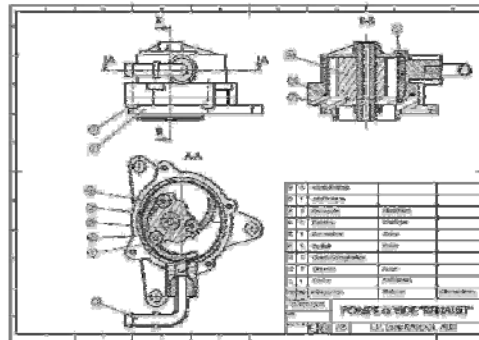
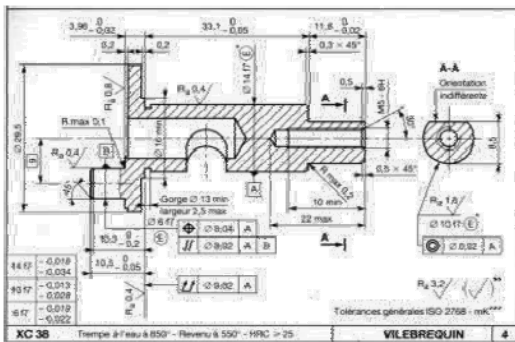


Working drawings

Drawings which contain all the information needed to make the object you have designed, including dimensions and details of components, materials and assembly instructions, are called _____.

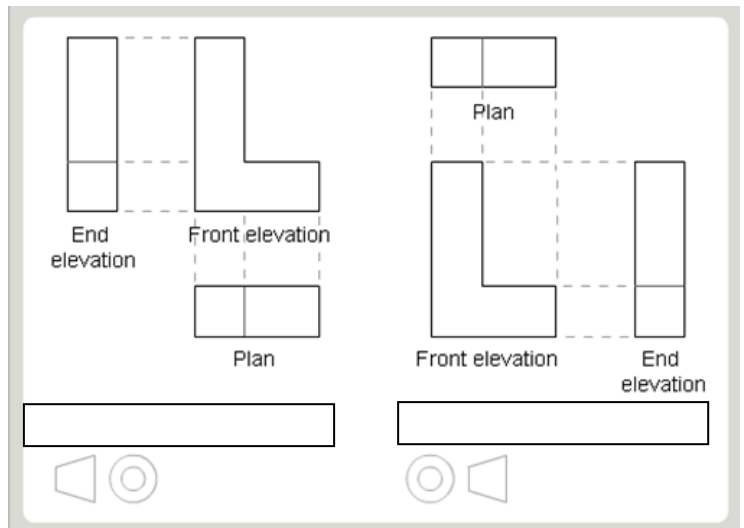
The normal drawing technique for working drawings is _____.



Orthographic projection

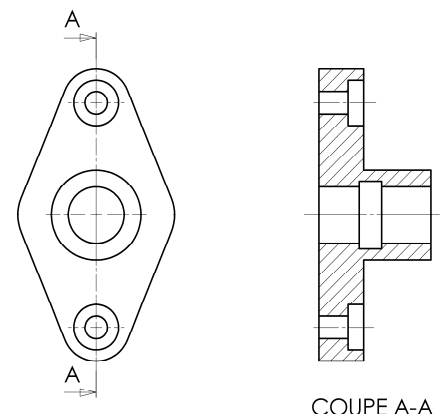
Orthographic projection shows complex objects by doing a 2D drawing of each side to show the main features. Orthographic drawings usually consist of a front view, a side view (for example left view) and a plan (or top view), but more views may be shown for complex objects with lots of detail.

Orthographic drawing may be done using **first angle projection** (as used mainly in Europe) or **third angle projection** (used by countries such as the USA). The graphic opposite shows the differences between the two.



Section drawings

Section drawings show the various parts of a product as if it had been sliced in half. (Sometimes they are called **cross-sections**.) The position of the imaginary cut is called a **section plane**, sometimes represented by a line consisting of long and short dashes. The purpose of a section drawing is to make clear how a product is constructed. Parts of the object that are cut through are shaded with lines that are called **cross-hatching**. If two parts of a product are touching, then the cross-hatching goes in opposite directions. Parts such as nuts and bolts and axles are not normally sectioned.

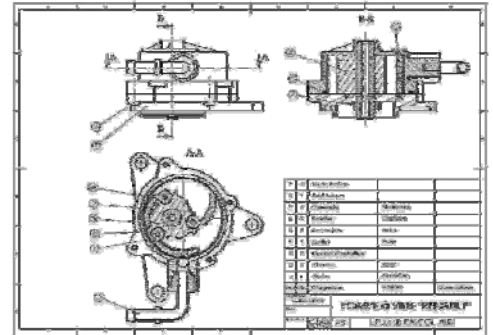
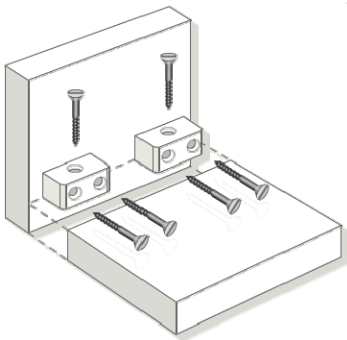


Assembly drawings

An assembly drawing shows the various parts of a product drawn to show exactly how they fit together. They are often used for products such as construction and model kits or flat-pack furniture, to show the user how to assemble the parts.

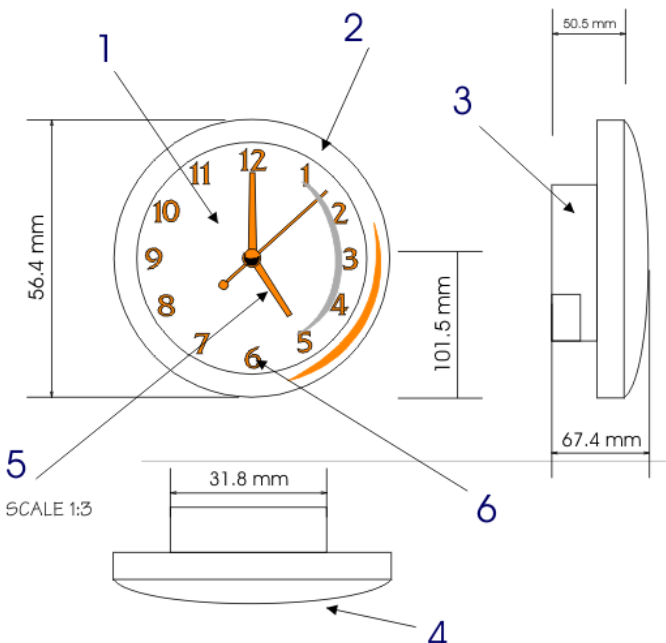
They can be drawn in two ways.

- A **fitted assembly drawing** shows the parts put together, and can be drawn in 2D or 3D.



- An **exploded drawing** shows the parts separated, but in the correct relationship for fitting together. Exploded views are usually drawn in 3D, as illustrated.

Part list



A 'Parts List' is a very important feature of the working drawing as all the parts are listed, with measurements. The materials used are also mentioned as well as the finish applied to the individual pieces.

PART No	No OFF	DESCRIPTION	MATERIALS	DIMENSIONS	FINISH
1	1	CLOCK FACE	MDF		RED PAINT
2	1	CLOCK BACK	PERSPEX	Dia. 156mm x 20mm	NONE
3	1	MECHANISM			NONE
4	1	GLASS			POLISH
5	1	HANDS			BLACK
6	2	NUMBERS			RED

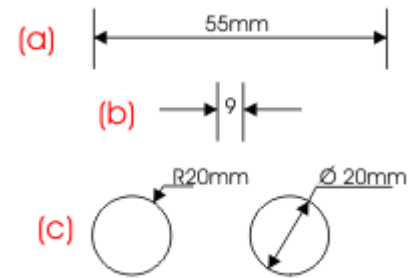
Measurements (dimensions)

1. The working drawing should be precise and drawn to a scale. If the drawing is half the size of the solution, the scale is _____. If the drawing was a 3rd the size of the original then the scale would be _____.

2. Usually there are at least six dimensions but you can add as many as you feel are required in order that the precise size of your design can be determined by anyone reading the drawing.

3. Draw the measurements (dimensions) very carefully. Some example dimensions are shown opposite.

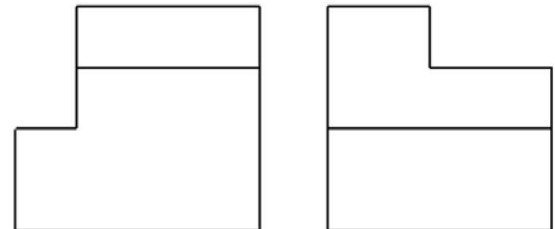
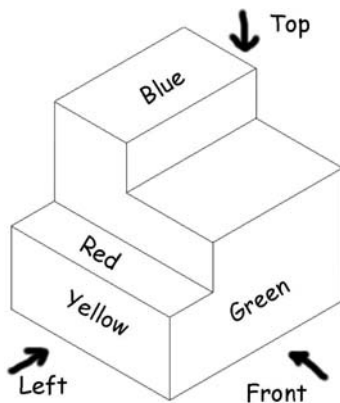
Dimensions are normally drawn as shown in (a) although dimensions under 9mm should be drawn as shown in (b). Diameters and radii are drawn as shown in (c).



Technical drawings. View connections

For each part and each view, colour the areas as mentioned. Draw the missing view.

PART 1 :



PART 2

