1**
1/16 oe (0.0625) cao	**A1**

Answer: 1/16 (0.0625)

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