25 Numbers

A Types of numbers

Numbers in a group together may be called a **series** or **set of numbers**. If the order in which they occur is significant then they may be called a **sequence of numbers**. 1, 4, 9, 16, 25 is a sequence of numbers, for example – it represents the numbers 1 to 5 **squared**.

1, 3, 5, 7 ... = **odd numbers**; 2, 4, 6, 8 ... = **even numbers**; 2, 3, 5, 7, 11 ... = **prime numbers**. The highest number in a group is the **maximum** and the lowest is the **minimum**. *The room holds a **maximum** of 50 and we won't run the class without a **minimum** of 12 students.*

An **approximate** number is one which is roughly correct but is not the **precise** or **exact number**. *Look at the figures and work out in your head what the **approximate** answer is likely to be. Then use a calculator to find the **exact** number.*

An **aggregate** is a number reached by totalling a set of numbers = the **total**. *The **average** mark achieved in the exam is calculated by taking the **aggregate** of all the marks and dividing by the number of exam entries.*

A **discrete** number or unit is something which is separate and cannot be divided into smaller numbers or units of the same thing. The opposite of discrete is **continuous**. A bag of apples, for example, could be considered as consisting of discrete items whereas apple sauce could be considered – by mathematicians, at least – as continuous.

A **constant** number or quantity is one that does not change. *In the experiment we **varied*** [changed] *the amount of water in the beaker but kept the amount of salt added **constant**.*
A **random number** is one chosen by chance, i.e. it is not predictable.

B Working with numbers

The word **figure** is often used to refer to the symbol used for a number. *Write the total number in words and figures.*
Verbs that are frequently used with the word **number** include **calculate [work out] a number, estimate**[1] **a number, round a number up/down**[2], **total [add up]** a set of numbers. Numbers can also **tally**[3]. *My figures don't seem to **tally** with yours.* You can also **deduct [take away, subtract]** one number from another number.

[1] make a rough guess at [2] make a **fraction**, e.g. $\frac{1}{6}$ or 0.78 into the nearest **whole number**
[3] match, agree

Values and **variables** are also useful terms when working with numbers. **Values** are individual numbers in a set of data. *The graph shows the temperature **values** for different months of the year.* **Variables** are characteristics that can take on different values for different members of a group or set being studied. *In investigating living standards you must take key **variables** such as social provision and cost of living into account.*

The **incidence** of something refers to how frequently it occurs. *The **incidence** of twins in the population is growing.* When talking about numbers, **magnitude** simply refers to the size of something, whereas in other contexts it indicates large size or importance. *Write down the numbers in order of **magnitude**, beginning with the smallest.*

When **making calculations** in, say, an exam, it is often a good idea to make an **estimate**[4] first of what the answer is likely to be. Then you will see if your final answer is **in the right area**[5] or not. Exam candidates are also often advised to **show their workings**[6] so that the marker can see how they **arrived at their answer** and they may get credit for their method even if the final answer is incorrect.

[4] rough guess [5] approximately the same [6] leave all their calculations on the page

Exercises

25.1 Answer these questions.

1 What is five squared?
2 What is the next prime number after 19?
3 How is this sequence of numbers created? 3, 9, 27, 81
4 What is the aggregate of this set of test marks? 6, 8, 9, 5, 6, 7
5 If you round up 6.66, what number do you have?
6 $\frac{7}{9}$ and 4 – which is a whole number and which is a fraction?
7 In your country is tax automatically deducted from employees' earnings?
8 Is an accountant pleased or displeased if figures that he/she is checking tally?

25.2 **Dr Syal is advising one of his dissertation students who is interested in pollution in road tunnels. Complete the conversation. You are sometimes given the first letter to help you.**

Dr Syal: You could c..... the total number of private cars that use the tunnel each week, based on the day-to-day figures, and get an a..... figure for how much carbon they're all emitting.
Melissa: How p..... would that figure have to be?
Dr Syal: Oh, it doesn't have to be exact, you just need to e..... more or less what the total pollution will be. Then you can check to see if those figures t..... with the figures that have already been published for similar tunnels. And the figure won't be c..... of course; it'll go up and down depending on lots of factors such as weather conditions, average speed, etc.
Melissa: But can we say if the figures will be true for the future too?
Dr Syal: Well, we do know that the traffic growth has been c..... over the past ten years; it hasn't ever gone down, so I think you can make some useful predictions.
Melissa: Should I present each daily total as a d..... item or can I just put them all together into one figure for each week?
Dr Syal: A weekly total is fine, and you can ..... it up or ..... to the nearest 100.
Melissa: Right, OK. Thanks so much for your help.

25.3 **Rewrite these spoken sentences so that they are more appropriate for writing, using the word in italics in an appropriate form.**

1 There were fewer car accidents last year. *incidence*
2 We made a rough guess at what the final figure might be. *estimate*
3 The graph shows the results from the lowest to the highest. *magnitude*
4 A computer program helped us work out the significance of the different variables. *calculate*
5 Taking x away from y will help you arrive at the correct answer. *subtract*
6 The results from the first experiment were not the same as those we got from the repeat experiment. *tally*

25.4 **Fill in the gaps in this advice a maths lecturer is giving her students.**

In the exam, don't forget to show all your (1) ..... as we want to see how you (2) ..... at your results. Make your (3) ..... very carefully – you'd be amazed at how many people submit answers that are hardly even in the right (4) ..... . And please write legibly – we must be able to distinguish all your (5) ..... ! When doing graphs, plot your (6) ..... carefully and if asked to describe an experiment don't forget to take all significant (7) ..... into account. Good luck!

FOLLOW UP Find some examples of the use of numbers in your own subject area. Note down some interesting phrases or sentences.