

# Sectioning

## What will we learn?

How to create various types of sectional views. (Sectional views allow you to see inside an object.)

## Key points...

Using a sectional view can be very useful for parts that have complex interior geometry.

## What is a section view?

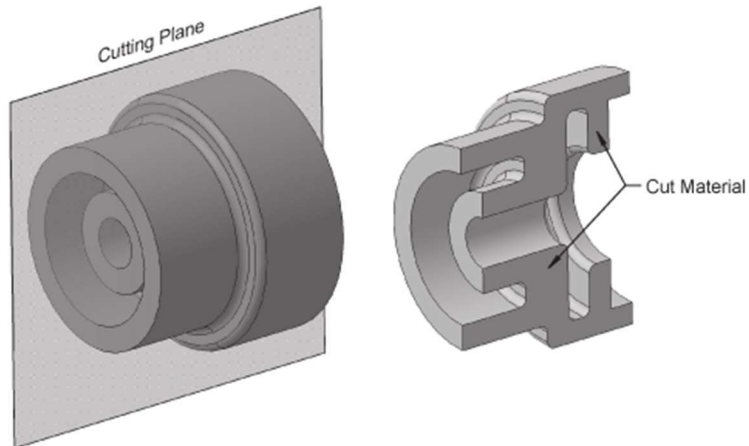
A sectional view or **a section looks inside an object**. Sections are used to clarify the interior construction of a part that cannot be clearly described by hidden lines in exterior views. By taking an imaginary cut through the object and removing a portion, the inside features may be seen more clearly.

What is this object on the left? An ugly rock? Notice to the right the image shows that it is a more than that.

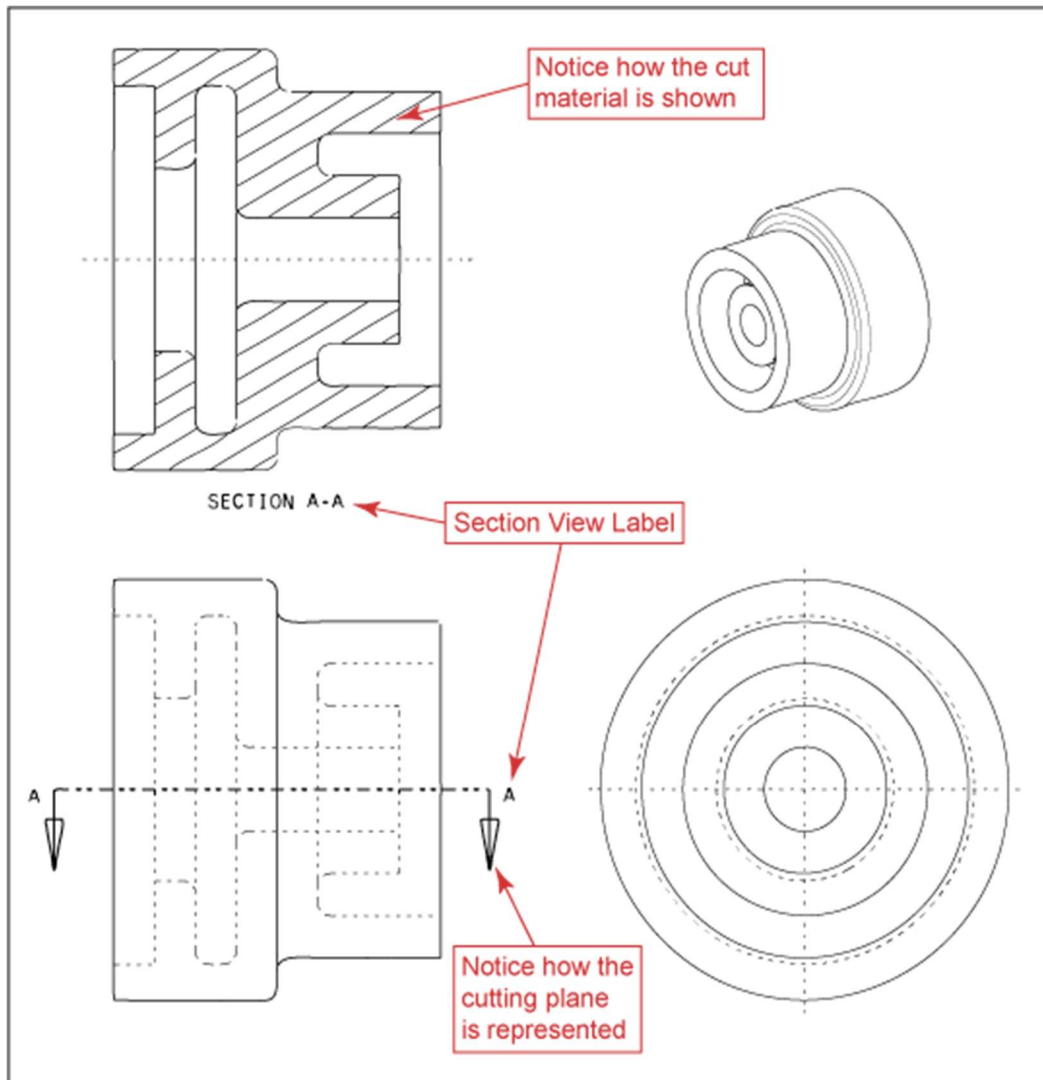


## Creating a section view.

1. The part is cut using an imaginary cutting plane.
2. The unwanted portion is mentally discarded exposing the interior construction.



Section view example



Lines used in section views.

**Cutting Plane:** An imaginary plane along which a section is taken.

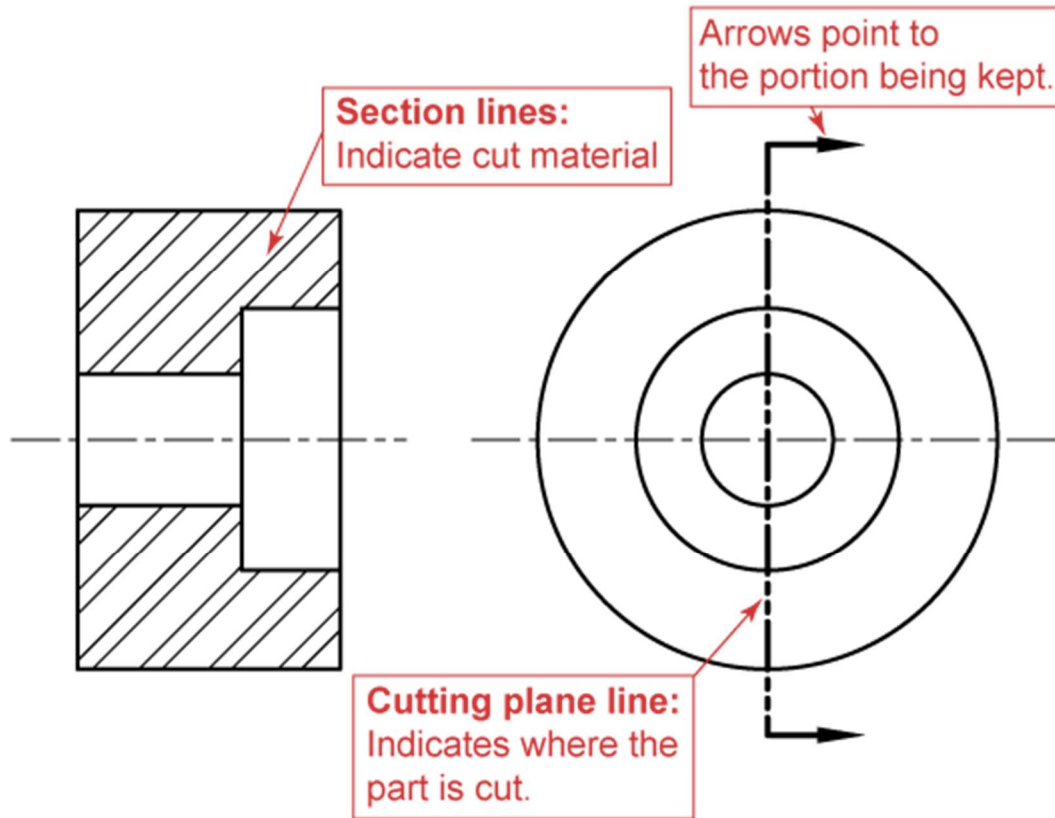
**Cutting Plane Line:** A line on a normal view that shows where the cutting plane passes through the object. It is used to show where the object is being cut. (Phantom or Hidden linetype)



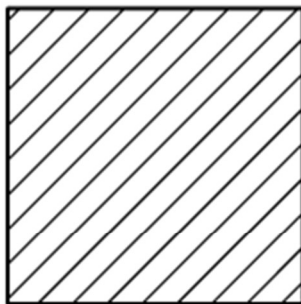
Used for long distances



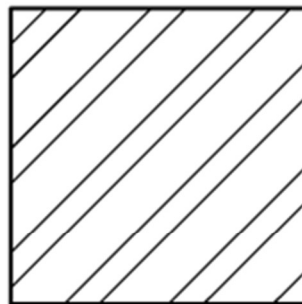
Used for short distances



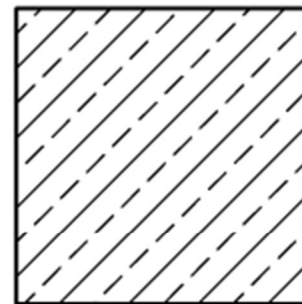
**Section Lines:** Used to indicate where the cutting plane cuts the material. Section lines are thin and the symbols (type of lines) are chosen according to the material of the object. Section lines are generally drawn at a 45° angle and they are generally drawn 1/8" apart. However, different materials (steel and bronze) have different patterns that may have a uniquely different spacing.



Cast Iron,  
General use  
all materials



Steel



Brass, Bronze,  
Copper

## Rules of Sectioning

- **Rule 1:** A section lined area is always completely bounded by a visible outline.
- **Rule 2:** The section lines in all areas should be parallel. Section lines shown in opposite directions indicate a different part.
- **Rule 3:** All the visible edges behind the cutting plane should be shown.
- **Rule 4:** Hidden features should be omitted in all areas of a section view. Exceptions include threads and broken out sections.

### What type of section should I use?

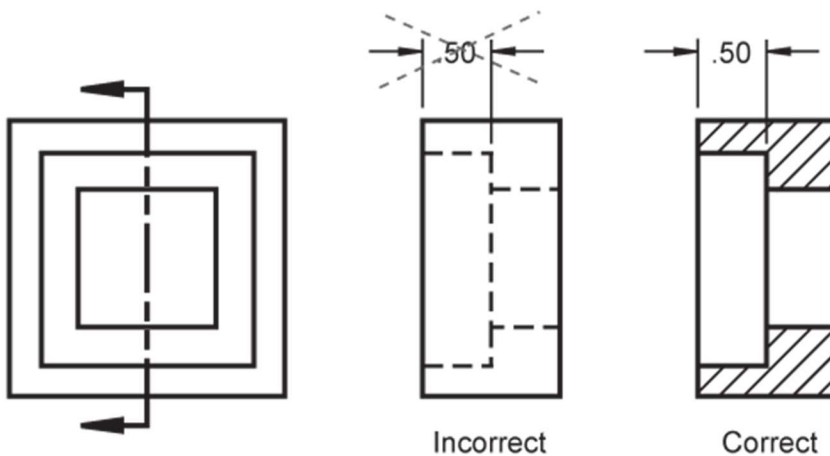
The type of section used depends on the situation and what information needs to be conveyed.

### Types of Sectional Views

- |                        |                       |
|------------------------|-----------------------|
| 1. Full Sections       | 5. Revolved Sections  |
| 2. Offset Sections     | 6. Removed Sections   |
| 3. Half Sections       | 7. Auxiliary Sections |
| 4. Broken-Out Sections | 8. Phantom Sections   |

### Full Section

To create a full section, the cutting plane passes fully through the object. Used in many cases to avoid having to dimension hidden lines.



Material: General Use

Name: \_\_\_\_\_ Bell: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_

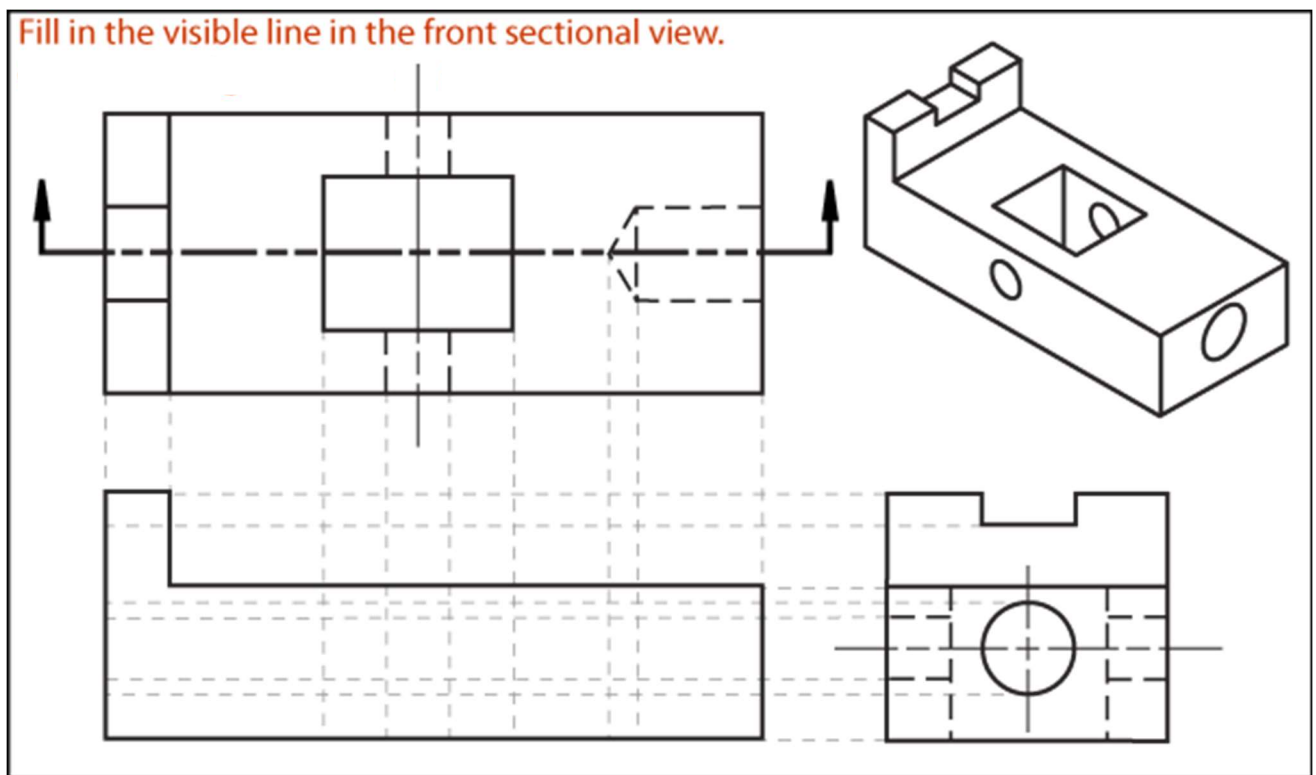
There are many pages to this assignment. Complete each one before moving on to the next. Review the information before attempting the exercises. Do your best work.

**SKETCHING EXERCISE 3**

This exercise will take you through creating a full section.

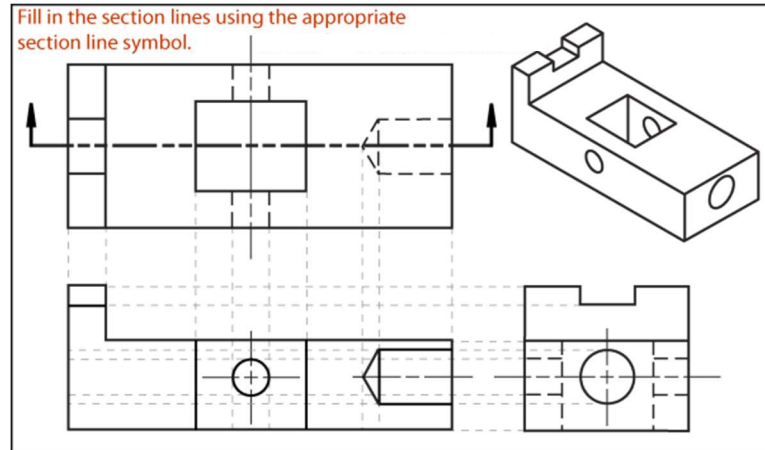
**You will need to complete this exercise.**

Directions: Given the top and right-side views, sketch the front view as a full section. The material used is steel. Trace over the dashed lines with the correct linetype needed. Add the appropriate section view label letters for identification purposes.

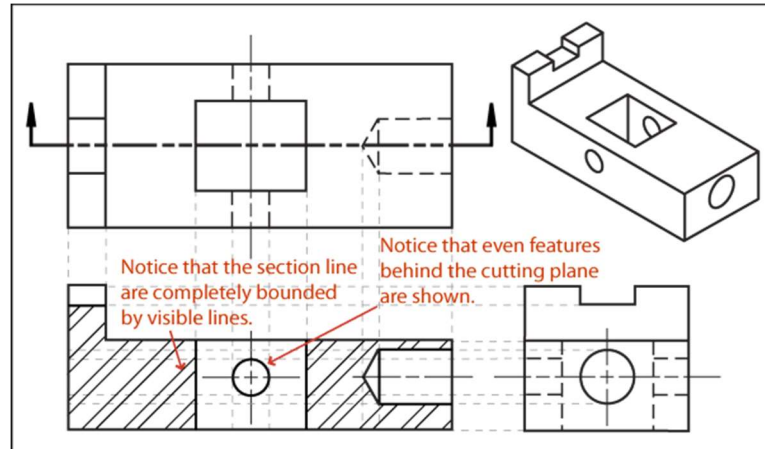


Answer key for sketching exercise 3

With Visible Lines added



With Section Lines added



RECALL ACTIVITY 1

List each section type by its name. List as many as you can from memory.

1. \_\_\_\_\_

6. \_\_\_\_\_

2. \_\_\_\_\_

7. \_\_\_\_\_

3. \_\_\_\_\_

8. \_\_\_\_\_

4. \_\_\_\_\_

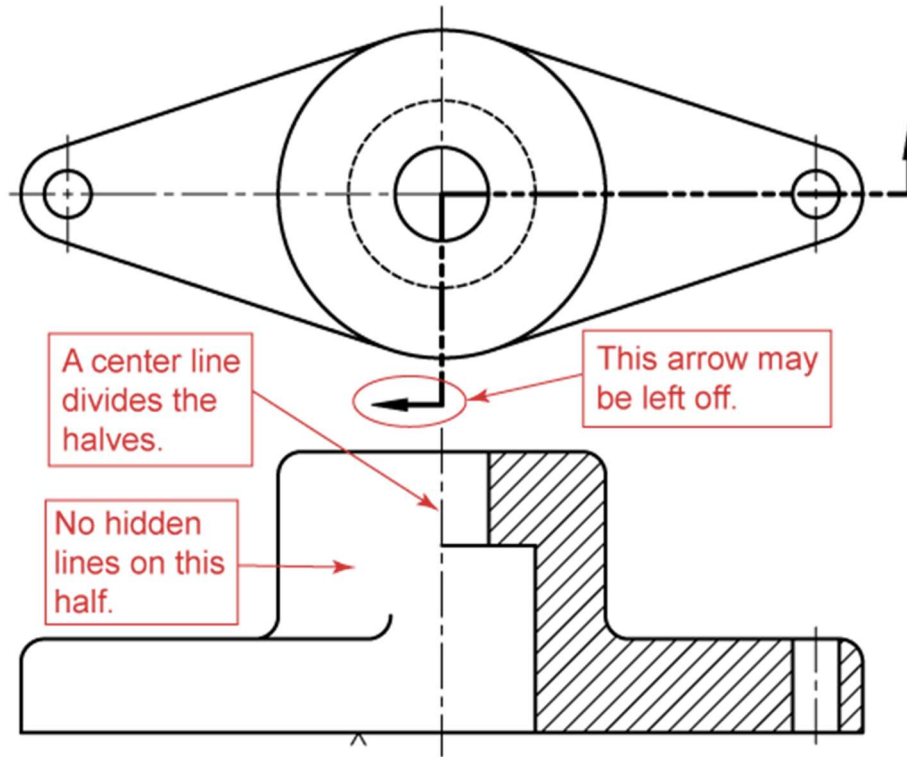
9. \_\_\_\_\_

5. \_\_\_\_\_

10. \_\_\_\_\_

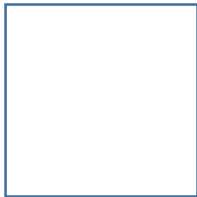
### Half Section

A half section exposes the interior of one half of an object while retaining the exterior of the other half. Half sections are used mainly for symmetric objects or assembly drawings. A centerline is used to separate the two halves. Hidden lines should not be shown on either half.



### RECALL ACTIVITY 2

Sketch each linetype respectively. Complete as many as you can, but do not look up or cheat.



Steel



Cast Iron



Bronze



Brass



General



Copper



Wood-End Grain



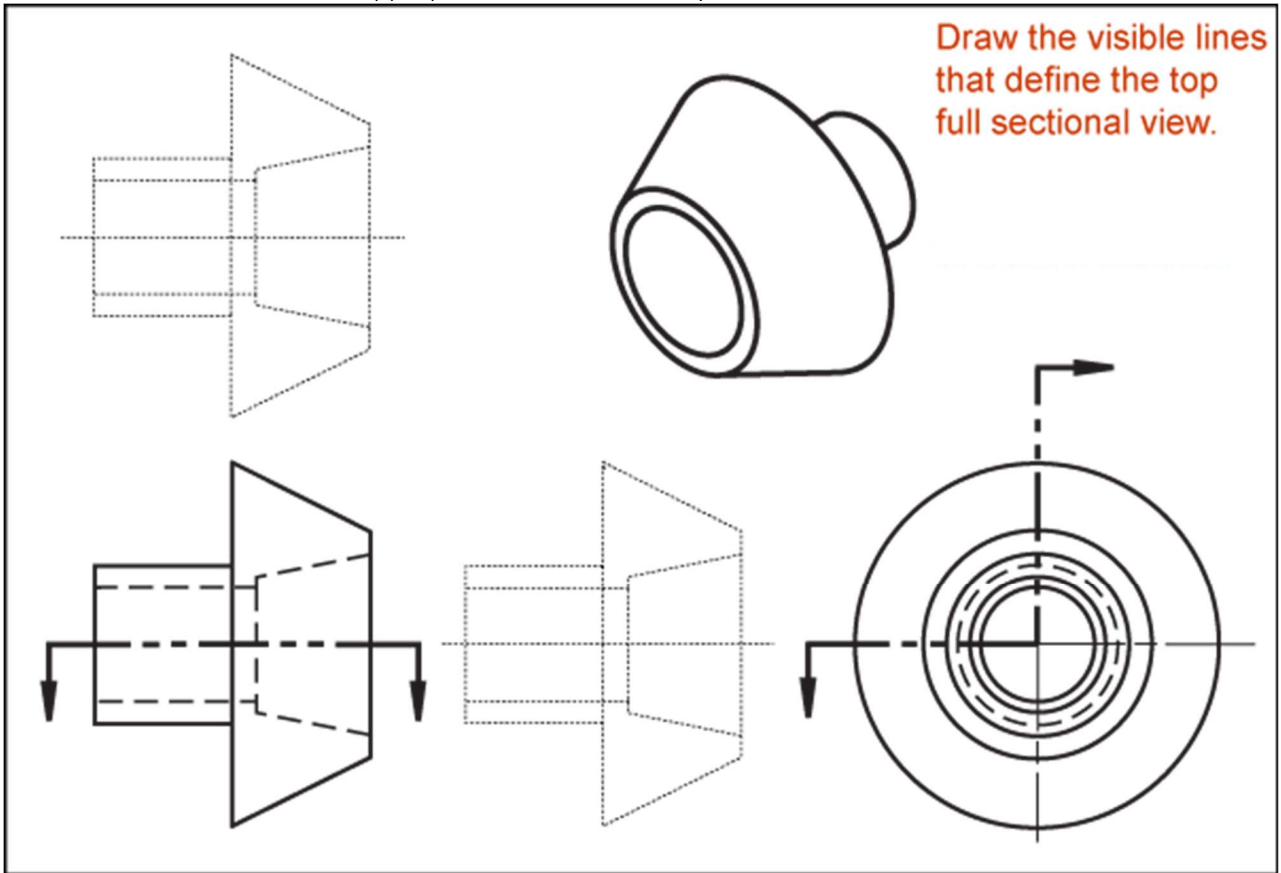
Wood-With Grain

**SKETCHING EXERCISE 4**

This exercise will give you practice at creating section views. **You will need complete this exercise.**

Directions: Given the front and right side views, sketch the top view as a full section and create a half sectioned right side view. **Top View first, Side view second**

The material used is brass. Add appropriate letters to identify different section view labels.



Answer all three knowledge questions from memory without error.

1. What is a cutting plane? \_\_\_\_\_  
 \_\_\_\_\_

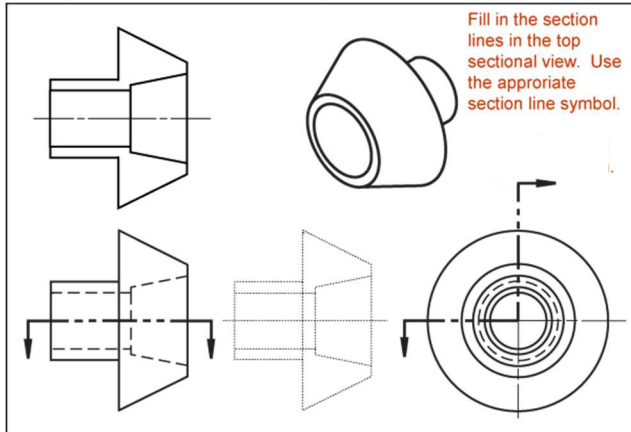
2. How does a cutting plane differ from a cutting plane line? \_\_\_\_\_  
 \_\_\_\_\_

3. What linetype is shown as the cutting plane line in the exercise examples above?  
 \_\_\_\_\_

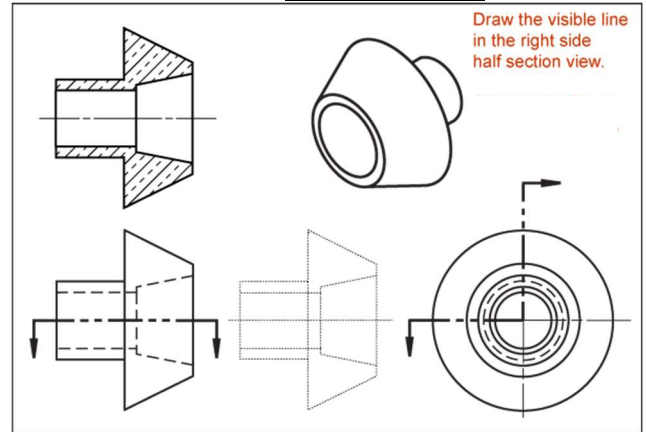


Answer Key for sketching exercise 4

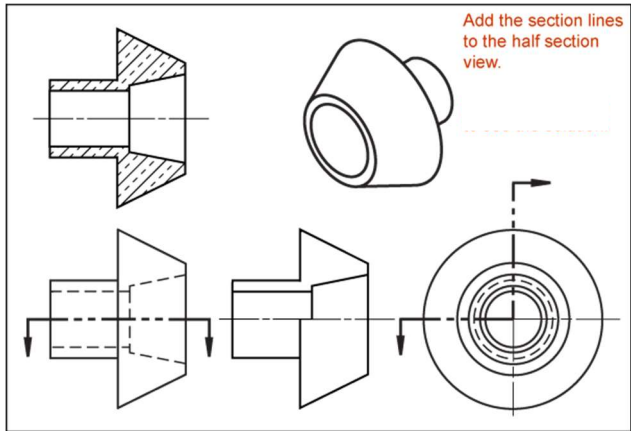
1. Top view shown with object lines drawn



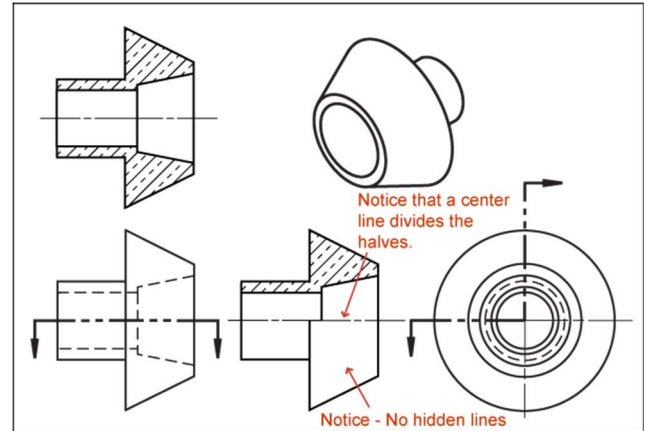
2. Top view shown as a Full Section View



3. Right side view shown with object lines

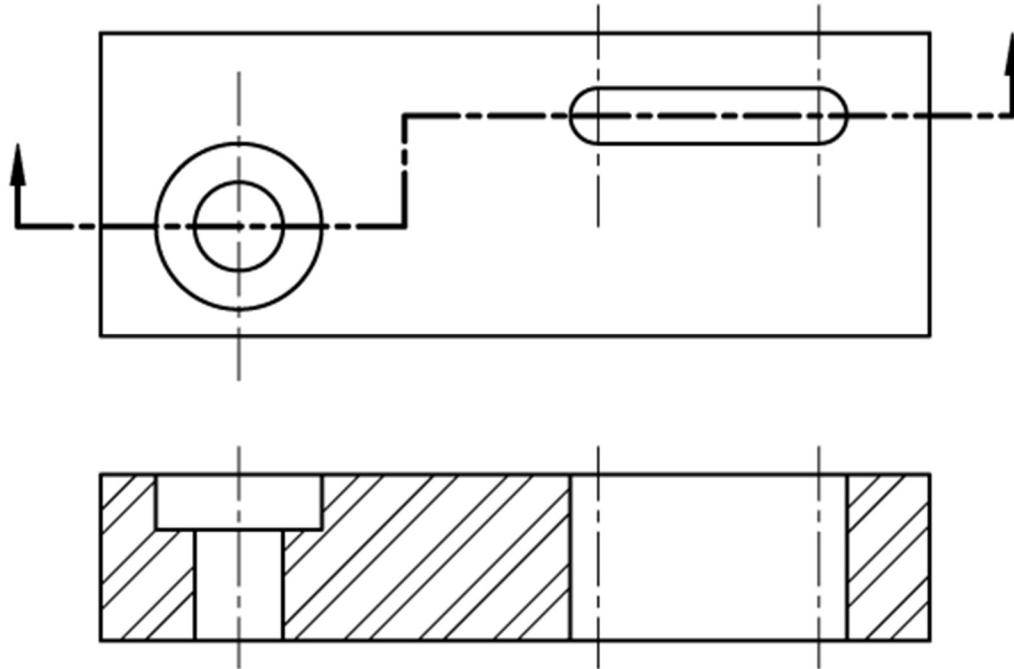


4. Right side view shown as a Half Section View



### Offset Section

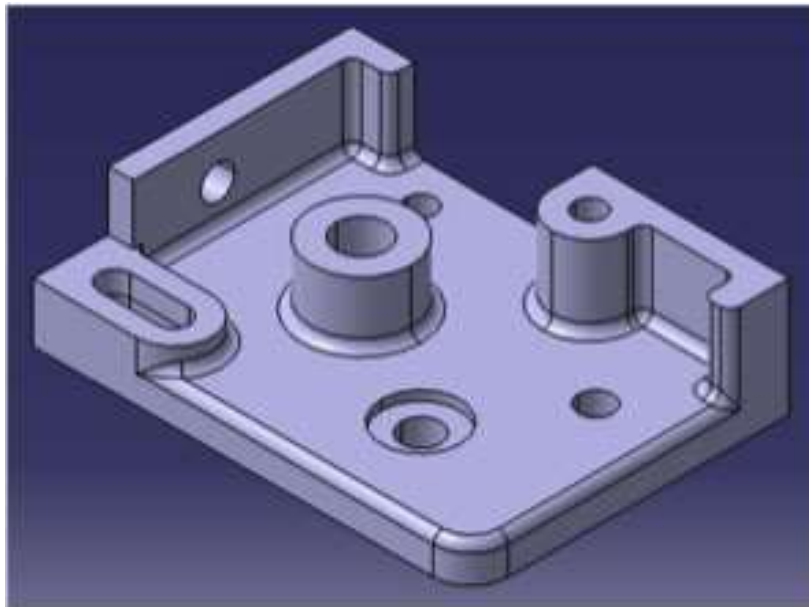
An offset section is produced by bending the cutting plane to show features that don't lie in the same plane.



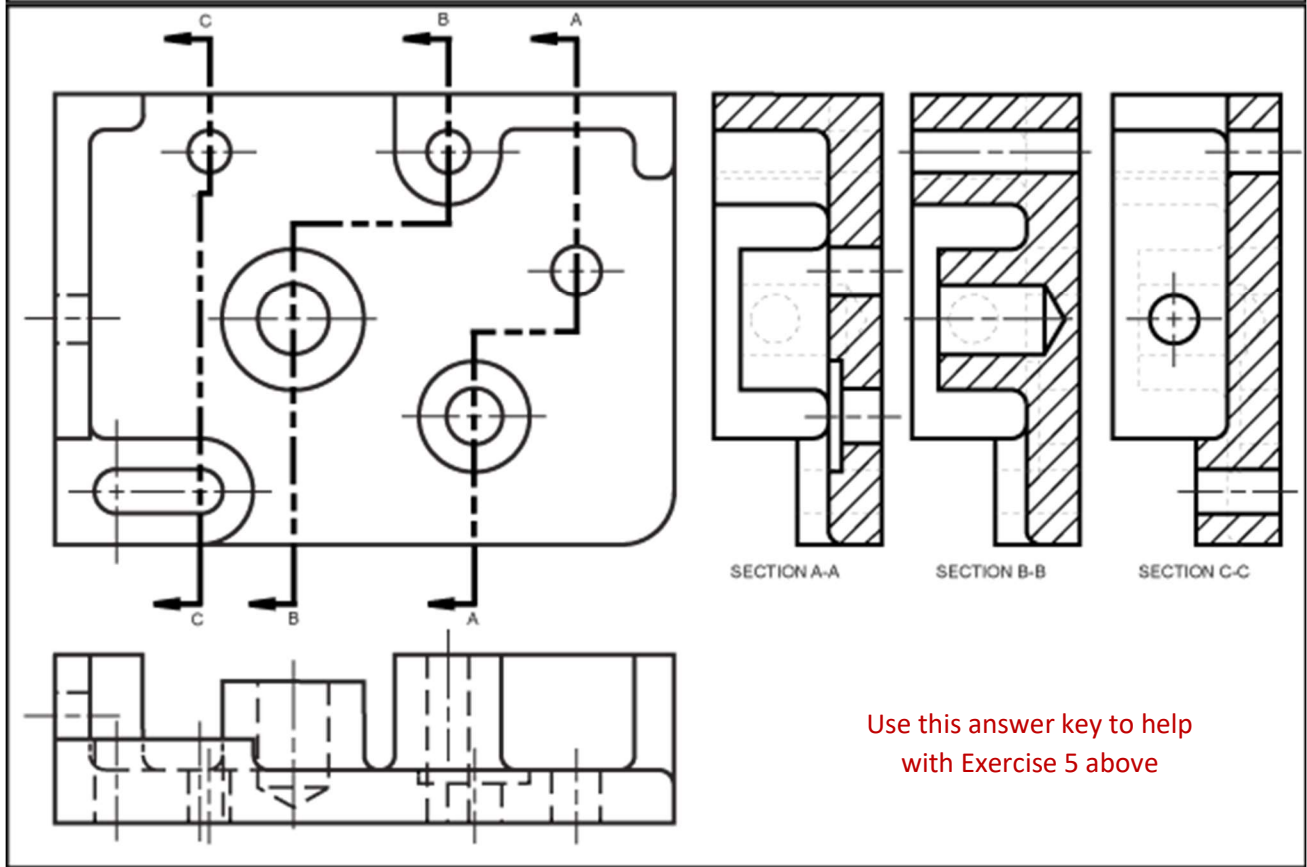
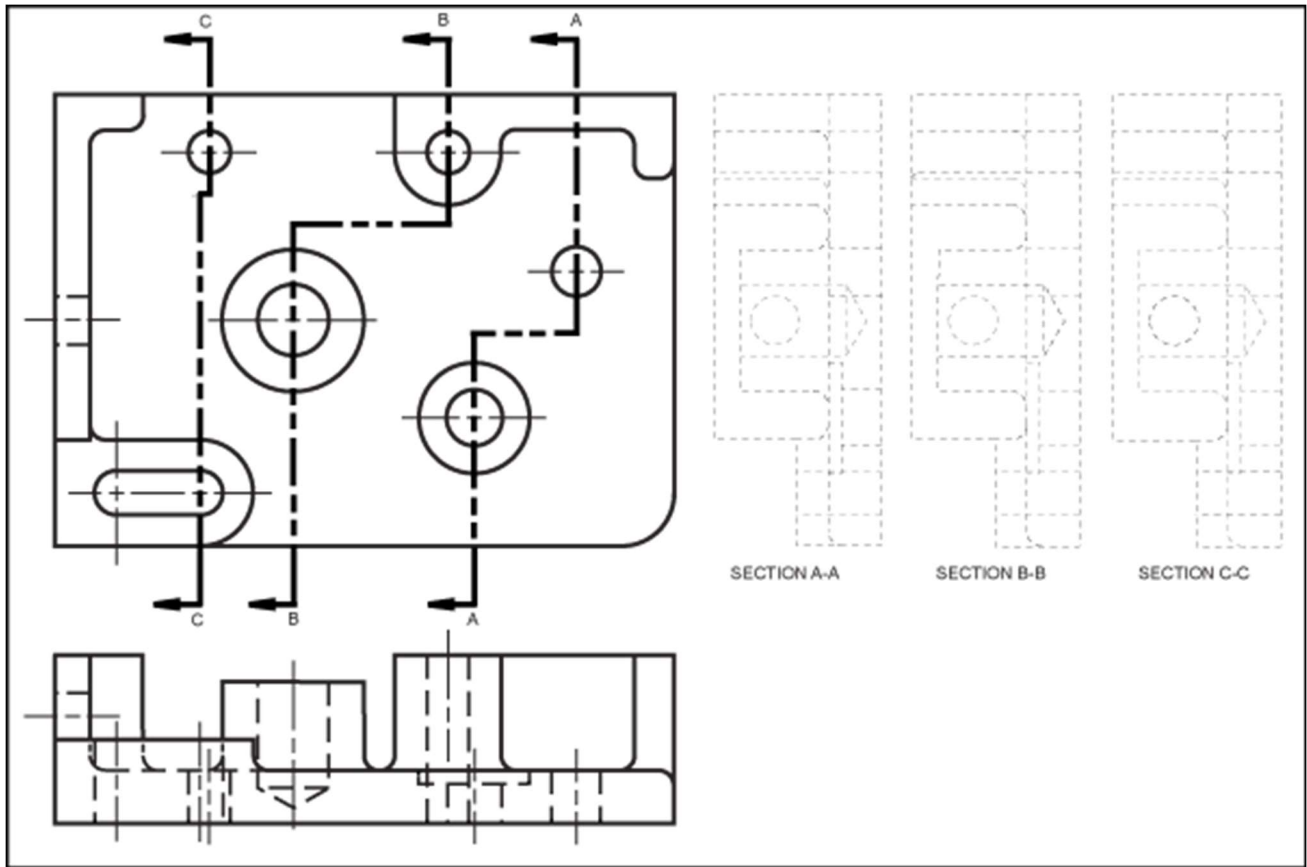
Material: Steel

### SKETCHING EXERCISE 5

This exercise will take you through creating an offset section. **You will need to complete this exercise.** But it will be done in a different manner. Study the object below in its isometric view. Imagine how it might be sectioned.



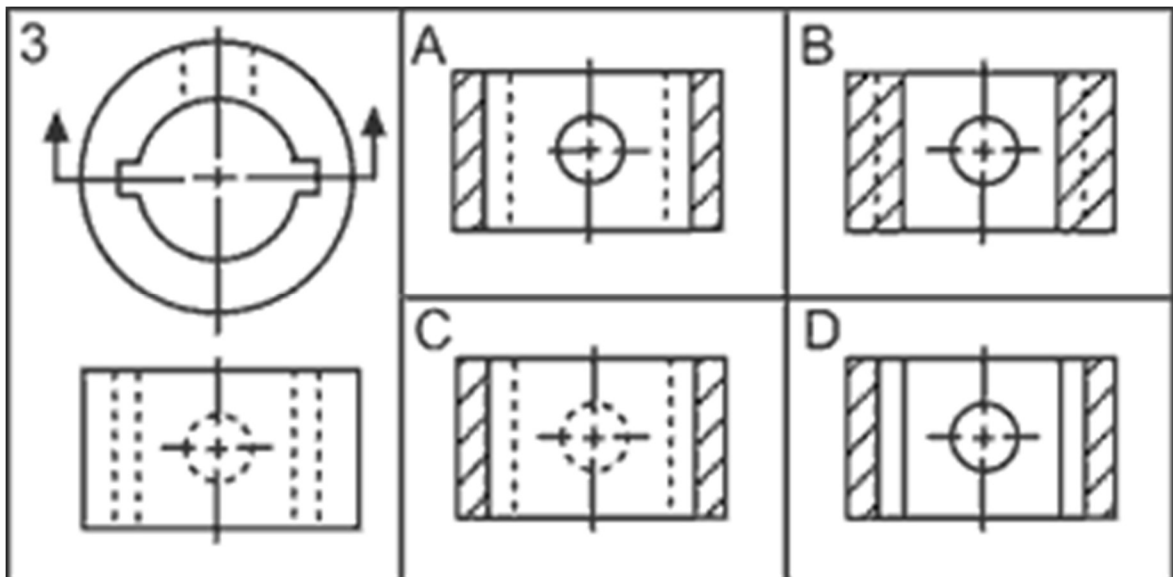
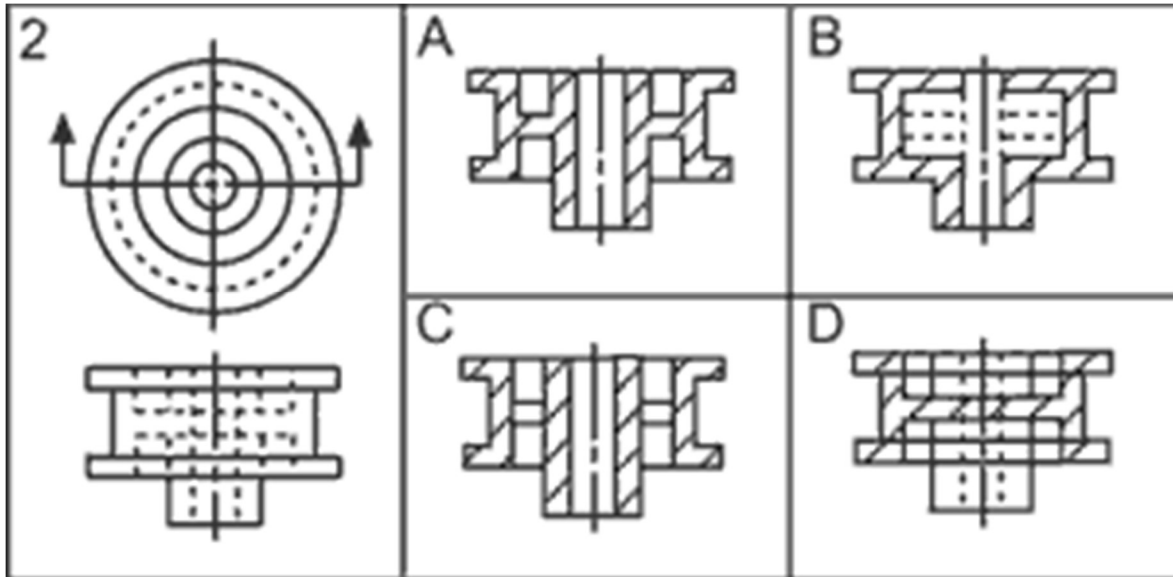
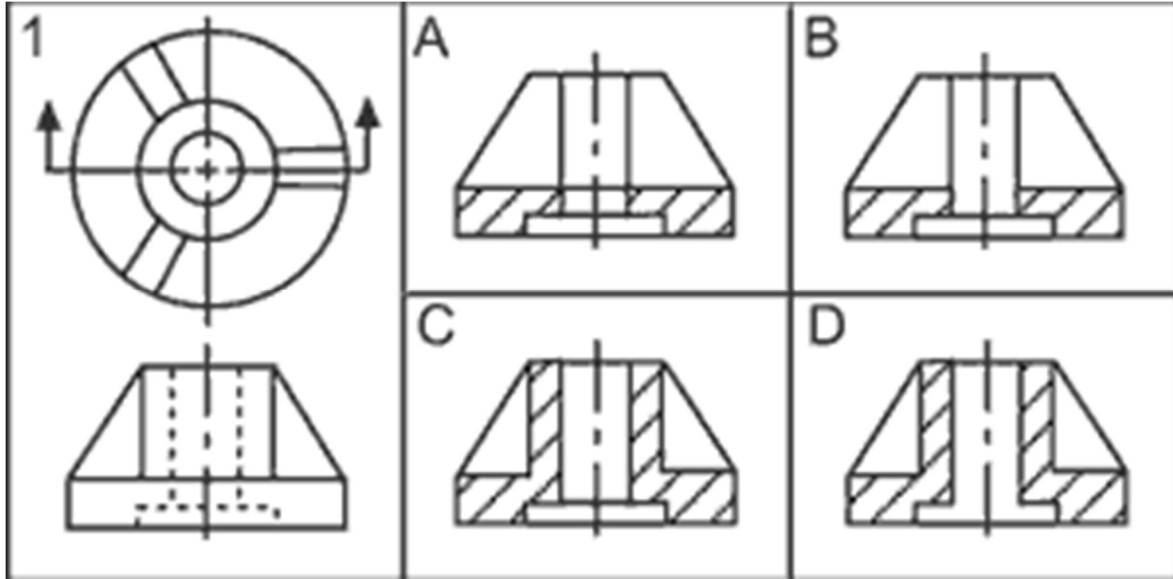
Given the front and top views on the next page, sketch the three missing section views in their appropriate places. The material is cast iron. The correct view is given below the orthographic view. Follow it well.



Use this answer key to help with Exercise 5 above



Directions: Observe the Multiview drawing on left, and then chose the correct section view on the right



Directions: Observe the Multiview drawing on left, and then chose the correct section view on the right

<p>4</p>	<p>A</p>	<p>B</p>
	<p>C</p>	<p>D</p>

<p>5</p>	<p>A</p>	<p>B</p>
	<p>C</p>	<p>D</p>

<p>6</p>	<p>A</p>	<p>B</p>
	<p>C</p>	<p>D</p>