1.2) Sampling

Worked example	Your turn
There are 46 girls and 65 boys in a school. Explain briefly how you could take a random sample of 12 pupils using a simple random sample.	There are 64 girls and 56 boys in a school. Explain briefly how you could take a random sample of 15 pupils using a simple random sample. Allocate a number between 1 and 120 to each pupil. Use random number tables, computer, calculator, to generate random numbers between 1 and 120 inclusive. If a number generated is a repeat, ignore it, and generate an extra random number. Repeat the process until there are 15 distinct numbers. Pupils corresponding to these numbers are the sample.

Worked example	Your turn
There are 46 girls and 65 boys in a school. Explain briefly how you could take a random sample of 12 pupils using a simple random sample using lottery sampling.	There are 64 girls and 56 boys in a school. Explain briefly how you could take a random sample of 15 pupils using a simple random sample using lottery sampling. Allocate a number between 1 and 120 to each pupil, or use their name, written on identical cards. Place these cards into a hat. Draw out cards from the hat, and do not put the cards back in the hat, once drawn. Repeat until there are 15 cards. The 15 pupils corresponding to these cards are the sample.

Worked example	Your turn
A telephone directory contains 5000 names. A researcher wishes to select a systematic sample of 1000 names from the directory. Explain in detail how the researcher should obtain such a sample.	A telephone directory contains 50000 names. A researcher wishes to select a systematic sample of 100 names from the directory. Explain in detail how the researcher should obtain such a sample. Randomly select a number between 001 and 500. This number corresponds to the first person in the sample. After this select every 500th person in the telephone directory.

Worked example	Your turn
A school has 30 classes and a sixth form. In each class there are 60 students. In the sixth form there are 300 students. There are equal numbers of boys and girls in each class. There are equal numbers of boys and girls in the sixth form. The head teacher wishes to obtain the opinions of the students about school uniforms. Explain how the head teacher would take a stratified sample of size 140.	A school has 15 classes and a sixth form. In each class there are 30 students. In the sixth form there are 150 students. There are equal numbers of boys and girls in each class. There are equal numbers of boys and girls in the sixth form. The head teacher wishes to obtain the opinions of the students about school uniforms. Explain how the head teacher would take a stratified sample of size 40.

Total in school $= 15 \times 30 + 150 = 600$

Random sample of $\frac{30}{600} \times 40 = 2$ from each class

Random sample of $\frac{150}{600} \times 40 = 10$ from sixth form

Label the boys in each class from 1-15 and the girls in each class from 1-15.

Use random numbers to select 1 girl and 1 boy.

Label the boys in the sixth form from 1-75 and the girls from 1-75.

Use random numbers to select 5 different boys and 5 different girls.

If the random number generates the same person, repeat until there are distinct members in the sample.

Worked example	Your turn
A company wants to survey the opinions of workers. The manager decides to give a questionnaire to a sample of 40 workers. There are 50 workers between ages 18 and 32. There are 180 workers between 33 and 47. There are 70 workers between 48 and 62. Explain how the manager could obtain a stratified sample of worker opinions.	A company wants to survey the opinions of workers. The manager decides to give a questionnaire to a sample of 80 workers. There are 75 workers between ages 18 and 32. There are 140 workers between 33 and 47. There are 85 workers between 48 and 62. Explain how the manager could obtain a stratified sample of worker opinions. Total = 75 + 140 + 85 = 300 workers 18-32: $\frac{75}{300} \times 80 = 20$ workers 33-47: $\frac{140}{300} \times 80 = 37.33 \ldots \approx 37$ workers 48-62: $\frac{85}{100} \times 80 = 22.66 \ldots \approx 23$ workers. Number the workers in each age group. Use a random number table, generator, or calculator, to produce the required quantity of random numbers. If the random number generates the same person, repeat until there are distinct members in the sample. Give the questionnaire to the workers corresponding to these numbers.