HIGHER

1.6 Capture Recapture: 1-hour Pack

Total Marks

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A random sample of 80 students in a school was taken. 37 of them walk to work. There are 2000 students in the school altogether. Estimate the number of students in the school who walk to work. Give your answer to the nearest whole number.

(Total for Question 1 is 3 marks)

---

2 A random sample of 10 of the 200 parcels sent by a firm last week had a mean mass of 87 kg. Estimate the total mass of all 200 parcels.

(Total for Question 2 is 2 marks)

---

3 To estimate the number of frogs in a pond, 30 are caught, marked and released. Later, 40 are caught and 4 of them are marked.

(a) Estimate the total number of frogs in a pond.

(b) State one assumption you have made.

(Total for Question 3 is 3 marks)

© Revision Library | revisionlibrary.co.uk

4 A random sample of 20 of the 300 parcels sent by a firm last week had a mean mass of 85 kg. Estimate the total mass of all 300 parcels.

(Total for Question 4 is 2 marks)

---

5 Two surveys estimate the proportion of students in a school who cycle. Survey A: 6 of 25 cycle. Survey B: 62 of 250 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 5 is 4 marks)

---

6 To estimate the number of frogs in a pond, 20 are caught, marked and released. Later, 30 are caught and 5 of them are marked.

(a) Estimate the total number of frogs in a pond.

(b) State one assumption you have made.

(Total for Question 6 is 3 marks)

---

7 A random sample of 50 members of a gym was taken. 23 of them use a bike. There are 1200 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 7 is 3 marks)

© Revision Library | revisionlibrary.co.uk

8 A random sample of 40 residents of a town was taken. 13 of them have a library card. There are 5000 residents of the town altogether. Estimate the number of residents of the town who have a library card. Give your answer to the nearest whole number.

(Total for Question 8 is 3 marks)

---

9 To estimate the number of deer in a park, 30 are caught, marked and released. Later, 30 are caught and 6 of them are marked.

(a) Estimate the total number of deer in a park.

(b) State one assumption you have made.

(Total for Question 9 is 3 marks)

---

10 A random sample of 200 visitors to a museum was taken. 40 of them own a pet. There are 5000 visitors to the museum altogether. Estimate the number of visitors to the museum who own a pet. Give your answer to the nearest whole number.

(Total for Question 10 is 3 marks)

© Revision Library | revisionlibrary.co.uk

11 Two surveys estimate the proportion of visitors to a museum who cycle. Survey A: 25 of 50 cycle. Survey B: 104 of 200 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 11 is 4 marks)

---

12 A random sample of 100 residents of a town was taken. 11 of them have a library card. There are 5000 residents of the town altogether. Estimate the number of residents of the town who have a library card. Give your answer to the nearest whole number.

(Total for Question 12 is 3 marks)

---

13 A random sample of 10 of the 400 parcels sent by a firm last week had a mean mass of 45 kg. Estimate the total mass of all 400 parcels.

(Total for Question 13 is 2 marks)

---

14 To estimate the number of frogs in a pond, 60 are caught, marked and released. Later, 60 are caught and 8 of them are marked.

(a) Estimate the total number of frogs in a pond.

(b) State one assumption you have made.

(Total for Question 14 is 3 marks)

© Revision Library | revisionlibrary.co.uk

15 A random sample of 80 members of a gym was taken. 23 of them have a library card. There are 5000 members of the gym altogether. Estimate the number of members of the gym who have a library card. Give your answer to the nearest whole number.

(Total for Question 15 is 3 marks)

---

16 A random sample of 10 of the 300 parcels sent by a firm last week had a mean mass of 66 kg. Estimate the total mass of all 300 parcels.

(Total for Question 16 is 2 marks)

---

17 To estimate the number of deer in a park, 60 are caught, marked and released. Later, 30 are caught and 5 of them are marked.

(a) Estimate the total number of deer in a park.

(b) State one assumption you have made.

(Total for Question 17 is 3 marks)

© Revision Library | revisionlibrary.co.uk

18 Two surveys estimate the proportion of residents of a town who cycle. Survey A: 2 of 20 cycle. Survey B: 14 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 18 is 4 marks)

---

19 Two surveys estimate the proportion of members of a gym who cycle. Survey A: 2 of 20 cycle. Survey B: 22 of 250 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 19 is 4 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.6 Capture Recapture: 1-hour Pack

Question 1

37/80	**M1**
37/80 x 2000	**M1**
925 cao	**A1**

Answer: 925

Question 2

200 x 87	**M1**
17400 kg cao	**A1**

Answer: 17400 kg

Question 3

30 x 40 / 4	**M1**
300 cao	**A1**
e.g. the population has not changed between catches (no births, deaths, or migration), or marked ones mix back evenly	**B1**

Answer: (a) 300; (b) the population is unchanged between the two catches

Question 4

300 x 85	**M1**
25500 kg cao	**A1**

Answer: 25500 kg

Question 5

6/25 x 100 or 62/250 x 100	**M1**
24% and 24.8% cao	**A1**
Survey B	**B1**
it has a larger sample (250 compared with 25)	**B1**

Answer: (a) 24% and 24.8%; (b) Survey B, larger sample

Question 6

20 x 30 / 5	**M1**
120 cao	**A1**
e.g. the population has not changed between catches (no births, deaths, or migration), or marked ones mix back evenly	**B1**

Answer: (a) 120; (b) the population is unchanged between the two catches

Question 7

23/50	**M1**
23/50 x 1200	**M1**
552 cao	**A1**

Answer: 552

Question 8

13/40	**M1**
13/40 x 5000	**M1**
1625 cao	**A1**

Answer: 1625

Question 9

30 x 30 / 6	**M1**
150 cao	**A1**
e.g. the population has not changed between catches (no births, deaths, or migration), or marked ones mix back evenly	**B1**

Answer: (a) 150; (b) the population is unchanged between the two catches

Question 10

40/200	**M1**
1/5 x 5000	**M1**
1000 cao	**A1**

Answer: 1000

Question 11

25/50 x 100 or 104/200 x 100	**M1**
50% and 52% cao	**A1**
Survey B	**B1**
it has a larger sample (200 compared with 50)	**B1**

Answer: (a) 50% and 52%; (b) Survey B, larger sample

Question 12

11/100	**M1**
11/100 x 5000	**M1**
550 cao	**A1**

Answer: 550

Question 13

400 x 45	**M1**
18000 kg cao	**A1**

Answer: 18000 kg

Question 14

60 x 60 / 8	**M1**
450 cao	**A1**
e.g. the population has not changed between catches (no births, deaths, or migration), or marked ones mix back evenly	**B1**

Answer: (a) 450; (b) the population is unchanged between the two catches

Question 15

23/80	**M1**
23/80 x 5000	**M1**
1438 cao	**A1**

Answer: 1438

Question 16

300 x 66	**M1**
19800 kg cao	**A1**

Answer: 19800 kg

© Revision Library | revisionlibrary.co.uk

Question 17

60 x 30 / 5	**M1**
360 cao	**A1**
e.g. the population has not changed between catches (no births, deaths, or migration), or marked ones mix back evenly	**B1**

Answer: (a) 360; (b) the population is unchanged between the two catches

Question 18

2/20 x 100 or 14/100 x 100	**M1**
10% and 14% cao	**A1**
Survey B	**B1**
it has a larger sample (100 compared with 20)	**B1**

Answer: (a) 10% and 14%; (b) Survey B, larger sample

Question 19

2/20 x 100 or 22/250 x 100	**M1**
10% and 8.8% cao	**A1**
Survey B	**B1**
it has a larger sample (250 compared with 20)	**B1**

Answer: (a) 10% and 8.8%; (b) Survey B, larger sample

© Revision Library | revisionlibrary.co.uk