Fortrose Academy

Higher Graphics Course Notes

Preliminary, Production and Promotional graphics - The 3 Ps

The 3 Ps

All graphic forms can be classified by the following terms: ***Preliminary, Production*** and **Promotional** graphics. It is important you are familiar with each term and how they are applied across all features of the graphics industry. You shall have used many within several aspects of your school work to date, including within other subjects.

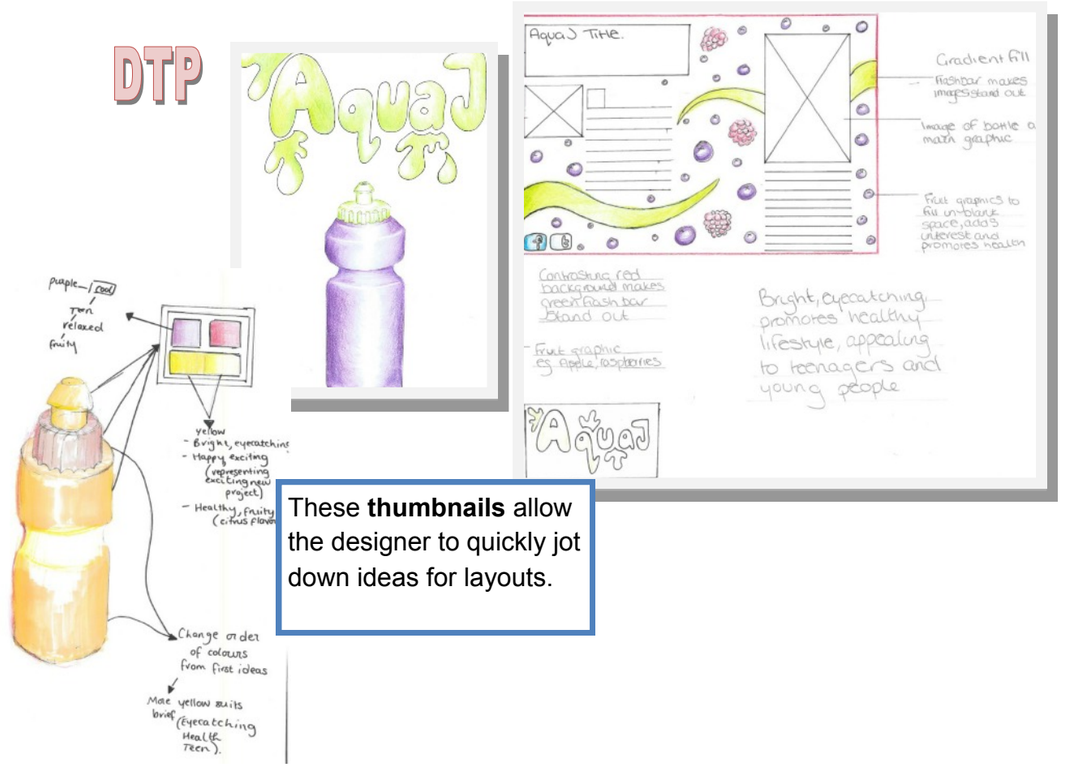
Preliminary graphics

This is the first category of graphic, and as the name suggests these are used to **plan** how graphic design briefs shall be answered. Their form varies depending on the area of graphics concerned, but always takes the form of **quick, freehand sketches.** Here are three examples from 3D mod elling, 2D CAD and DTP:

Benefits of using ***preliminary graphics***—thumbnails, rough sketches and illustrations:

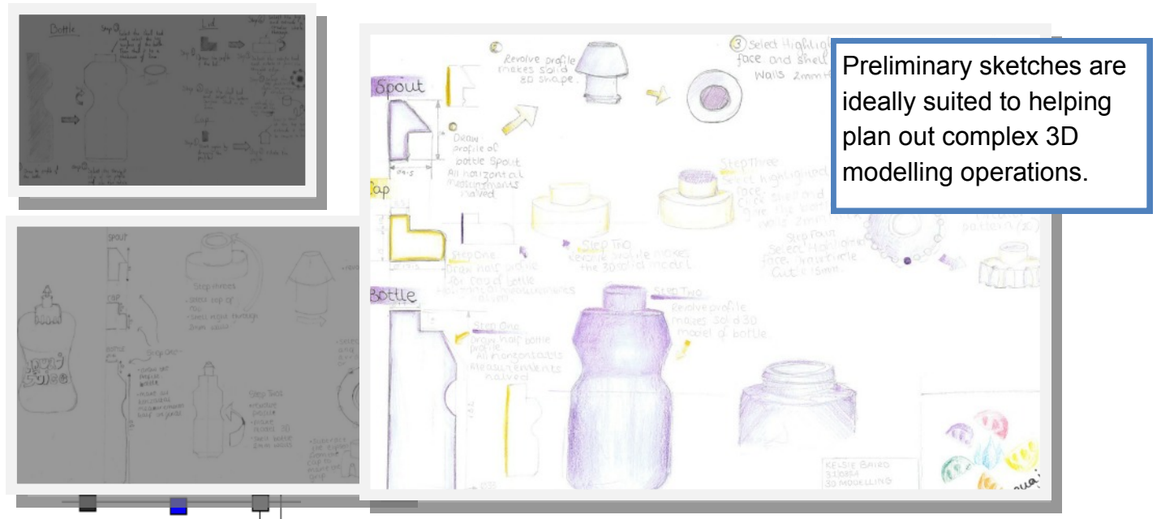
- They can be easily and quickly annotated to convey ideas
- They are a good way of recording ideas
- They are quick to produce
- Sketches are excellent ways to communicate ideas to a client.
- They are produced cheaply—no expense is required for materials.

DTP



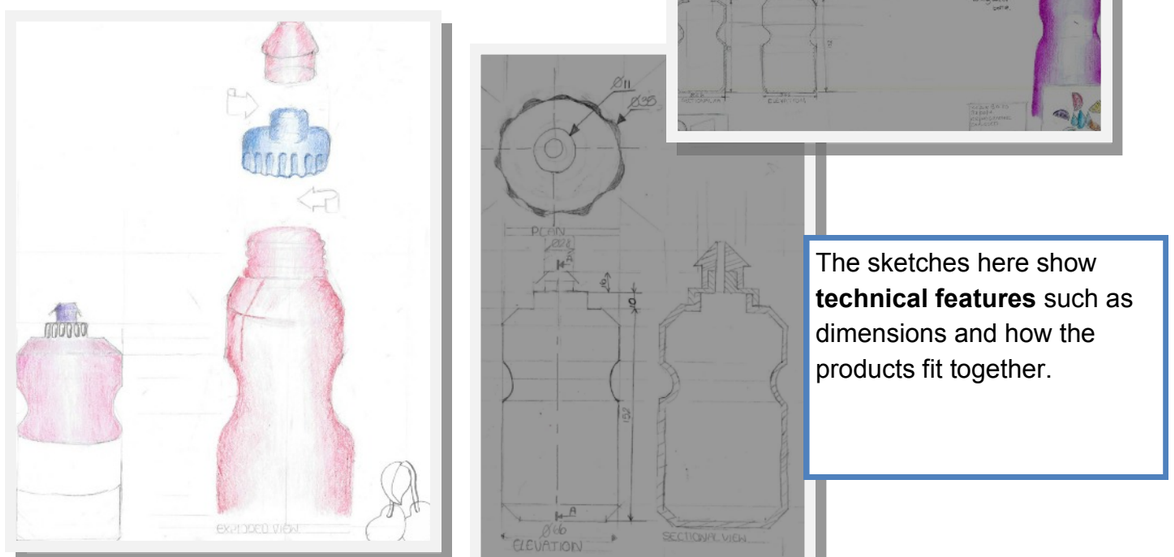
These **thumbnails** allow the designer to quickly jot down ideas for layouts.

3D Modelling



Preliminary sketches are ideally suited to helping plan out complex 3D modelling operations.

Engineering/ development



The sketches here show **technical features** such as dimensions and how the products fit together.

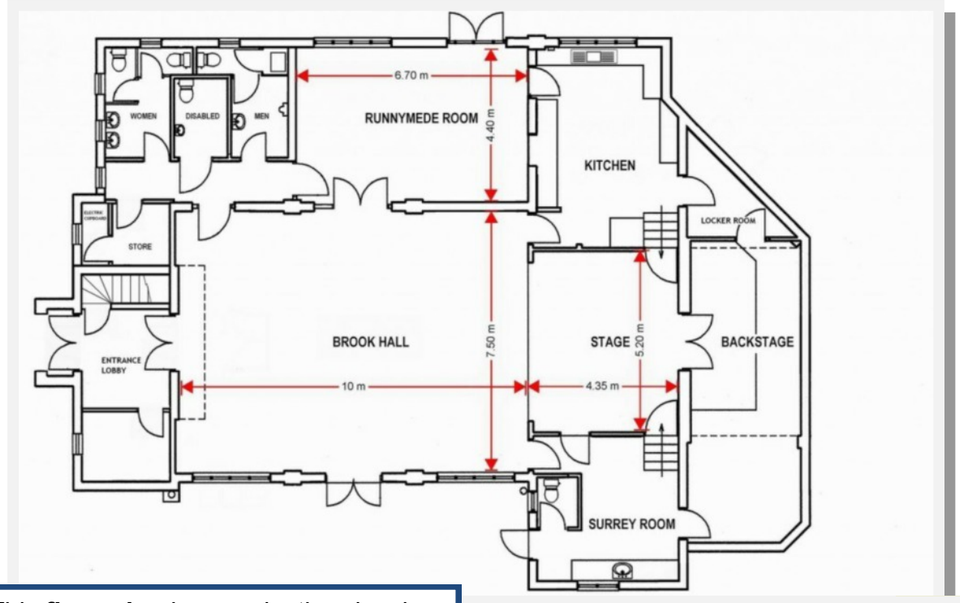
The 3Ps

Production Graphics

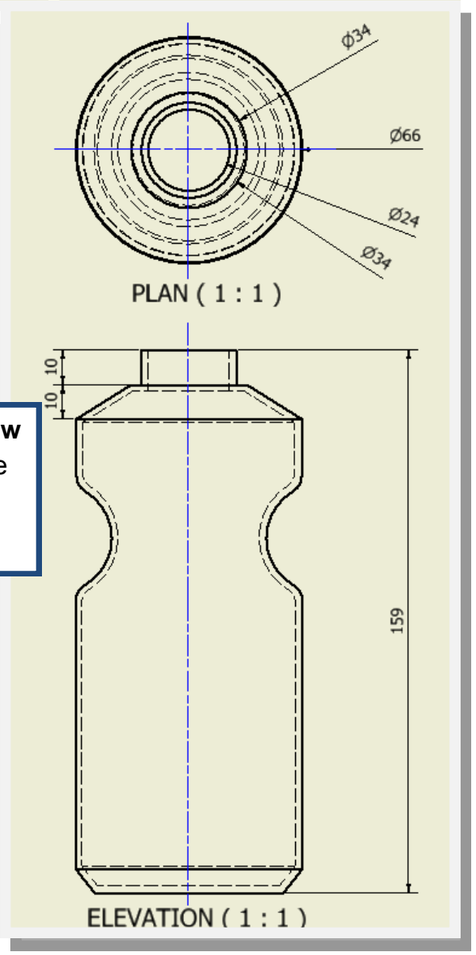
These graphics—as the name sug gests—are used to produce the article in question. They must therefore be accurately **dimensioned** and in pro portion.

Benefits of using ***production drawings;*** dimensioned ortho graphic views, exploded draw ings, surface developments and sectional views

- They are accurate and drawn to scale
- They can be easily dimensioned
- Technical details can be shown using a variety of drawing types
- Commonly required parts can be added to a library to be easi ly accessed and re-used.
- Because of the international standards applied, they can be understood and used by anyone in the world.
- They can be used in promotion al material to illustrate how products are assembled.

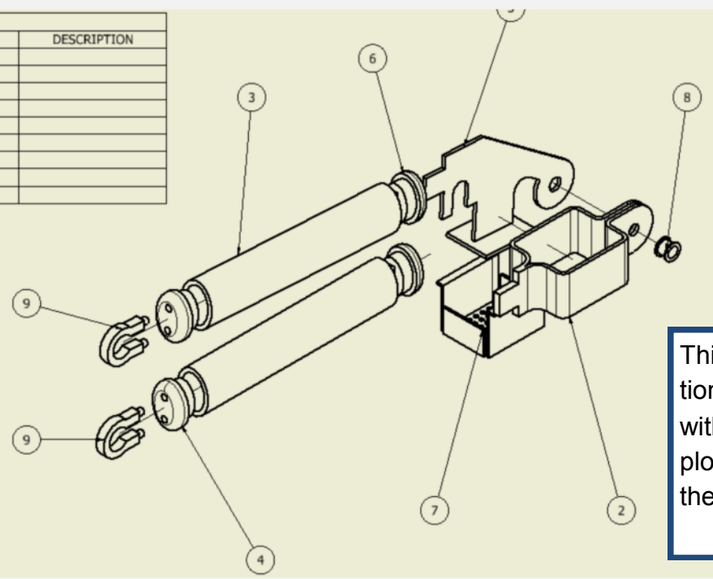


This **floor plan** is a production drawing; it has specific dimensions and various items of detail and information are in cluded.



This **dimensioned orthographic draw ing** is a production drawing; it has spe cific dimensions of the bottle which would allow it to be produced.

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	PUSHERHANDLETOP	
2	1	INVTOP	
3	2	HANDLE	
4	2	INVBASEENDS	
5	1	INVPUSHER	
6	1	TOPEND	
7	1	INVMESH	
8	1	RIVET	
9	2	INVHOOK	



This **exploded isometric** is a produc tion drawing; the parts list corresponds with the **balloon numbers** on the ex ploded views. This provides details of the model's assembly.

The 3Ps

Promotional graphics

The purpose of these graphics is to make the product attractive to the consumer—in short, ***to sell*** the prod uct. Various graphic techniques—both manual and computer based—are ap plied to achieve this.

Benefits of using ***promotional graphics***—posters, leaflets, web pages, graphs, animations, bill boards, etc.

- They can be easily understood by people with no technical train ing
- They can show a customer what the finished product would look like
- Images can be enhanced to make them more attractive to the customer
- They can be made to look more realistic than production draw ings
- The same product can be styled to appear to a particular market.

Consumer industry

Construction and property businesses

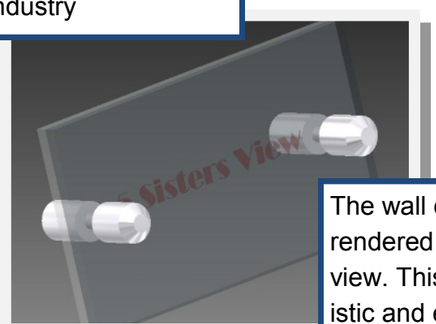
Selling or renting the property is an important part of any building pro ject. This often begins before the build ing work starts. In fact, it is now com mon to buy a new house before a brick has been laid – think of all the new build houses in Livingston which are sold be fore they are finished.

The process of selling a new building is known as **marketing the property.** This requires a special type of graphic known as an illustration.

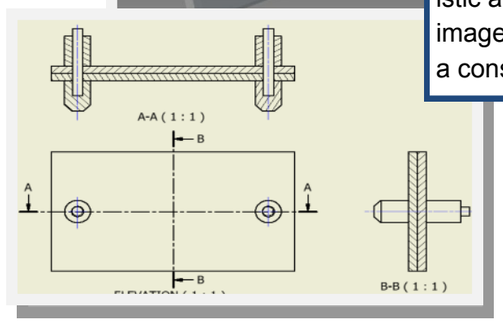
Illustrations are usually pictorial graphics and they are vital to the mar keting plan because:

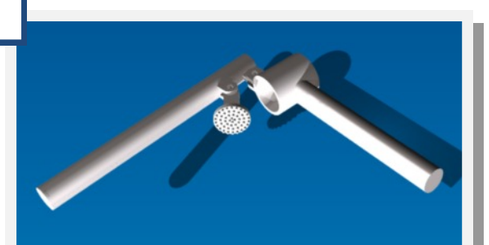
- They can be drawn in perspective and rendered in colour to make them realistic and attractive to cus tomers
- They promote the property on the market
- They are easily understood by the public because they are not tech nical graphics
- They can be included in sales bro chures for customers
- They can represent the property in pleasant, mature surroundings – like trees, plants etc. which are un likely to be there at the building site when the property is being built.

Manufacturing/ engineer ing industry



The wall display has been rendered from a pictorial view. This allows a more real istic and easy to understand image of it to be produced for a consumer.



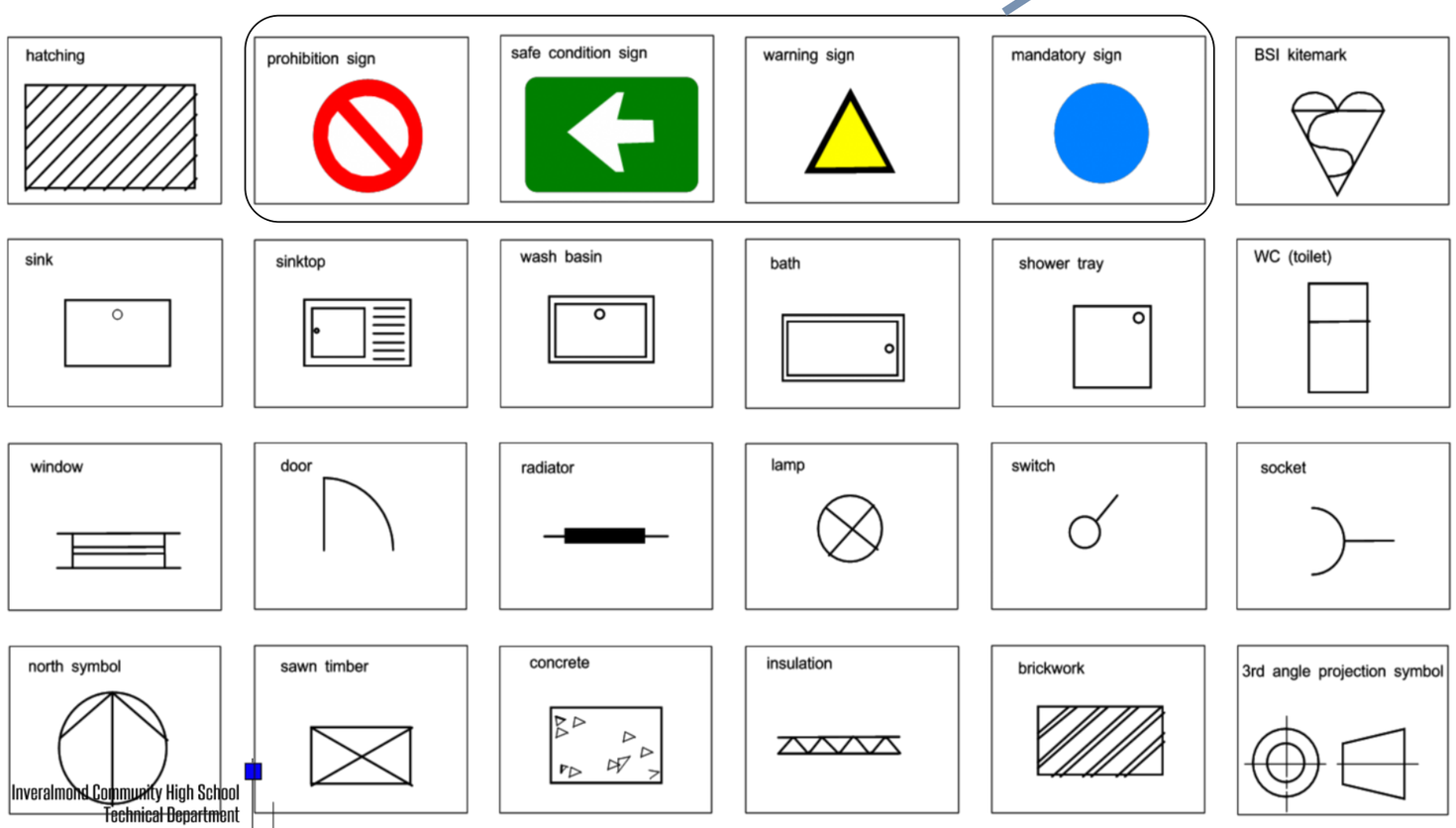


BSI Dimensions and protocols

The British Standards Institution (BSI) is a body which is responsible for a range of standards controlling quality over many different areas of industry and else where. Within graphics, there are several you must be aware of and understand. They are mostly concerned with **Production Drawings,** such as building plans and engineering layouts. Their purpose is to ensure **uniformity and consistency** across all material, and allow everyone concerned to understand the drawings and their intentions.

BSI symbols for construction

These are symbols used within the construction industry to represent a range of features which are relevant within this field. They are adopted so all architects, planners, engineers and tradesmen involved understand how the plans are laid out and what is required from them.



Mandatory Signs

Blue circular background with white symbol e.g eye protection must be

Safe Condition Signs

Green rectangular / square background with white text or symbol. E.g first aid, indication of direction.

Warning Signs

Yellow triangular back-ground with black band e.g risk of electric

Prohibition Signs

white circular background with red band and cross bar e.g

Firefighting Signs

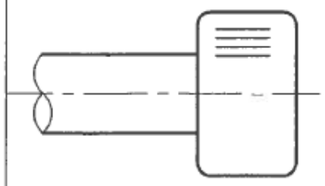
Red square background with white symbol or text e.g fire alarm

Danger Identification

Used to identify the perimeter of a hazard. The stripes are black and luminous orange or yellow.

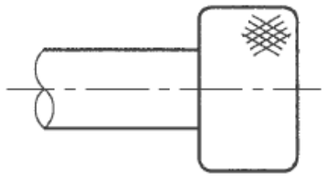
Some conventions

Knurling is a series of small grooves or indents which help provide a grip.
The two types are **straight** and **diamond**. The symbols are shown.



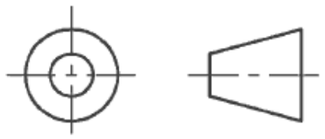
Straight grooves across.

Straight Knurling

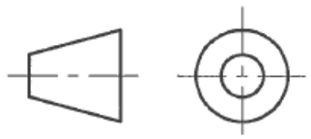


two sets of curved grooves across forming a diamond style pattern.

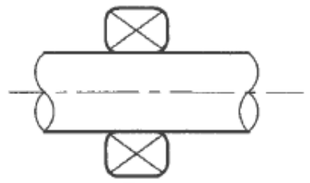
Diamond Knurling



3rd Angle Projection Symbol

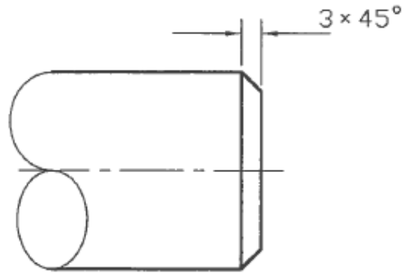


1st Angle Projection Symbol



Roller Bearing

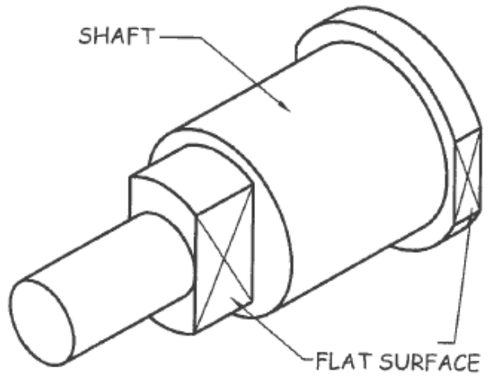
Make sure you can identify each of the projection symbols shown. You may be asked to sketch these symbols as well as identify them.



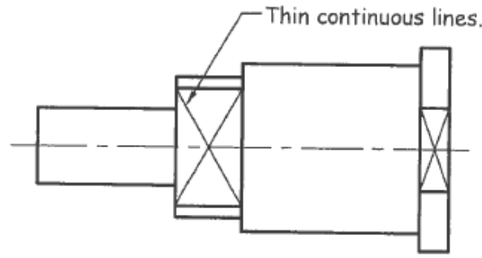
Dimensioning a chamfer

Make sure you remember how the chamfer is dimensioned. This has appeared in a few examination papers over the last few years.

Spring



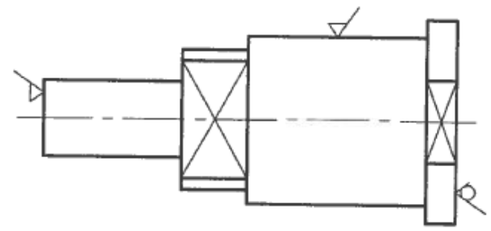
Flat surface on a shaft.



This view shows the convention which shows a **flat surface** on a shaft.
Diagonal lines across the flat surface.
Note: the diagonal lines are thin continuous lines.

Machining Symbol

- This symbol represents the surface texture (how rough or smooth the surface is)
- If a surface requires to be machined, a horizontal line is added to the symbol .
- If machining is not permitted (not allowed) a circle is added to the symbol.



BSI Line Types

DESCRIPTION	LINE	APPLICATION
continuous thick line	———	visible edges and outlines
continuous thin line	———	dimension, projection, hatching, leader lines
dashed thin line	– – – – – – – –	hidden edges and outlines
thin chain line	—— – —— – ——	centre lines
thin chain , thick at ends	— —— – —— – —— —	cutting plane/section lines
thin chain double dashed	—— – – —— – – ——	fold/bend lines on a development, extreme positions of moving parts
cotinuous thin straight with zigzags		limits of partial or interrupted views
cotinuous thin irregular		

Line types and dimensions in practice

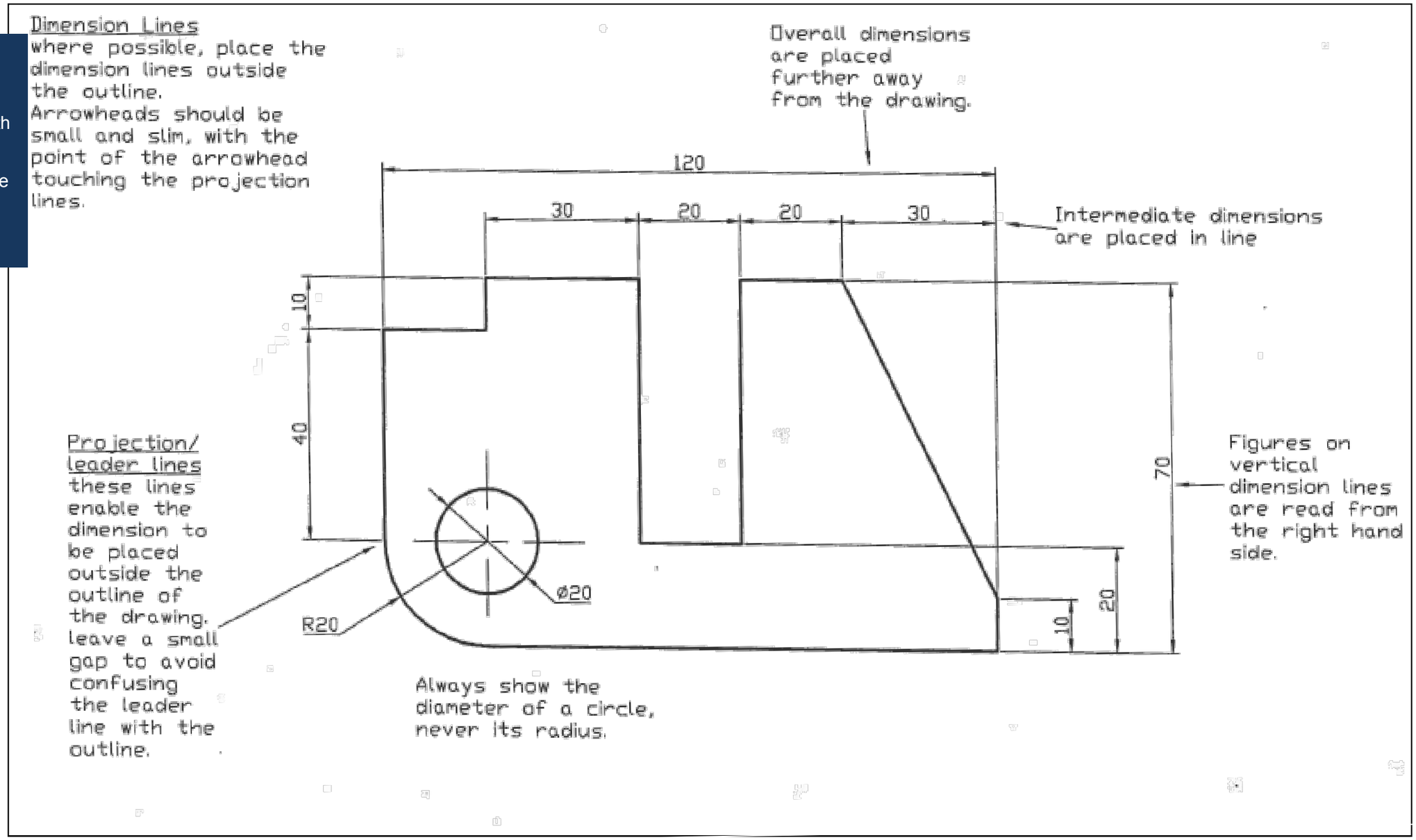
BSI Dimensions

It is important you are aware of the various BSI line types used within graphics; both to accurately produce your own drawings and to interpret oth ers.

You will need to understand these line types for your final exam.

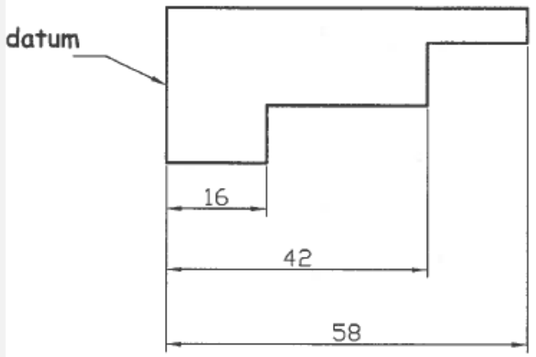
These symbols are used for dimen-sioning:

Ø	diameter
R	radius
□	square
CL	centre line
AF	across flats (Hexagons)
AC	across corners (Hexagons)



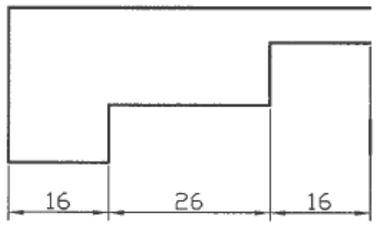
Dimensioning

Parallel Dimensioning

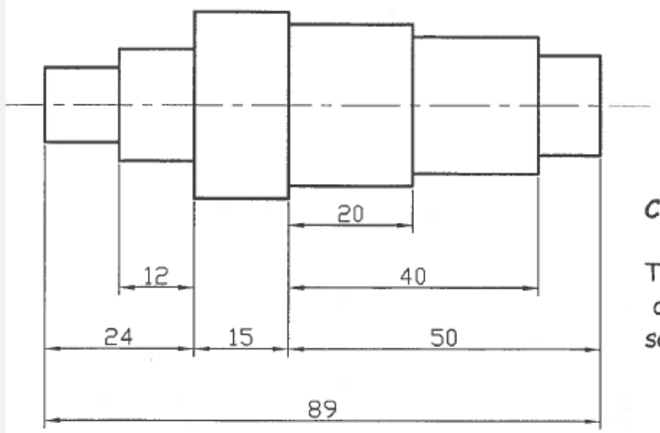


Parallel dimensioning
Parallel dimensioning consists of a number of dimensions originating (starting from) a datum feature (a common point), in this case the line on the left hand side.

Chain Dimensioning



Chain dimensioning should only be used where the possible accumulation of tolerances does not endanger the function of the part.
This basically means that there is more chance of the final size being too big or too small because each size is measured from the previous one which may be innaccurate.

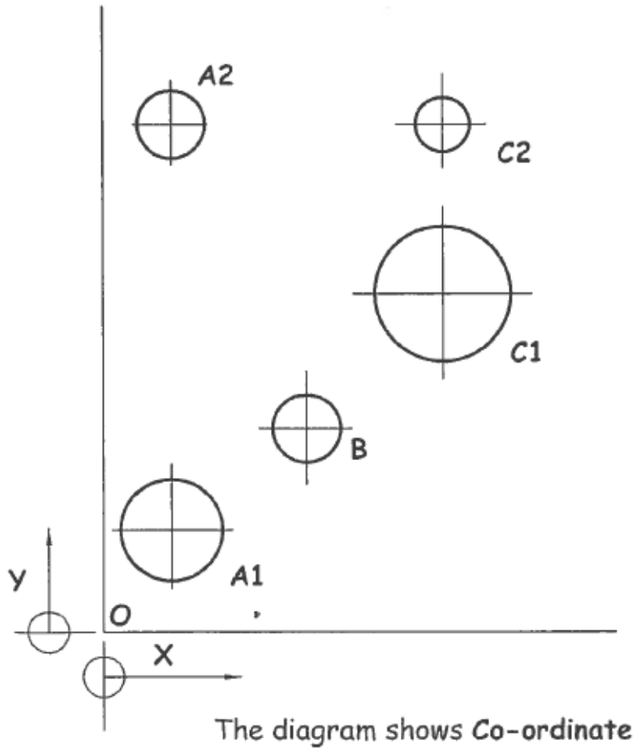


Combined dimensioning.

This method uses chain dimensioning and parallel dimensioning on the same drawing.

Co-Ordinate Dimensioning

Make sure you understand the diagrams and why they might be used rather than more traditional dimensioning methods.



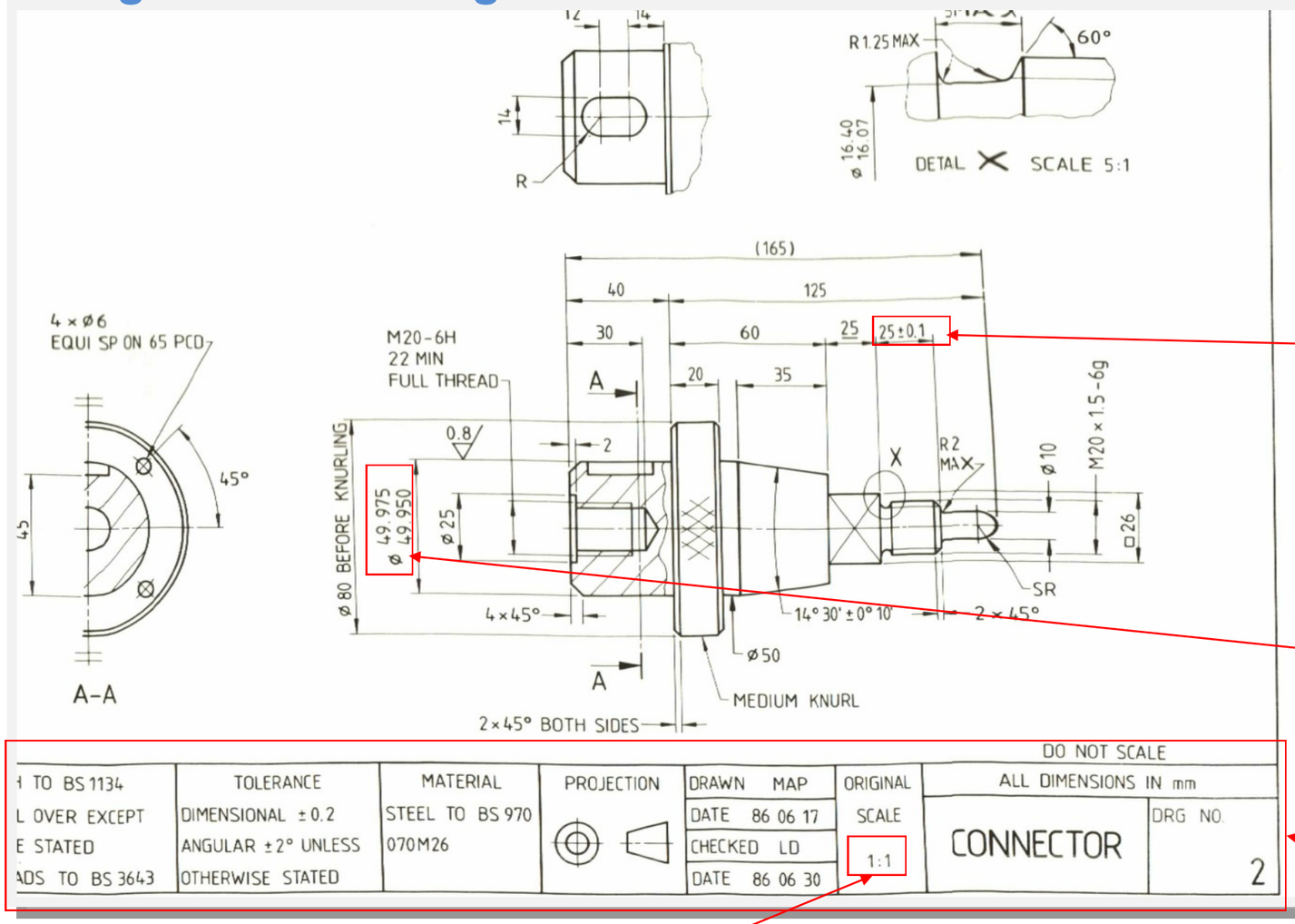
HOLE	X	Y	Ø
A1	10	15	15
A2	10	75	10
B	30	30	10
C1	50	50	20
C2	50	75	8

The diagram shows **Co-ordinate Dimensioning**.

One advantage of using co-ordinates is that they simplify the drawing and produce an easier method of locating specific points within a drawing i.e. the drawing is less "cluttered".
Less space is required to produce the drawing.

Another advantage is that all dimensions are measured from a single point (O), which means the finished object will be more accurate. This basically means that a single measurement is more accurate than having to produce two or more measurements.

Scaling and tolerancing

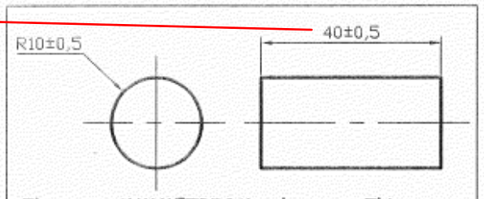


Tolerances

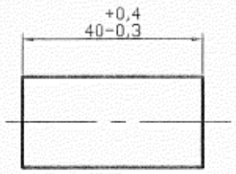
Tolerances are required during the manufacturing process. Anything which is required to fit or interact with another part must be manufactured to set tolerances. E.g. a tyre for a bicycle must be able to fit onto the bicycle wheel, an electrical plug must fit into the socket, batteries must be able to fit into the holders etc etc. Tolerances are also required in other situations. The position of a brick wall in a house, steel girders in roof structures etc.

The tolerance required will vary from situation to situation. A ROLEX watch will be made to much "finer" tolerances than a childs TIMEX watch. The machinery and equipment required to produce a ROLEX will be much more expensive than the machinery required for the TIMEX.

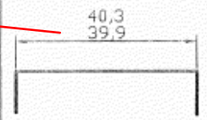
How to show a TOLERANCE



These are **SYMMETRICAL** tolerances. This means that the size could be anywhere between 0.5 bigger or 0.5 smaller than the nominal size.



This is an **ASYMMETRICAL** tolerance. This means that the size can be different above and below.



Another method is to show the upper and lower sizes. The upper size should always appear on top.
This is referred to as the **COMMON METHOD**.

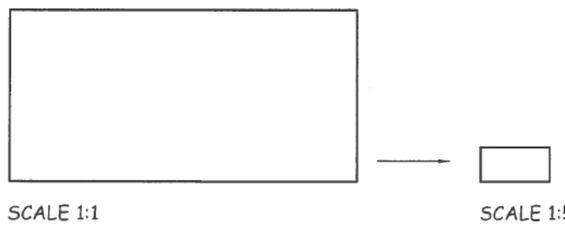
Scaling

A drawing can be scaled to make it bigger or it can be scaled to make it smaller.

The scale of a drawing depends upon:

1. The size of the paper being used
2. The size of the object being drawn
3. The amount of detail required

In general, scales should allow easy and clear understanding of the object being drawn.



EXPLANATION OF THE SCALE TERMS.

Scale 1:1 means the actual size of the object.

Scale 5:1 means five times bigger than the actual size

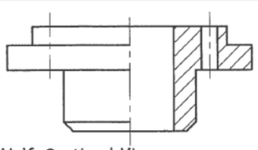
Scale 1:5 means one fifth of the actual size.

Title block

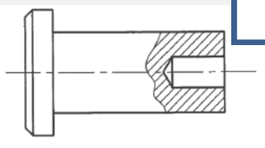
This contains such information as drawing name, number, date, tolerances, scale and third angle symbol. This is important as it sets out the standards the drawing uses and ensures there is no ambiguity regarding the information it represents.

Additional views

Sections

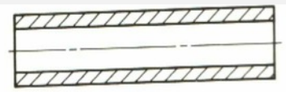


Half-Sectional View.
Symmetrical parts may be drawn as a half sectional view on one half and the other half as an ordinary outside view as shown above.

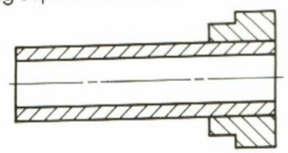


Local or Part Section
A local or part section may avoid the need for a complete sectional view.

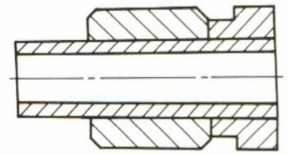
Note: a thin continuous irregular line is used for a part or local section.



(a) Hatching separated areas.



(b) Hatching adjacent parts



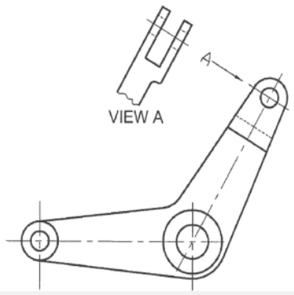
(c) Hatching adjacent parts at the same angle

Parts and features of parts not normally sectioned

When a sectional view is given where the cutting plane passes longitudinally through fasteners, such as bolts and nuts, and shafts, ribs, webs, spokes of wheels, etc., it is the practice to show them in external view (see figure 32).

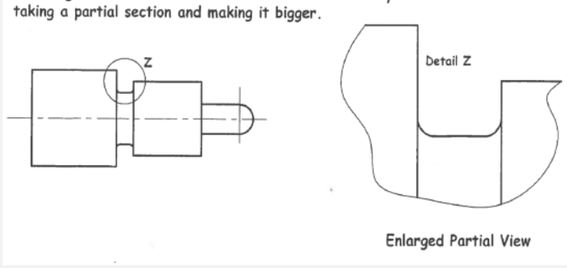
Partial views

It is not always necessary to draw a full view of an object. Sometimes a partial view is all that is required to show any details required.



Enlarged Partial View

The diagrams show how details can be made clearer by taking a partial section and making it bigger.

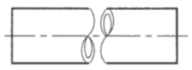


Enlarged Partial View

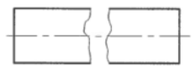
Interrupted views

Interrupted views are used to save space. Rather tha drawing a long component e.g. a shaft, the interrupted view can represent the complete component by drawing part of it. All the components below could be long items which could not fit onto an ordinary piece of paper if drawn to full size. The interrupted view allows enough detail to show the component without drawing it full size.

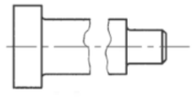
Conventional break lines for a **solid shaft.**



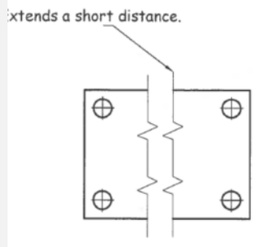
Conventional break lines for a **hollow shaft.**



General break lines.



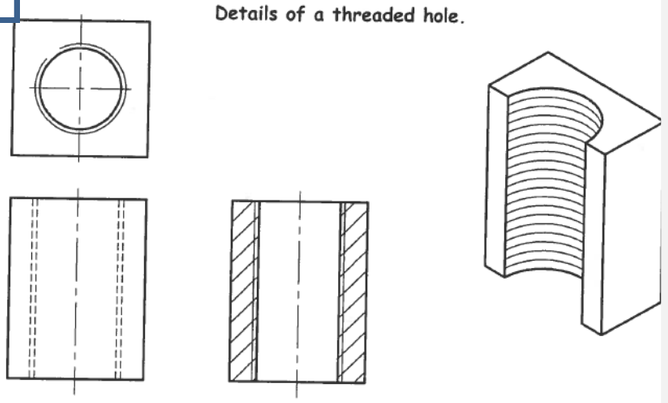
Break lines for a **solid shaft.**



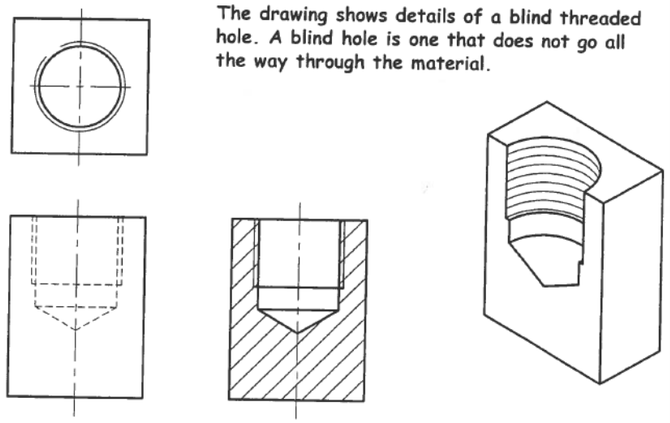
Another way to show an interrupted view is to use thin continuous line with zig zags. The zig zag line must continue for a short distance outside the outline as shown above.

Holes

Details of a threaded hole.



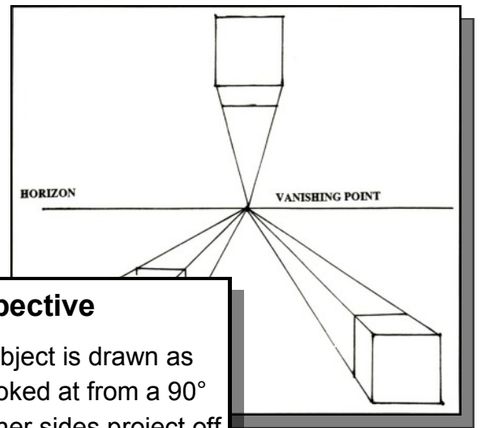
The drawing shows details of a blind threaded hole. A blind hole is one that does not go all the way through the material.



Drawing views

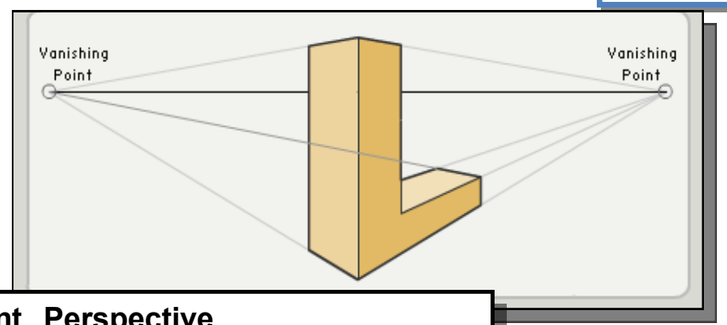
Pictorial views

These views allow all three dimen sions of an object, etc. to be seen. They are not known as **3D views**, how ever as they cannot be turned around or manipulated as they are still 'flat' views. Instead, they can be described as **2½ D.** They are used in many dif ferent situations to give a more realistic and easy to understand view of the item, in a way which orthographic views may not. This is also beneficial to communicate information to individu als who are not technically-minded or experienced in reading orthographic views.



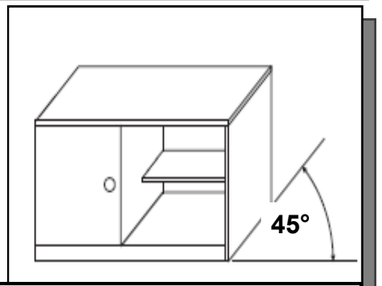
1 Point Perspective

The front of the object is drawn as its true shape (looked at from a 90° angle), and its other sides project off to a 'vanishing point' on a horizon line. These sides are subject to **foreshortening**—the effect that things become smaller as they are further away. This gives the descrip tion of **perspective**.



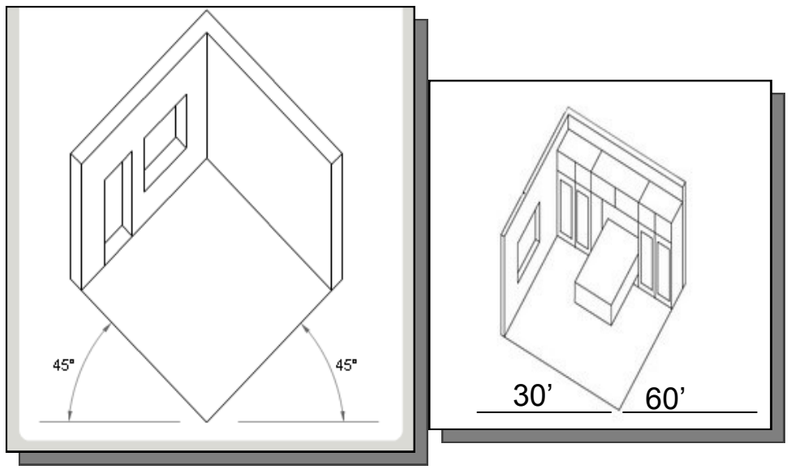
2 Point Perspective

A more realistic perspective view, this time with two vanishing points. The drawing is usually started with a vertical **leading edge** at the cen tre, and the 'horizontal' lines of the object going to either of the vanishing points. This form of pic torial view is often used in promotional graphics for houses, etc.



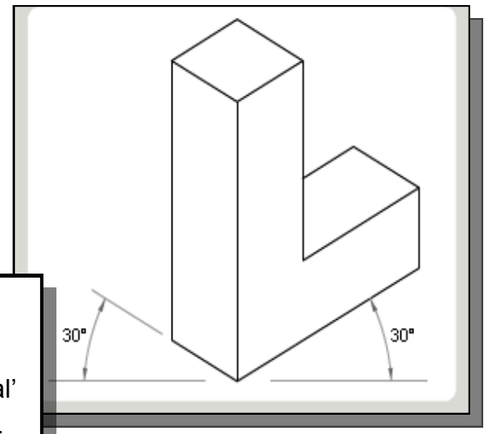
Oblique views

These views show the true shape of the elevation, with the breadths being projected back at 45° and divided by 2. They are often used to show circular based objects as the circle remains true, unlike iso metrics where it becomes an el lipse.



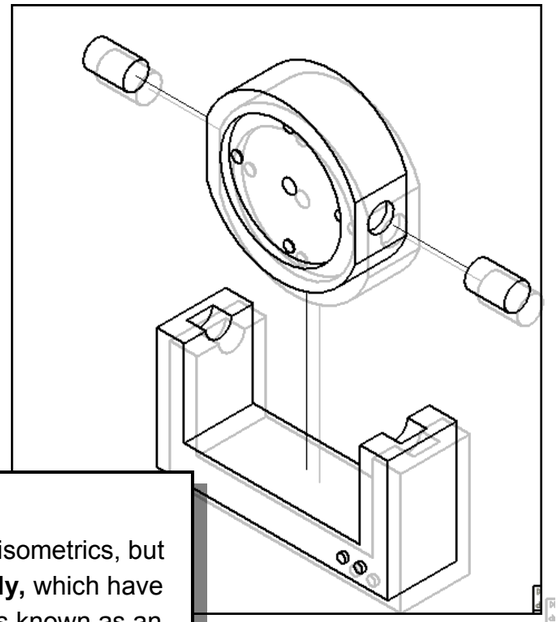
Planometric views

These views always have a 90° corner at their centre, and the other two angles add up to 90° also. They can either be 45°/45° or 30°/60°. They are frequently used to show the inside of rooms, but often outside features too such as gardens, etc.



Isometric views

These views have vertical heights and the two 'horizontal' dimensions are angled at 30°. All the sizes of the object being drawn remain the same from the orthographic view it is based on—ie the height is still the same as are the length and breadth. Isometric views are fre quently used to represent every day objects and engineering/ technical parts to make them easier to visualise.



Exploded Isometric

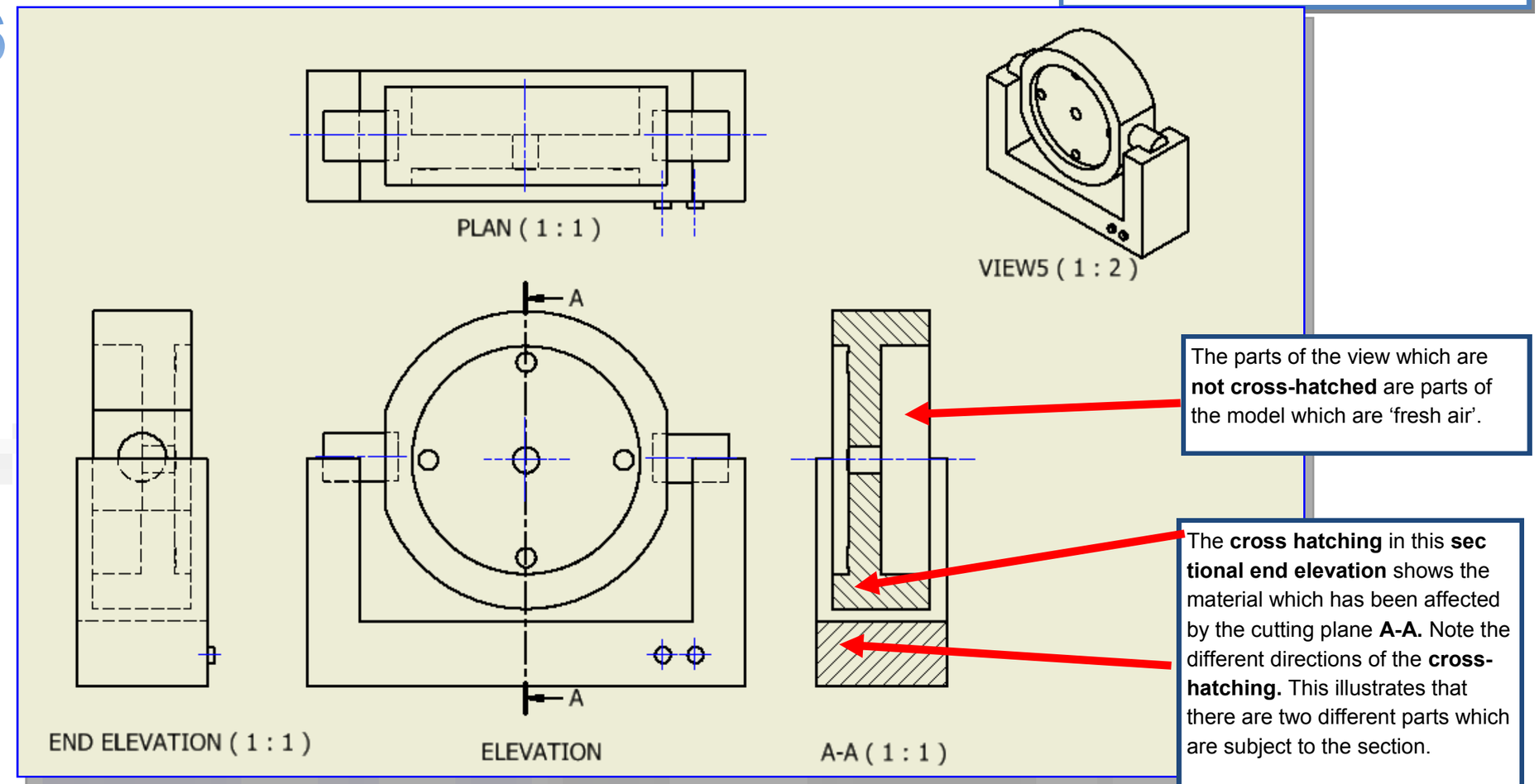
These views follow the same rules as isometrics, but involve 2 or more parts of an **Assembly,** which have been separated in a **linear** way. This is known as an **exploded view** and can be considered to be the op posite of an assembly. They are used to illustrate the relationship between separate parts within an assem bly, and are often used in instruction manuals for fur niture, toys, etc.

Drawing views

Assemblies and sections

Sectional views

These are used to show **hidden features** within the view—often an assembly. They allow various parts and edges to be seen as if the object has been ‘cut open’. They can either be **sectional ele vations** or **sectional plans** de pending on the view required and are labelled with the letters used by the **cutting plane.**



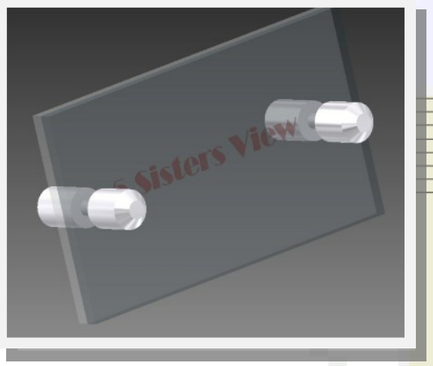
The parts of the view which are **not cross-hatched** are parts of the model which are ‘fresh air’.

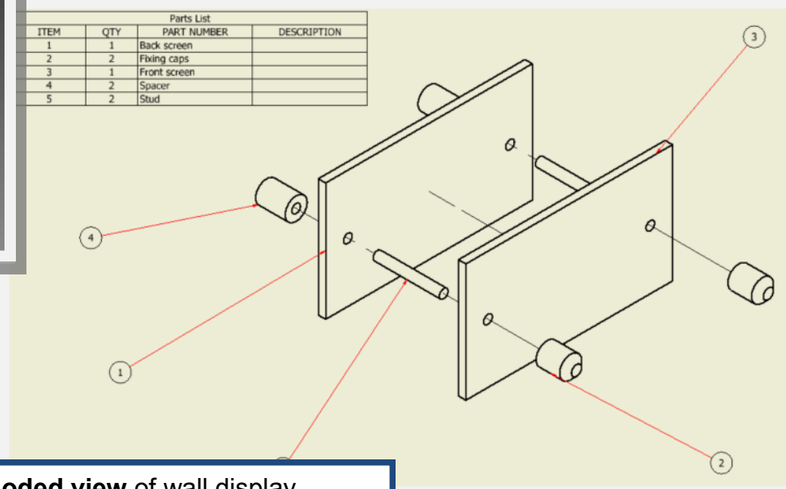
The **cross hatching** in this **sec tional end elevation** shows the material which has been affected by the cutting plane **A-A.** Note the different directions of the **cross-hatching.** This illustrates that there are two different parts which are subject to the section.

Assembly drawings

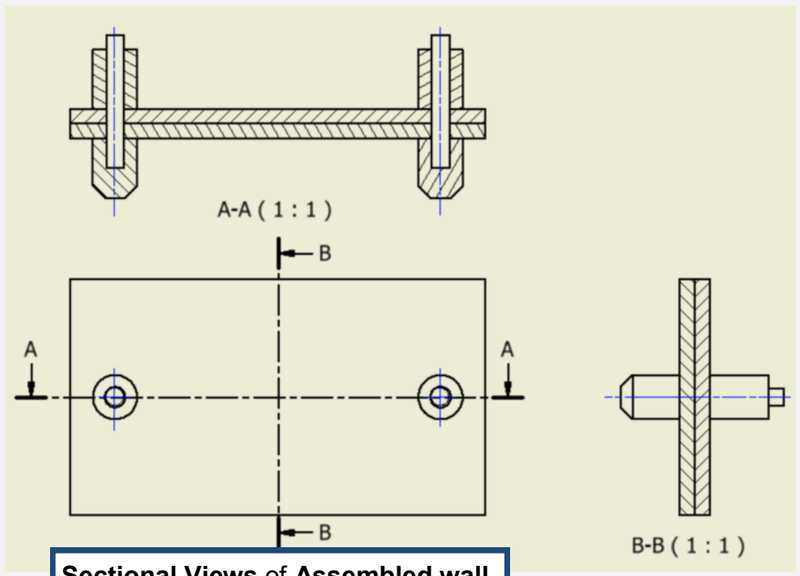
These drawings represent more than one part which have been joined or connected to each other. They are widely used for many purposes—basically whenever dif ferent parts are assembled!

Often, an **exploded view** is pro vided to make the assembled view easier to understand. An **as sembled view** can be thought of as being the opposite to an **ex ploded view**—and vice versa!





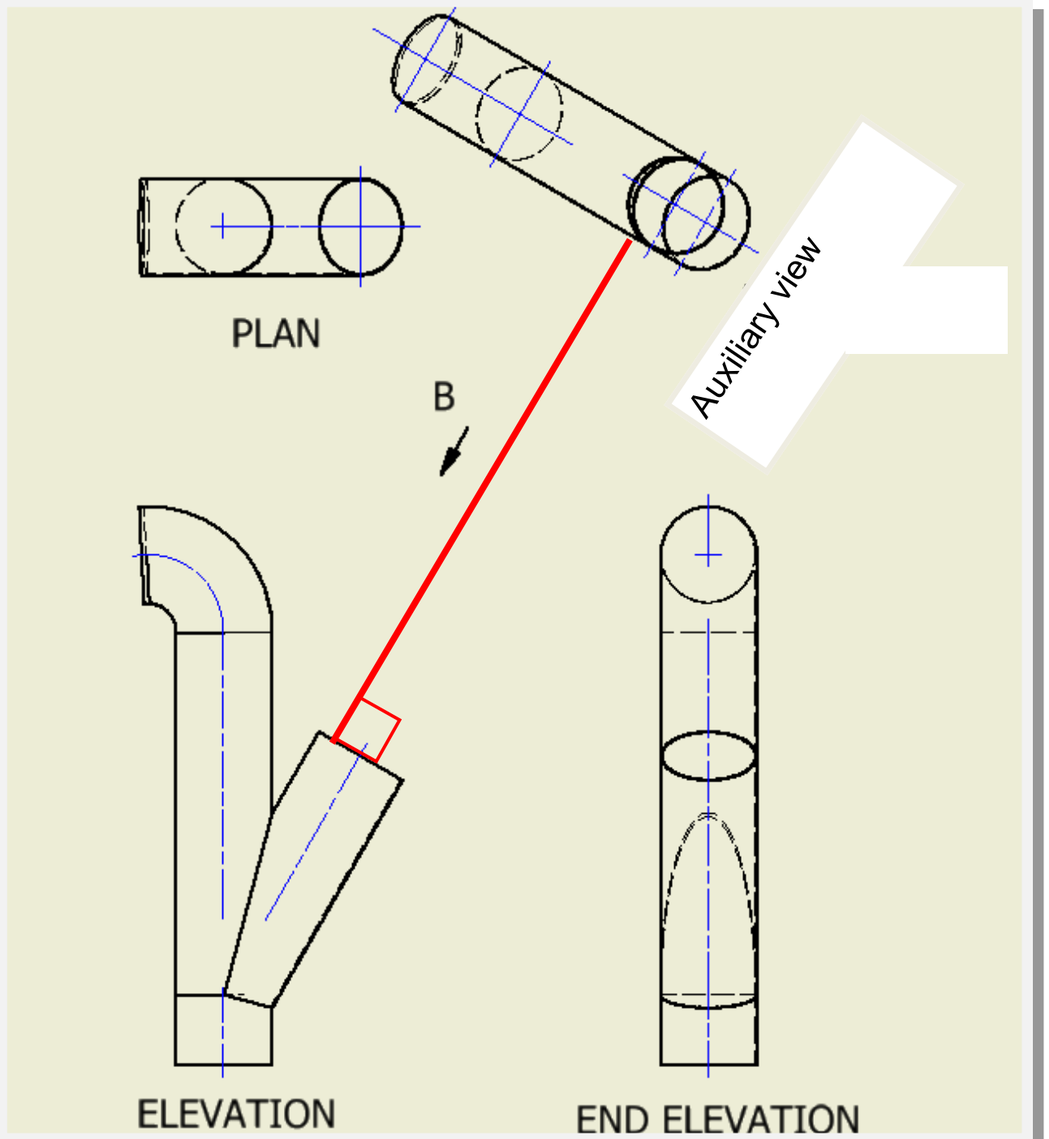
Exploded view of wall display



Sectional Views of **Assembled wall display**

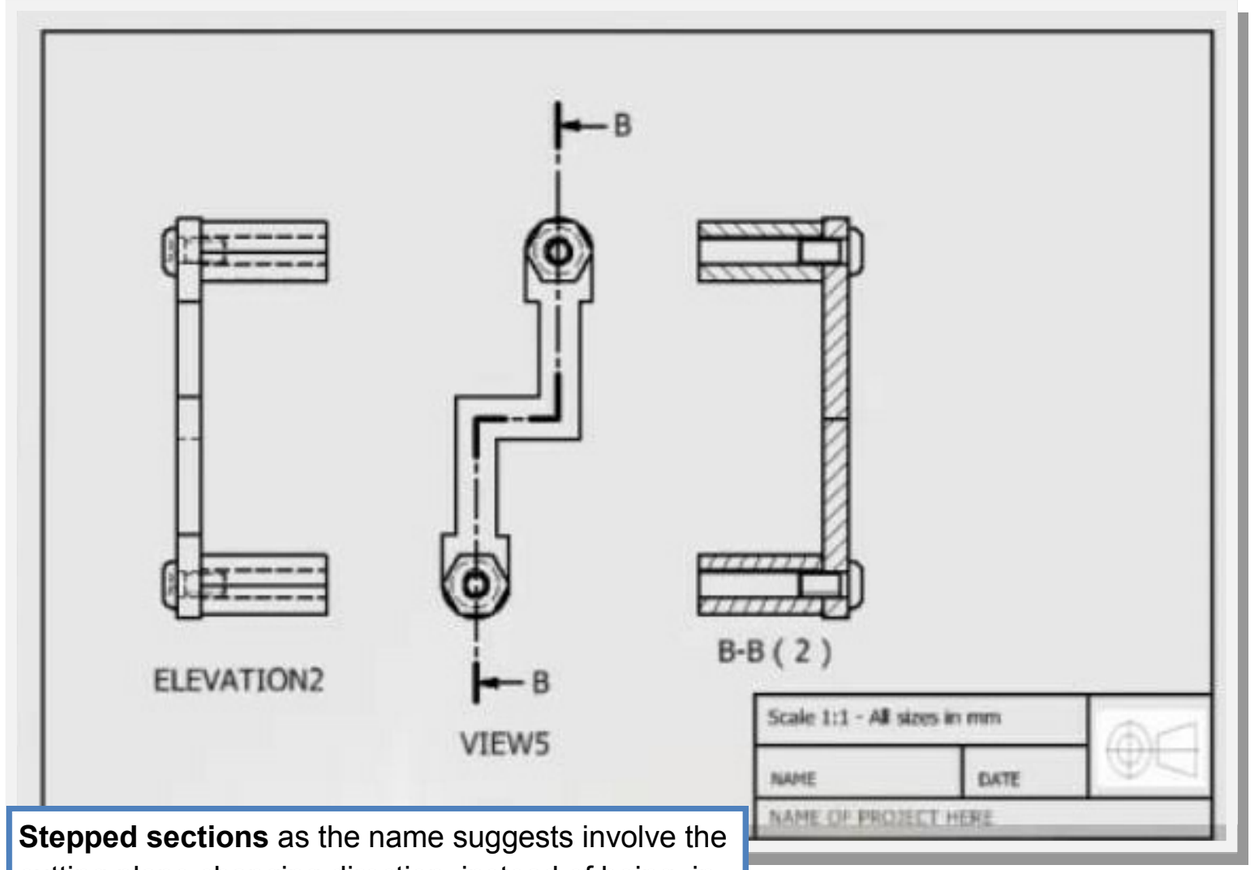
Drawing views

Auxiliary views

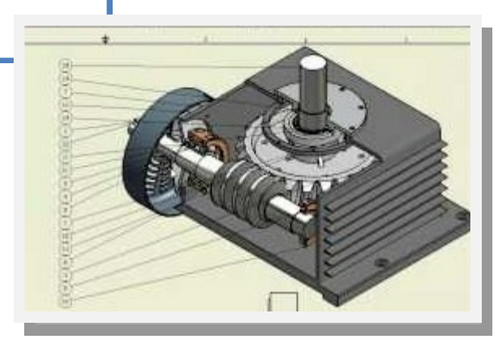


Auxiliary views enable another direction of view to the component, etc. in question. They are often adopted as a means of inspecting sloping edges as the slope in question is viewed as a **True Shape.**

Stepped section

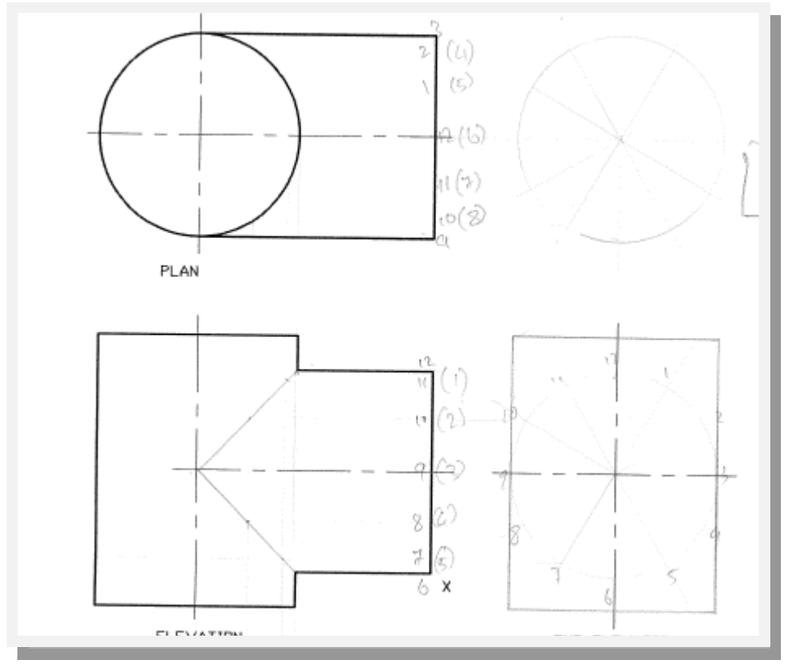


Stepped sections as the name suggests involve the cutting plane changing direction, instead of being in a continuous vertical or horizontal direction. This enables more complex parts to be sectioned fully, or a portion to be inspected.

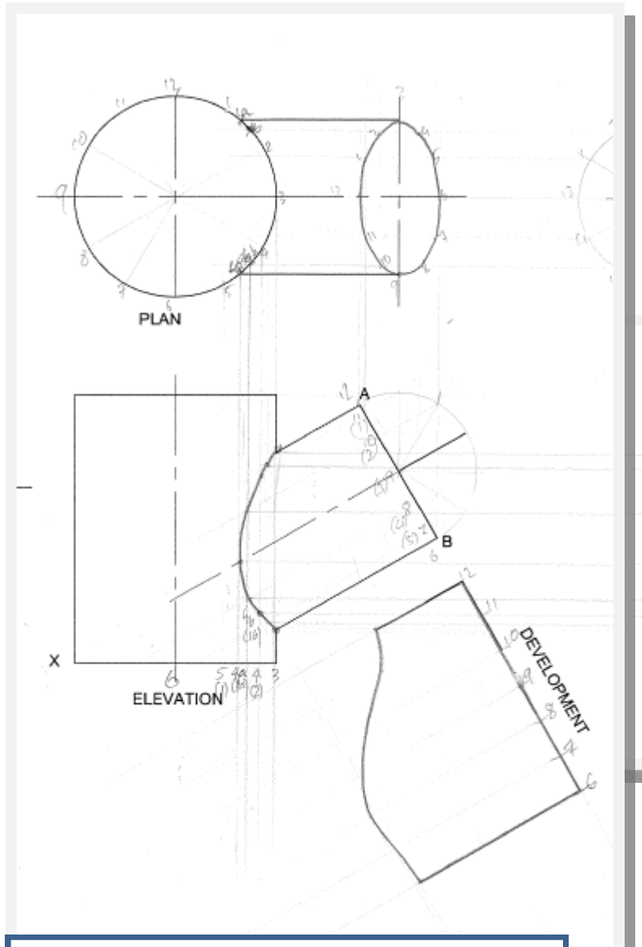


Interpenetration and intersection of prisms and cylinders

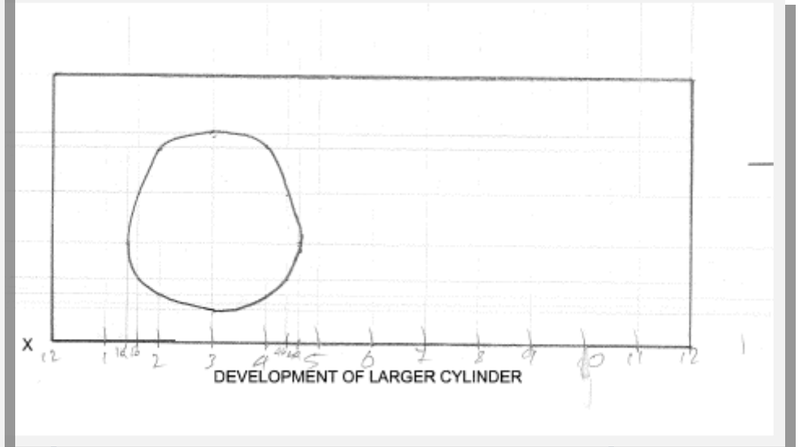
Interpenetration of two cylinders.



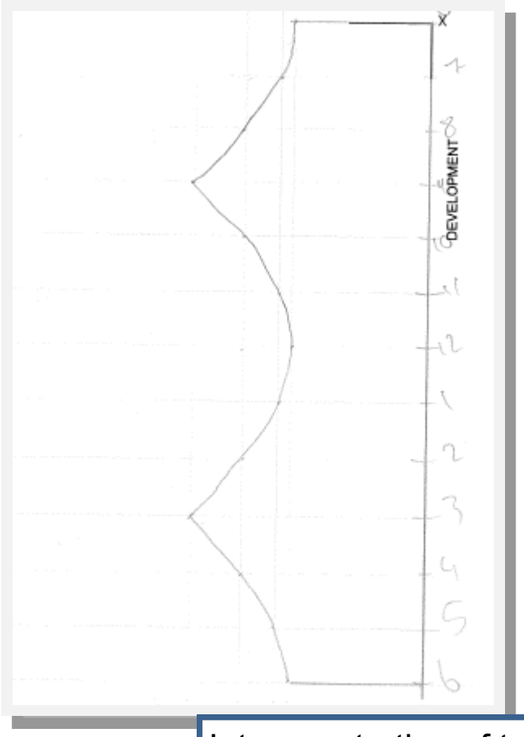
Cylinders of different diameters, one at an angle.



Symmetrical half development of small cylinder.



This development show the hole in the large cylinder to allow angled

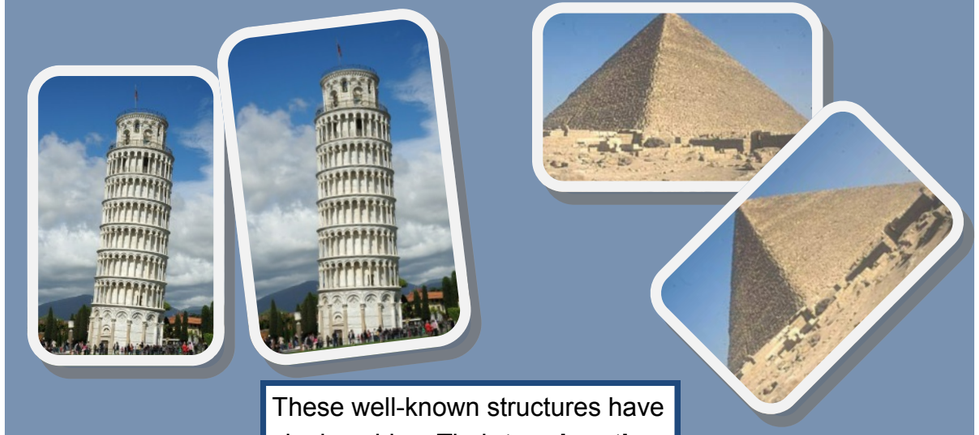


Interpenetration of two cylinders, both same diameter at 90° angle.

Geometric shapes and forms

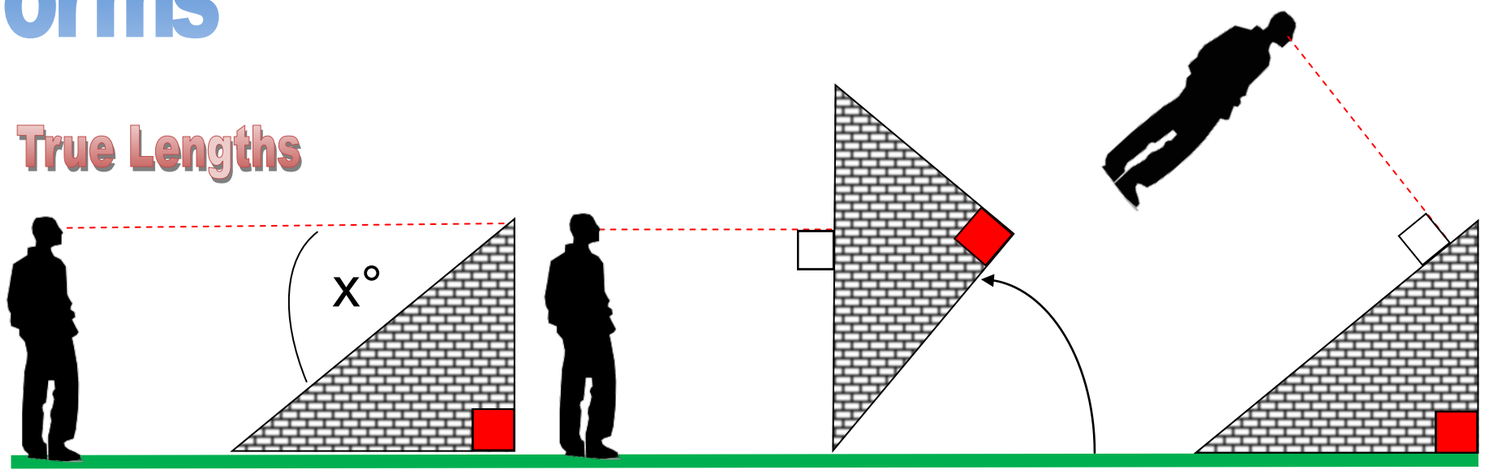
True lengths and shapes

The **true shape** and/ or **length** of an object can only be seen if one looks at the surface at an angle of 90°. In your exam you can be asked to identify dif ferent true shapes of sectioned objects



These well-known structures have sloping sides. Their **true length** can only be observed as shown by the graphic to the right.

True Lengths



The line of the man's sight is at an acute angle to the slope of the wall. That means that he is not seeing the **True Length** of the slope. If you think of Pythagoras' Theorem you did in maths, you will re member that this side is the largest of the three in a right an

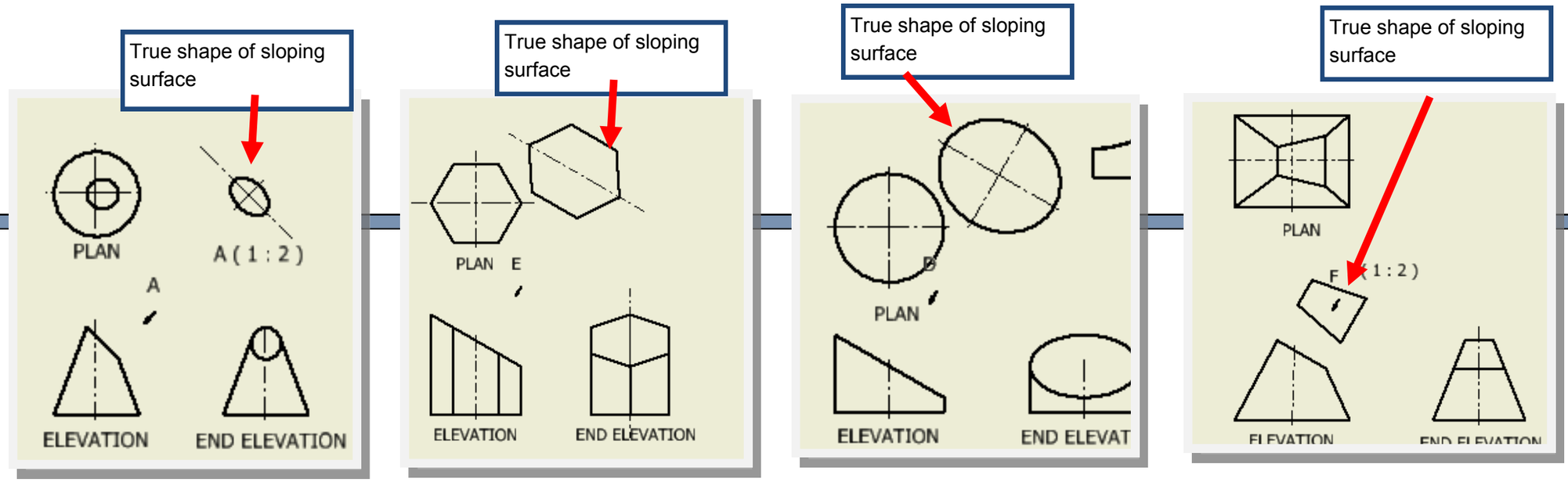
If the wall has been rotated so the man is seeing the 'slope' at an an gle of 90°. This means that he is seeing the **true length** of the sloping wall. Note that it is now a lot higher in relation to his vertical height.

This view shows what the man would see if it was **his** position which had changed in relation to the sloping wall. He is still looking at the slope at an angle of 90° so he is look ing at its **True Length.** It is this con cept—of looking at the object at 90° to the sloping surface— that you need to understand when identifying true

True Shapes

Drawing and identifying these views requires you to use the same principles adopted to achieve the **true length.** In this case, it is the entire **surface** of the sloping face which is created, rather than a single line.

So think of the third graphic above, with the man 'hovering' above the wall at an angle of 90° to the slope. Several



Inveralmond Community High School
Technical Department

The role of the computer in graphics

Hardware and software

Computers use a combination of **hardware** and **software** to perform tasks. Hardware is the name given to the physical parts of the system such as keyboard, monitor and printer. Software is the name given to programs which interact with the hardware, enabling the computer to perform its tasks.

Information is **INPUT** into the computer via various forms of **HARDWARE,** the com puter **PROCESSES** this information using **SOFTWARE** and the results are **OUTPUT** using **HARDWARE.**

Input to the system → Processing by the system → Output from the system

Processing by the system ↔ Storage within the system

Input


Mouse


Keyboard


Trackerball

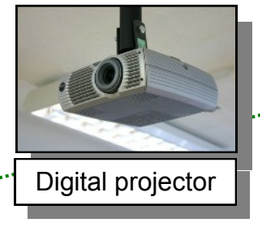
Hardware


Computer

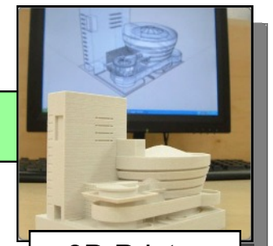
Output

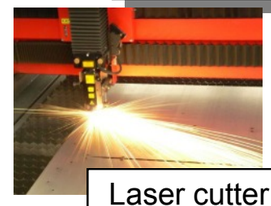
Electronic/


Monitor


Digital projector

Physical


3D Printer


Laser cutter


Laser Printer

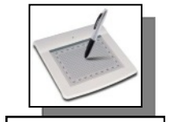

Drum plotter


Large format printer


Flatbed plotter

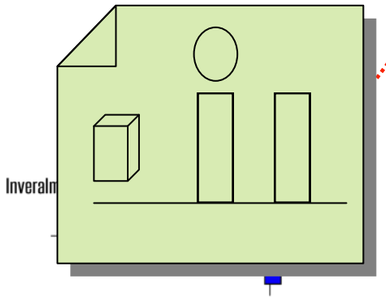

Inkjet printer

Inputting Hard Copies

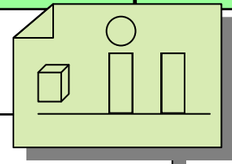

Graphics Tablet


Digital stills


Flatbed scanner



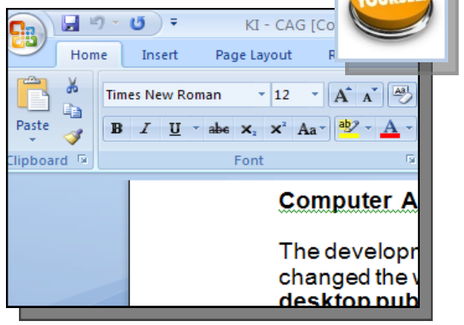
Hard Copies



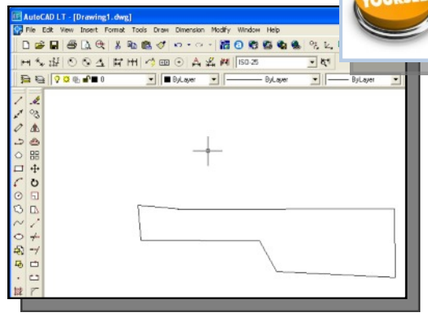
A **HARD COPY** is a **paper copy** of the information

Software

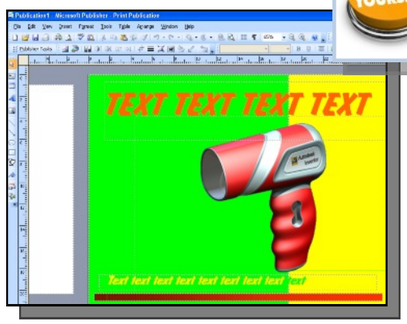
Software—the programs which allow the computer to do what you want it to—cover a huge range of functions. Most are dedicat ed to a particular role, but some programs have more than one feature—for example Inventor has a computer illustration feature: **Inventor** Studio. A comprehensive list is given on this page:



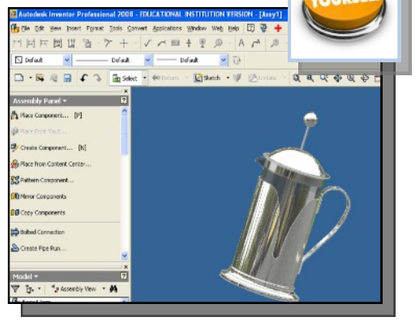
Word processing package e.g. Microsoft Word. This would be used to produce letters which only contain text.



Computer Aided Drawing (CAD) package e.g. Auto Cad. This would be used to produce detailed technical drawings of some component.



Desk Top Publishing (DTP) package e.g. Microsoft Pub lisher. This is used to produce a mixture of text and graphics, for example a magazine.



3D Modelling package e.g. Inventor. This is used to pro duce realistic 3D models of components, allowing changes to be made easily.

Illustration and Presenta tion package e.g. Inventor Studio. This would be used to colour and render an ob ject or environment.

Website building software

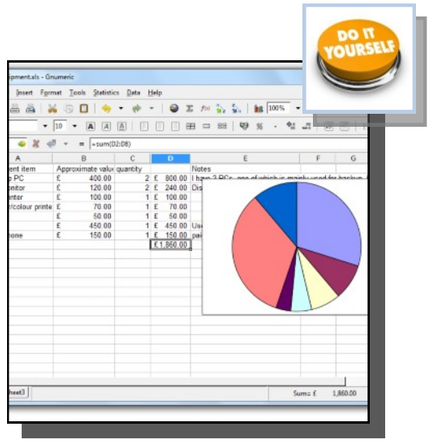
These allow the rapid creation of websites, and packages range in sophistication.

Video editing software

This software enables the user to professionally edit pre-recorded videos.

Vector drawing

High quality vector drawings can be quickly produced. There are many free pro grams available.



Spread sheets

Spread sheet programs usu ally have a feature which lets the user represent the data graphically.

Photo editing software

These packages allows the manipulation of previously taken images.