Number of Ways

Example In the sixth form there are 85 girls and 68 boys. How many ways can a leadership team be selected consisting of head girl, head boy, deputy head girl, deputy head boy

$$85 \times 84 \times 68 \times 67 = 32,529,840$$

Capture Recapture

Ex1 Ping Pong balls

We have a big jar and wish to estimate the number of balls within the jar.

Suppose we take out 20 and mark them.
Put them back in and mix thoroughly

A random sample of 40 is now selected of which 5 happen to be marked

Estimated population of ping pong balls $= 20 \times \frac{40}{5}$

$= 160$

Exam Question

13 Alex wants to find out how many ducks there are in a park.

One day he puts a tag on each of 30 of the ducks.
The next day he catches 40 ducks.
8 of these ducks have tags on them.

(i) Work out an estimate for the number of ducks in the park.

$30 \times \frac{40}{8} = 150$

Alex assumed that none of the tags fell off during the night.

(ii) If Alex's assumption is wrong, explain how this could affect your answer to part (i).

If some fell off there are less tagged ducks
so $\frac{40}{8}$ should be multiplied by a smaller number

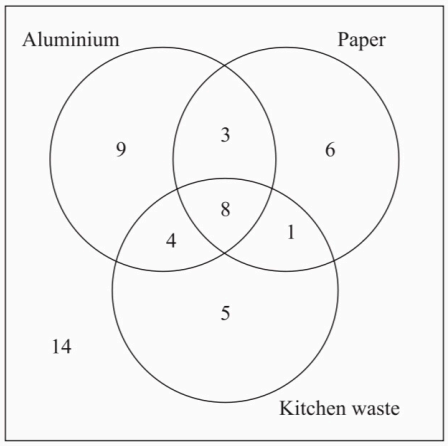
(Total for Question 13 is 4 marks)

150 would therefore be an overestimate

Multiply the two largest numbers and divide by the smallest

Venn Diagrams

4 A local council has introduced a recycling scheme for aluminium, paper and kitchen waste. 50 residents are asked which of these materials they recycle. The numbers of people who recycle each type of material are shown in the Venn diagram.



One of the residents is selected at random.

(i) Find the probability that this resident recycles

(*A*) at least one of the materials, [1]

(*B*) exactly one of the materials. [2]

(ii) Given that the resident recycles aluminium, find the probability that this resident does not recycle paper. [2]

Two residents are selected at random.

(iii) Find the probability that exactly one of them recycles kitchen waste. [3]

$\frac{36}{50}$

$\frac{9+6+5}{50} = \frac{20}{50}$

$\frac{13}{24}$

$P(\text{Exactly 1}) = P(\text{first does and second doesn't}) + P(\text{first doesn't second does})$

$= \frac{18}{50} \times \frac{32}{49} + \frac{32}{50} \times \frac{18}{49} = \frac{576}{1225}$

Probability

Question | Mark Scheme | Examiner's Report | Resources

The following shows the results of a survey on the types of exercise taken by a group of 100 people

65 run
48 swim
60 cycle
40 run and swim
30 swim and cycle
35 run and cycle
25 do all three

(a) Draw a Venn Diagram to represent these data.