Preparing to succeed in A-level Statistics

Summer Preparation Work

Name:

Welcome to college and to the Mathematics Department.

You will have a long break this summer and may well find that you get rather rusty at some of the maths skills which you spent so long learning at school.

This booklet contains some of those key ideas from GCSE which will help you to make a good start on the A-level course. Please work through this booklet over the summer to keep your skills up to speed.

Please make a good attempt at every question - we'd rather it was wrong than blank as it helps us to see where you may need some help! It's fine to look things up in your old books, or look at websites like BBC GCSE Bitesize to get some help if you need it.

Please set out all of your working carefully.

Hand in your completed booklet to your teacher on your **first statistics lesson** – this may be your first day in college so make sure you bring it with you!

Preparing for lessons in September – please bring:

- A4 file paper (lined not squared is preferable)
- A ring binder folder with some file dividers
- Pens and pencils
- Highlighter pens
- This booklet to hand in!
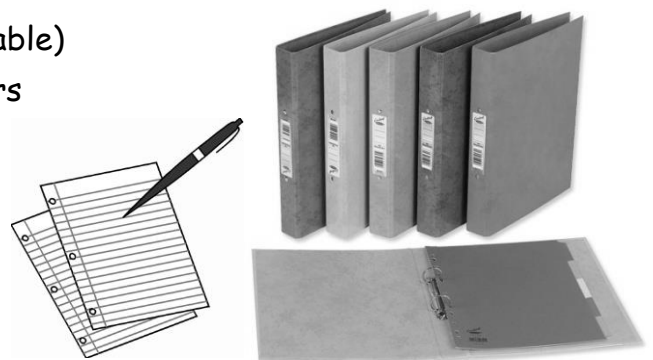
Probability

Probability is used to measure the chance of something happening and it fundamental to a great deal of statistical theory. Remember that probability is measured on a scale of 0 (impossible) to 1 (certain) and that with a set of equally likely outcomes the probability of an event happening is the number of outcomes for the event divided by the total number of possible outcomes.

Examples to do:

1. Sarah has a biased 4-sided spinner.
   The spinner can land on 1, 2, 3 or 4

   The probability that the spinner will land on 1, 2 or 4 is given in the table.

Number	1	2	3	4
Probability	0.4	0.35		0.1

   (a) Work out the probability that the spinner will land on 3

   ....

   Ryan is going to spin the spinner 80 times.

   (b) Work out an estimate for the number of times he should expect the spinner to land on 2

   ....
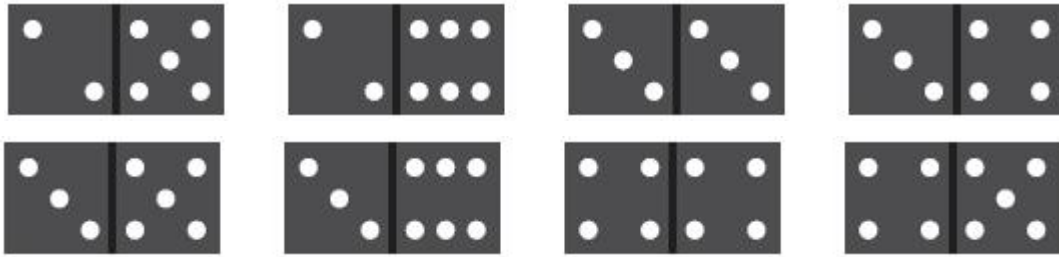
2. Abid is waiting for a bus.
   The probability that his bus will be early is 0.2
   The probability that his bus will be on time is 0.7
   Work out the probability that his bus will be either early or on time.

   ....

3. Here are 8 dominoes.

The 8 dominoes are put in a bag.

Riaz takes at random a domino from the bag.

(a)   Find the probability that he takes a domino with a total of 8 spots or a domino with a total of 9 spots.

....

Helima takes at random 2 dominoes from the bag of 8 dominoes without replacement.

(b) Work out the probability that

   (i) the total number of spots on the two dominoes is 18

....
   (ii) the total number of spots on the two dominoes is 17

....

4. Each student in a group of 32 students was asked the following question.

"Do you have a desktop computer (*D*), a laptop (*L*) or a tablet (*T*)?"

Their answers showed that

19 students have a desktop computer
17 students have a laptop
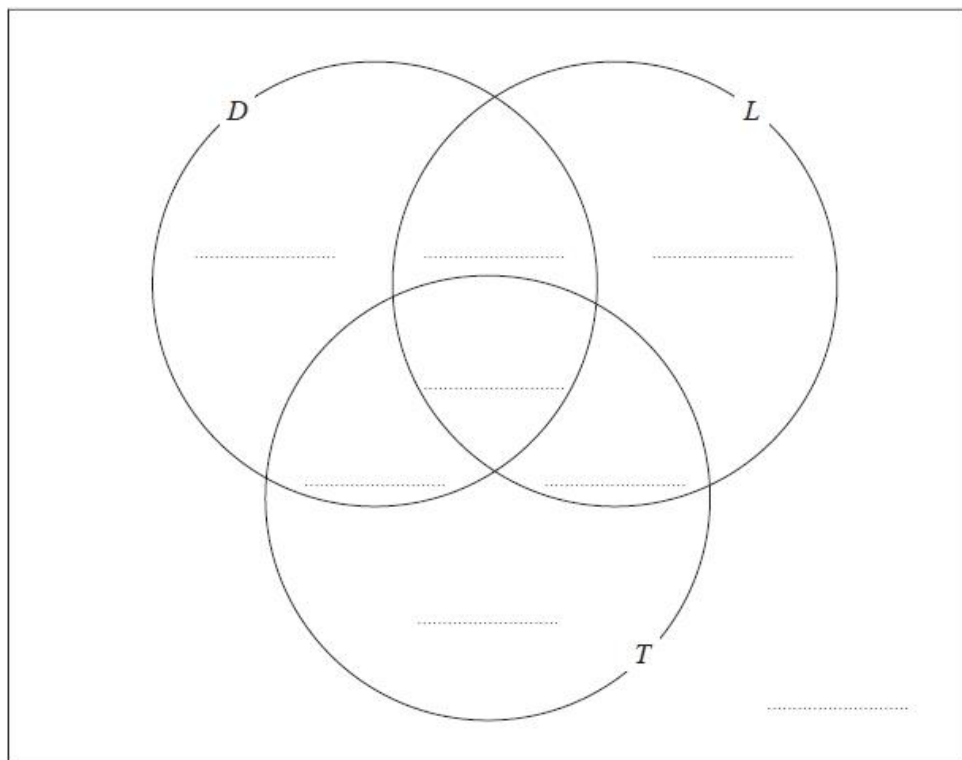16 students have a tablet
9 students have both a desktop computer and a laptop
11 students have both a desktop computer and a tablet
7 students have both a laptop and a tablet
5 students have all three.

(a)   Using this information, complete the Venn diagram to show the number of students in each appropriate subset

One of the students with both a desktop computer and a laptop is chosen at random.

(b) Find the probability that this student also has a tablet.

....

Numerical work

In statistics it is important to be able to work with fractions, decimals and percentages. Other numerical skills involve rounding decimals and using significant figures.

Examples to do:

1. (a) Lisa sees a dress in a sale.
   The normal price of the dress is £45
   The price of the dress is reduced by 12% in the sale.
   Work out the price of the dress in the sale.

   £..

   (b)   Lisa's weekly pay increases from £525 to £546

   Calculate her percentage pay increase.

   ....%

   (c)   Lisa sold a car for £2240 having made a loss of 30%. How much
          did she originally pay for the car?

   £..

2. (a) Work out the value of $\dfrac{\sqrt{7.4}}{9.8-2.2}$

Give your answer as a decimal.
Write down all the figures on your calculator display.

....

(b) Give your answer to part (a) correct to 3 significant figures.

....

3. Give the value of 2.91^2 correct to 2 decimal places.

....

4. (a) Write 64% as a fraction. Give your fraction in its simplest form.

....

(b) Write 9% as a decimal.

....

5. Here are five decimal numbers:
       0.16   0.06   0.007   0.41   0.032

(a) Write 0.41 as a fraction.

....

(b) Write 0.16 as a percentage.

....

(c) Write down the smallest of the five numbers.

....

Algebra

It will be necessary to substitute numbers into formulae and solve equations, including simultaneous equations.

Examples to do:

1. Solve the equation $4x - 5 = 17$

    $x =$ ....

2. Solve the equation $7.31 - b = 2.56$

    $b =$ ....

3. Solve the equation, giving your answer to 3 significant figures: $\frac{10}{s} = 4.63$

    $s =$ ....

4. $z = \frac{23.6 - m}{\sqrt{v}}$. Find the value of z to 2 decimal places when $m = 20$ and $v = 10$

    $z =$ ....

5. Solve the simultaneous equations:

$y - 2x = 6$

$y + 2x = 6$

Show clear algebraic working.

$x = $ ....

$y = $ ....

6. Solve the simultaneous equations:

$30 - m = 2.1s$

$10 - m = -1.6s$

Give your answers to 2 decimal places.

$m = $ ....

$s = $ ....