



ENGINEERING DRAWING FOR CIVIL ENGINEERS (LAB)

LECTURE # 2

LINES

TYPE OF LINES

DEPARTMENT OF CIVIL
ENGINEERING

Prepared By: Engr. Khurshid Alam

ELEMENTS OF ENGINEERING DRAWING

Engineering drawing are made up of graphics language and word language.

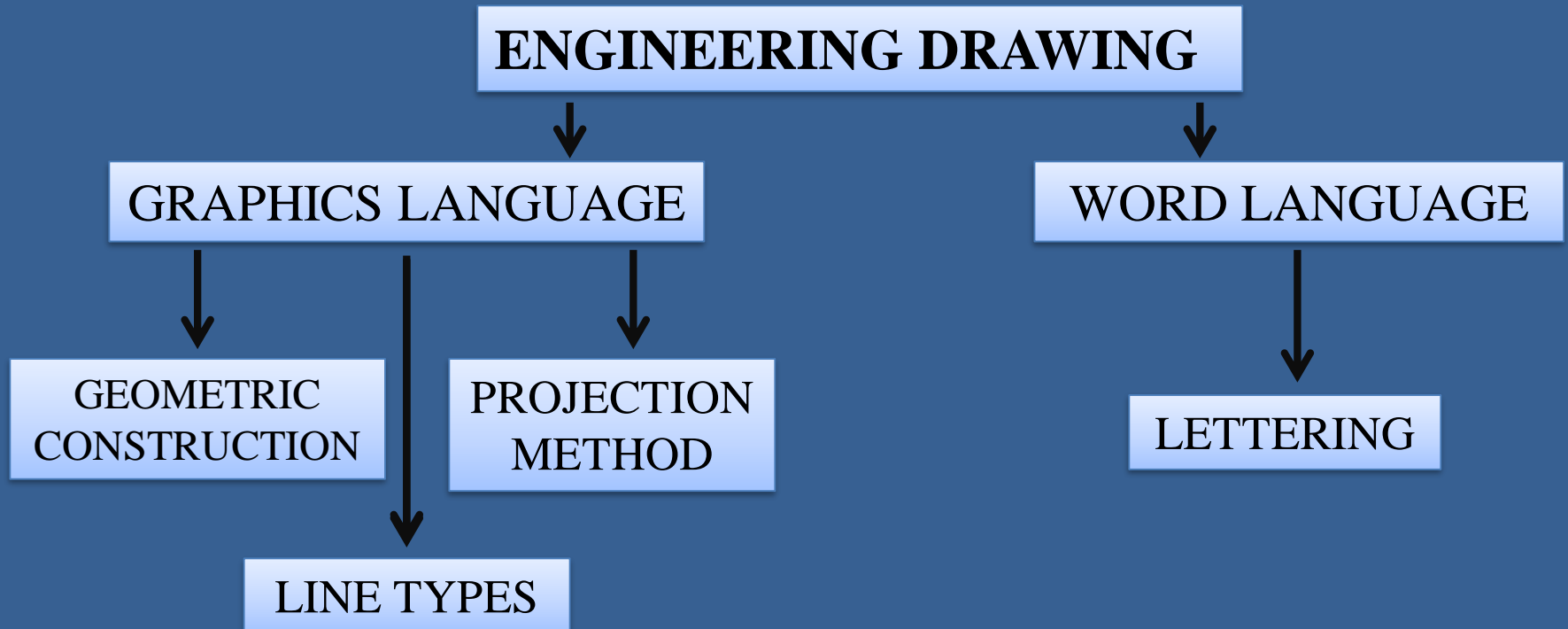
GRAPHICS LANGUAGE

Describe a shape (mainly).

WORD LANGUAGE

Describe an exact size, location and specification of the object.

ELEMENTS OF ENGINEERING DRAWING



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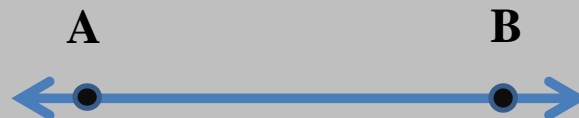
LINE

POINT

A point is an exact location

LINE





A line is a straight path of points that continues in both directions forever.



INTRODUCTION TO TYPES OF LINES

- Each line has a definite *form* and *line weight*.
- The standard **thick line** weight is *0.6mm HB Lead*.
- The standard **thin line** weight is *0.3mm HB Lead*.
- The standard **construction line** weight is *0.5mm 2H Lead*.

BASIC LINE TYPES & NAME ACCORDING TO APPLICATION

Thickness \ Style	Thick	Thin
Continuous	 Visible line	 1. Dimension line 2. Extension line 3. Leader line
Dash		 Hidden line
Chain		 Center line

BASIC LINE TYPES & NAME ACCORDING TO APPLICATION

VISIBLE LINE

Represent features that can be seen in the current view.

HIDDEN LINE

Represent features that cannot be seen in the current view.

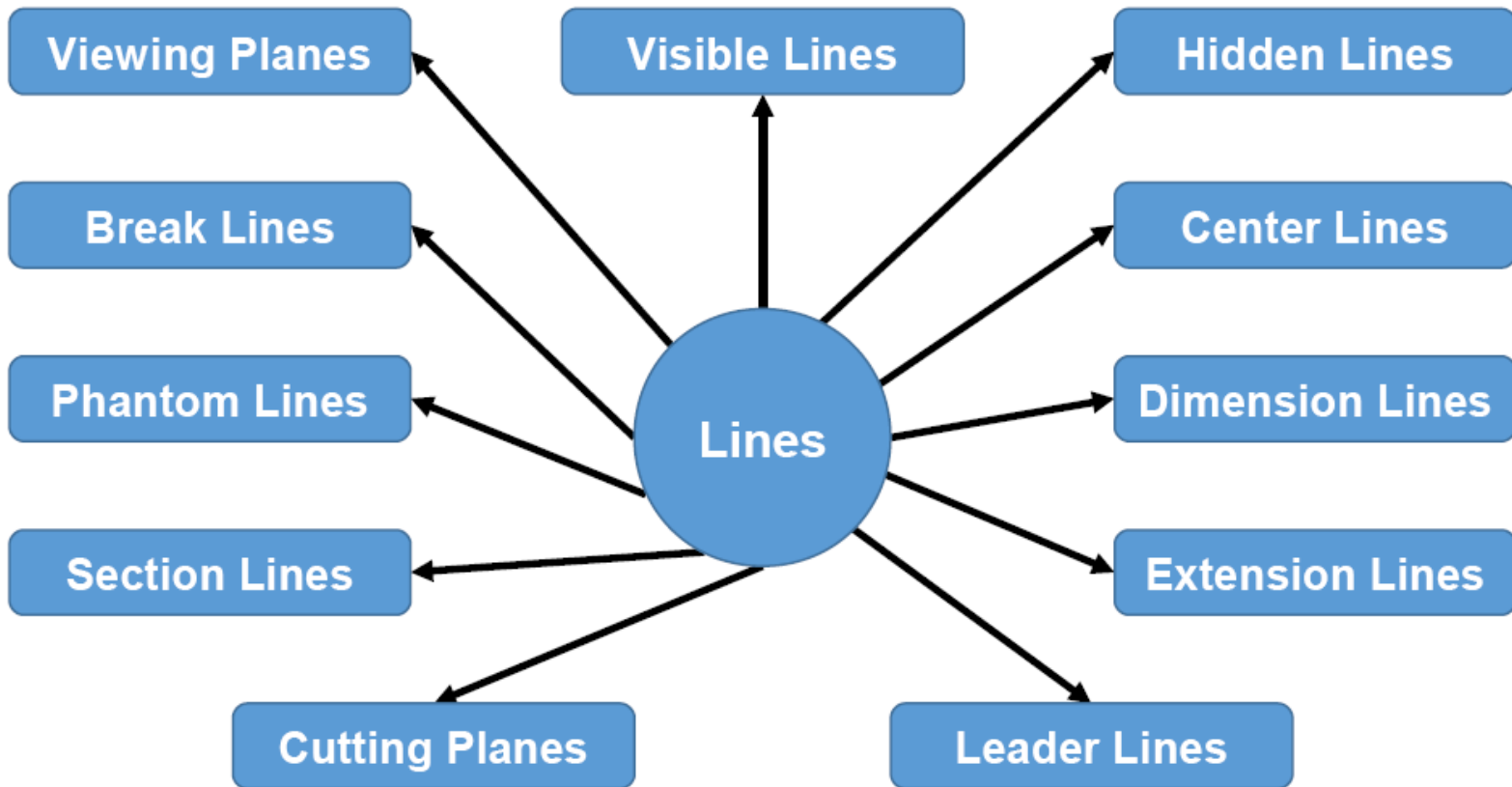
CENTER LINE

Represents symmetry, path of motion, centers of circles.

DIMENSION/ EXTENSION/ LEADER LINE

indicate the sizes and location of features.

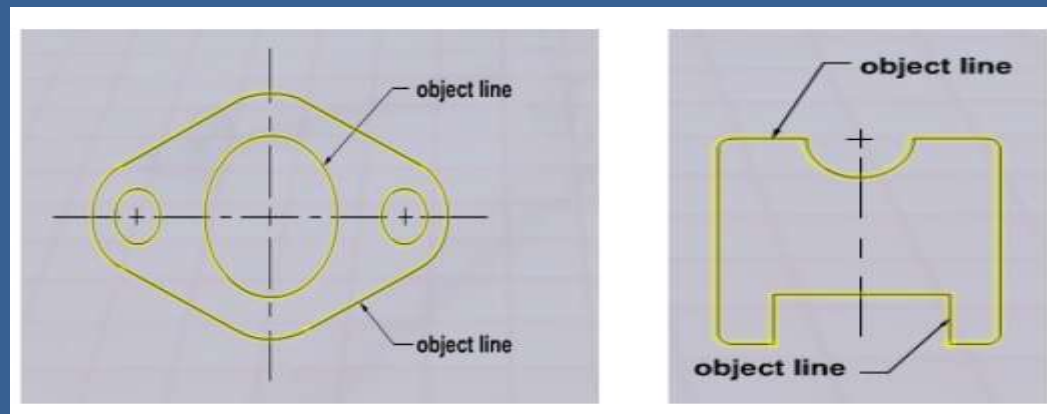
MAIN LINE TYPES



VISIBLE/ OBJECT LINE

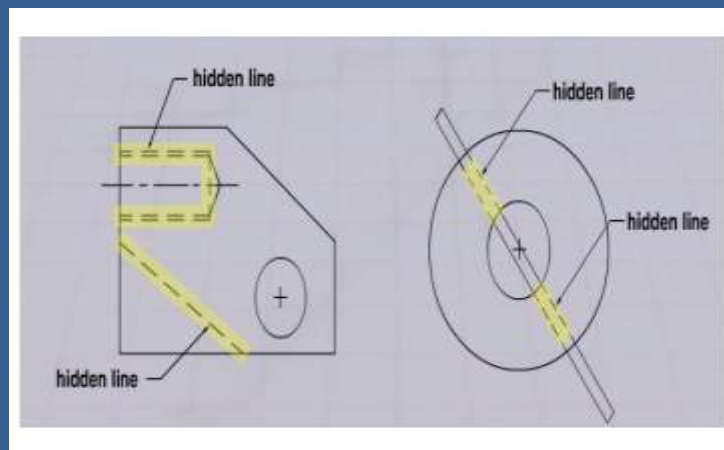
- Dark, heavy lines.
- Used to represent the outline or contour of the object being drawn.
- Define features you can see in a particular view.

Thick



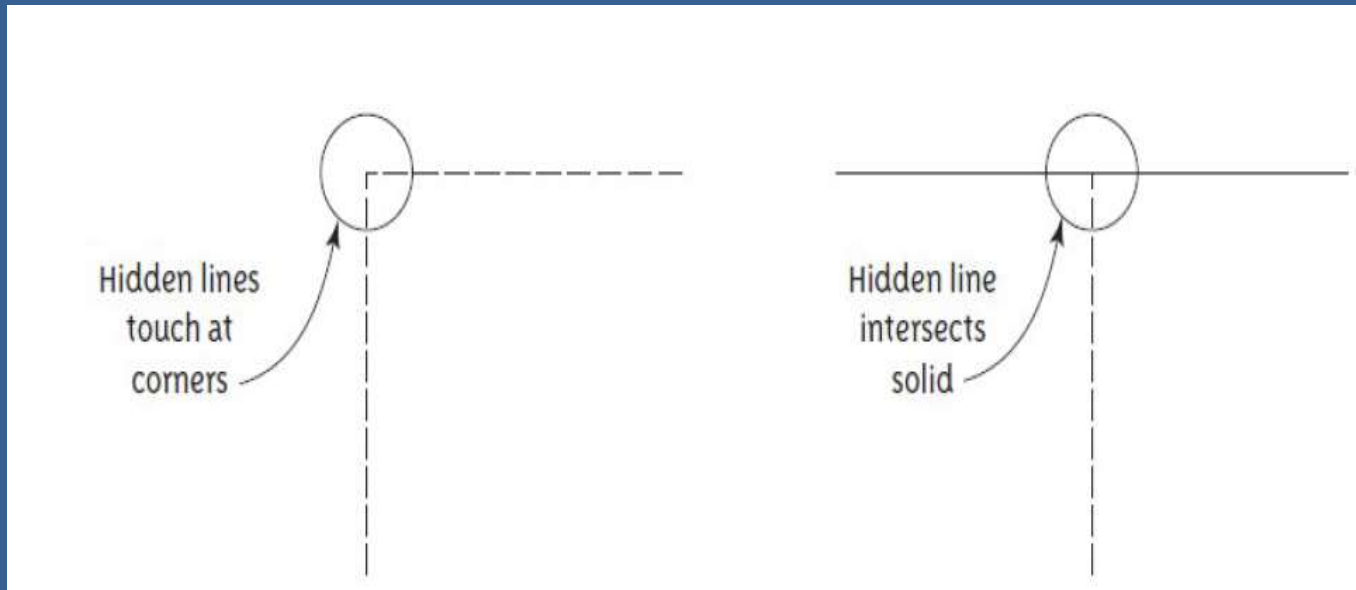
HIDDEN LINES

- Light, narrow, short, dashed lines.
- Shows the outline of a feature that can not be seen in a particular view.
- Used to help clarify a feature, but can be omitted if they clutter a drawing.



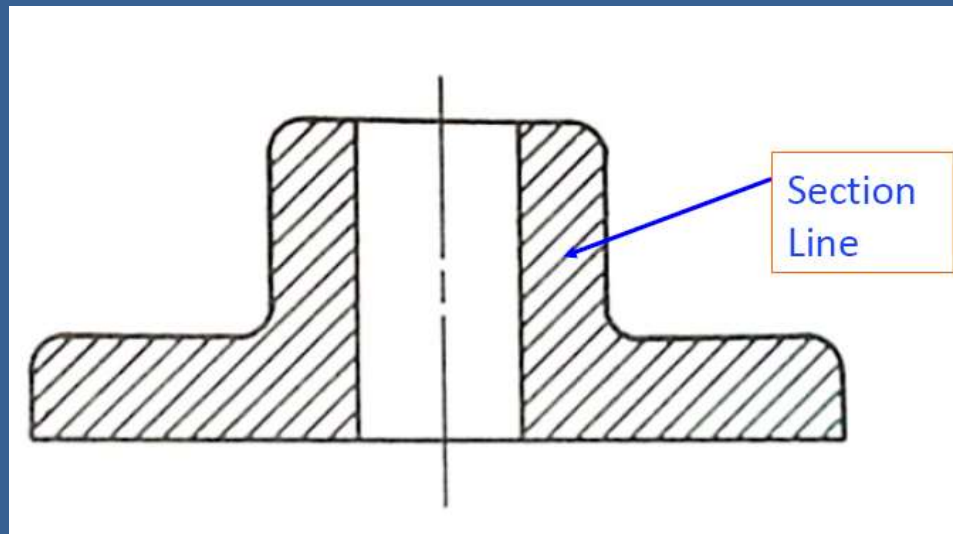
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HIDDEN LINES



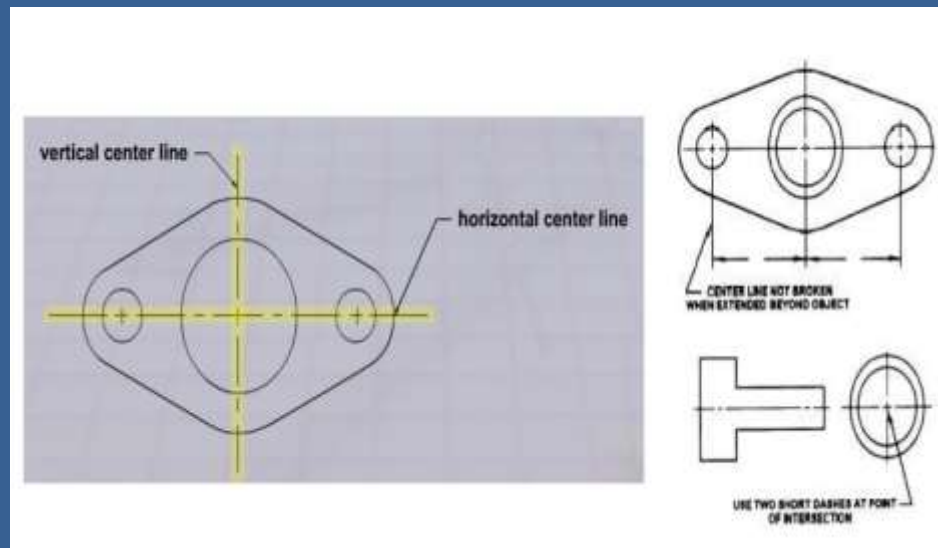
SECTION LINE

- Thin line usually drawn at a 45 degree angle.
- Indicates the material that has been cut through in a sectional view.



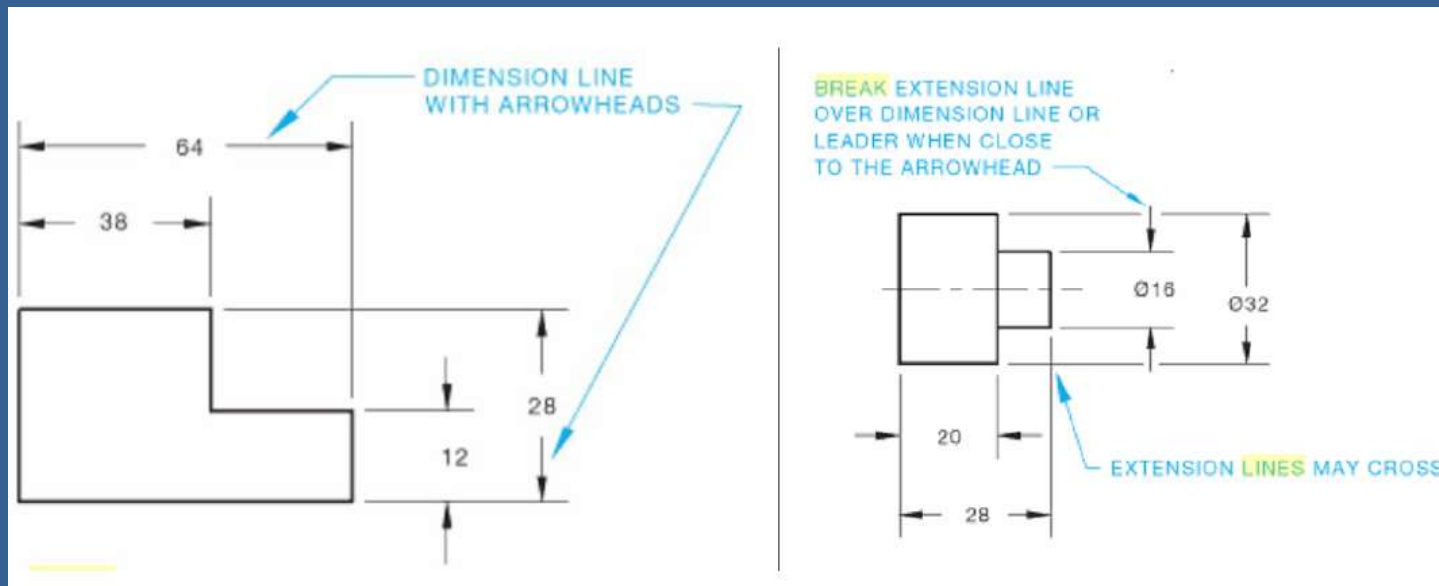
CENTER LINES

- Thin line consisting of alternating long and short dashes.
- Used to represent the center of round or cylindrical features, or the symmetry of a feature.



Dimension Lines

- Thin lines capped on the ends with arrowheads and broken along their length to provide a space for the dimension numeral.
- They indicate length.



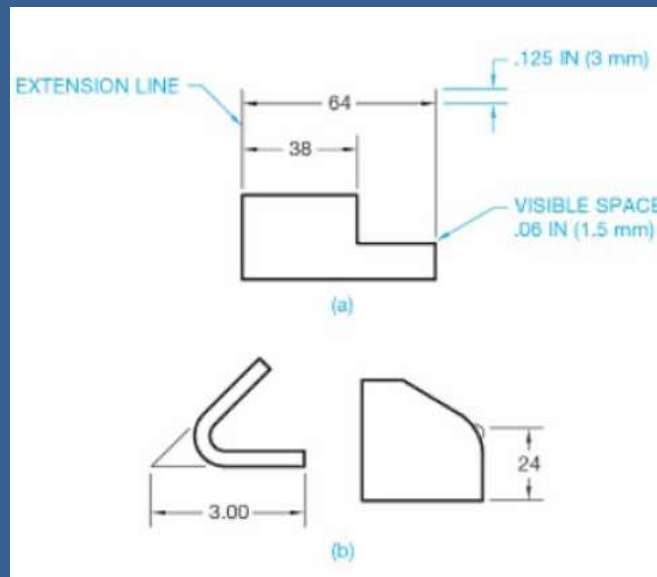
EXTENSION LINES

Thin lines used to establish the extent of a dimension.

Can also be used to show extension of a surface to a theoretical intersection as shown in (b).

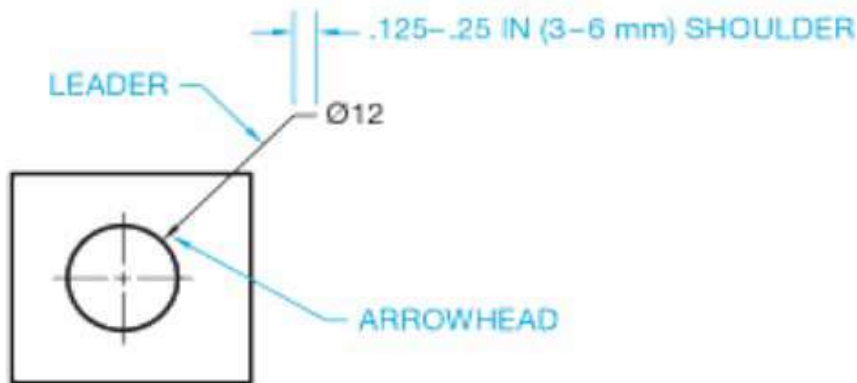
Begin 1.5mm from the object and extend to 3mm beyond the last dimension.

They should not cross dimension lines.



LEADER LINES

- Thin lines used to connect a specific note to a feature.
- Also used to direct dimensions, symbols, item number and part numbers on a drawing.
- Commonly drawn at *45, 30 and 60* degrees.
- Has a *short shoulder* (3-6mm) at one end beginning at the center of the vertical height of text, and a *standard dimension arrowhead* at the other end touching the feature.



- Leader lines should not cross each other.
- Leader lines should not be excessively long.
- Leader lines should not be vertical or horizontal.
- Leader lines should not be parallel to dimension lines, extension lines or section lines.

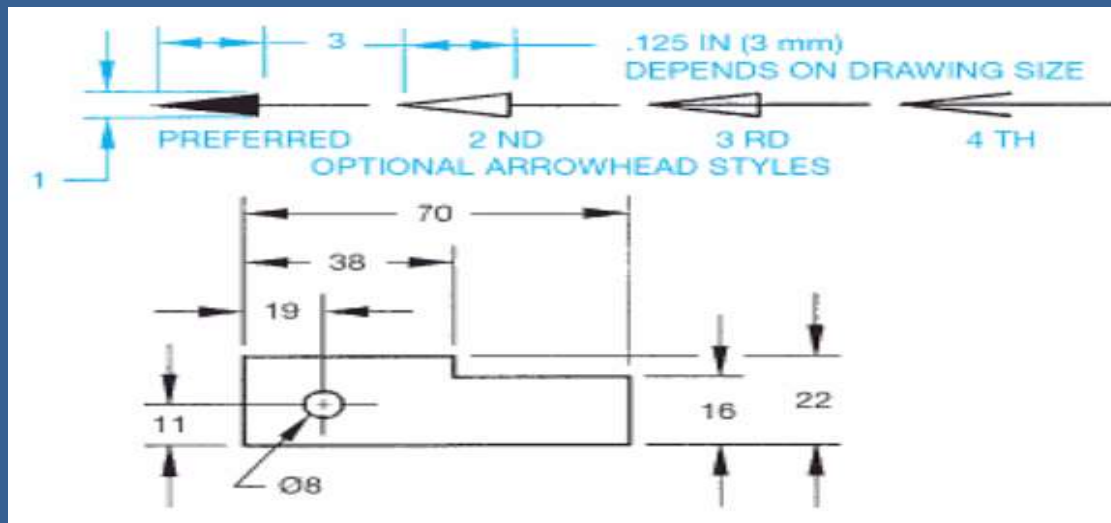
ARROWHEADS

Used to terminate dimension lines and leader lines and on cutting-plane lines and viewing plane lines.

They should be three times as long as they are wide.

They should be the same size throughout the drawing.

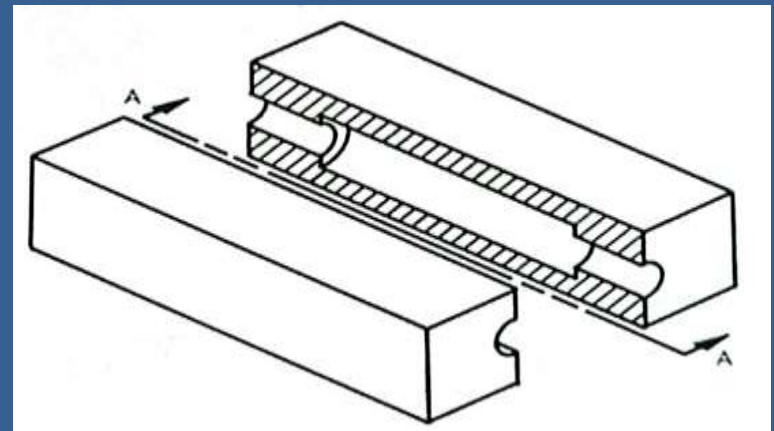
The filled arrowhead is generally preferred because of its clarity.



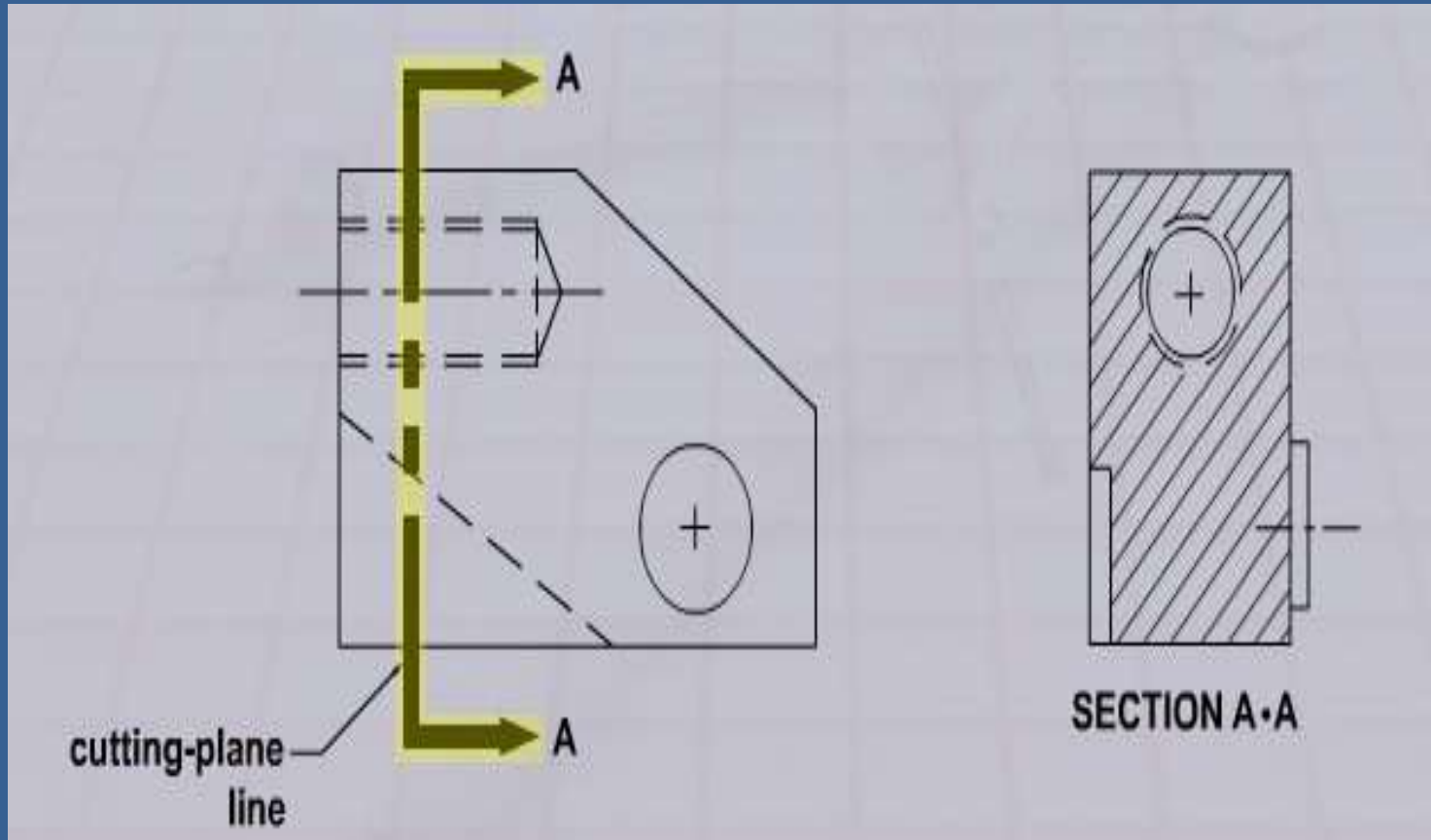
CUTTING PLANE LINES

Thick broken line that is terminated with short *90 degree arrowheads*.

Shows where a part is mentally cut in half to better see the interior detail.



CUTTING PLANE LINES

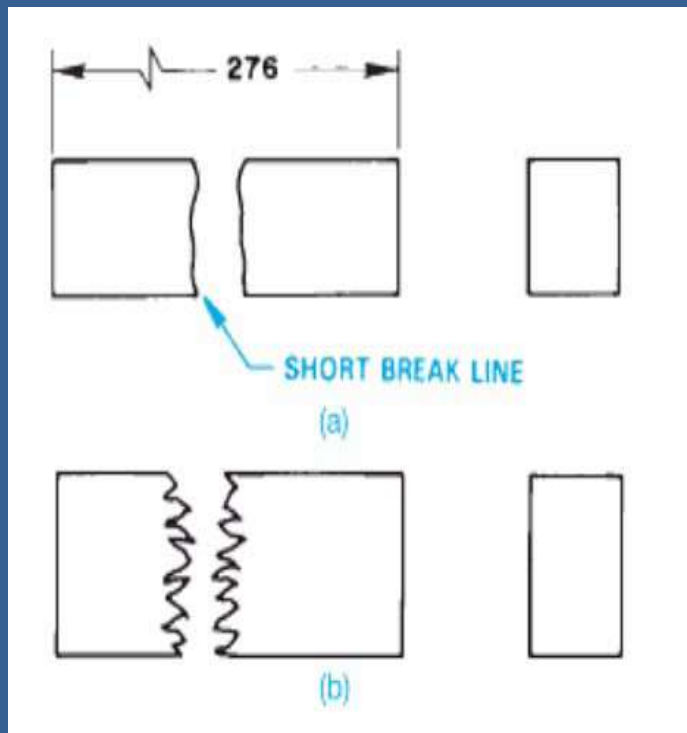


BREAK LINES

- Used to break out sections for clarity or for shortening a part.
- Three types of break lines with different line weights:
 1. Short Breaks.
 2. Long Breaks.
 3. Cylindrical Breaks.

SHORT BREAK LINES

- Thick wavy line.
- Used to break the edge or surface of a part for clarity of a hidden surface.

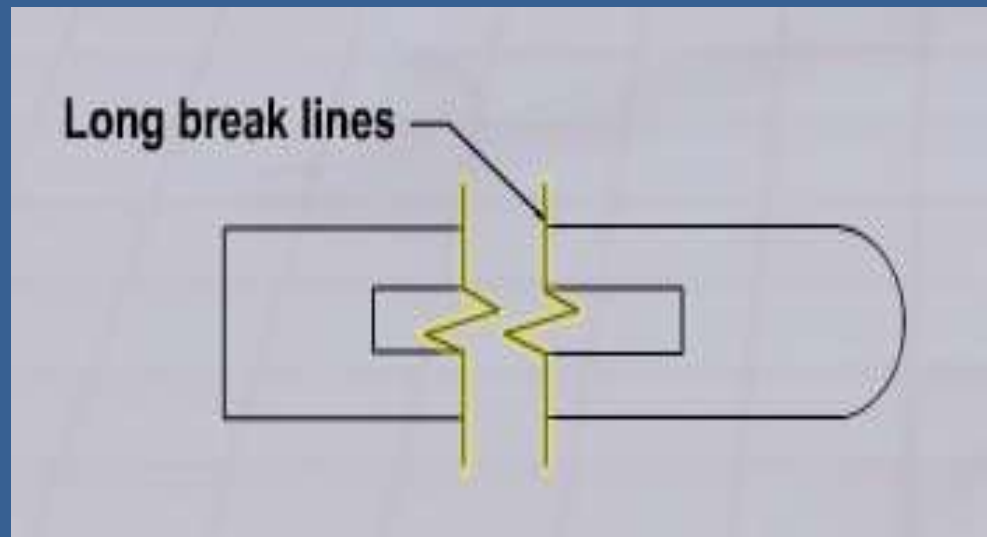


(a) Short break line on metal shape;

(b) Short Break Line on wood shape.

LONG BREAK LINES

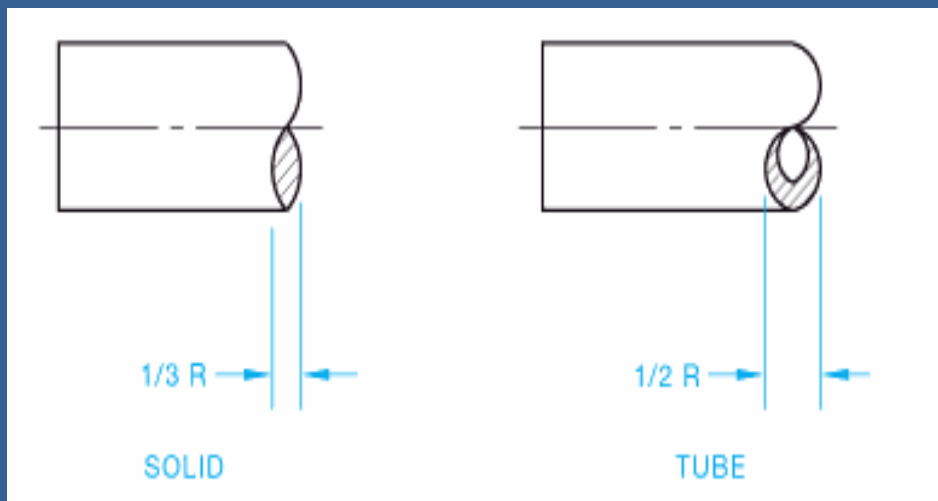
- Long, thin lines.
- Used to show that the middle section of an object has been removed so it can be drawn on a smaller piece of paper.



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CYLINDRICAL BREAK LINES

- Thin lines.
- Used to show round parts that are broken in half to better clarify the print or to reduce the length of the object.



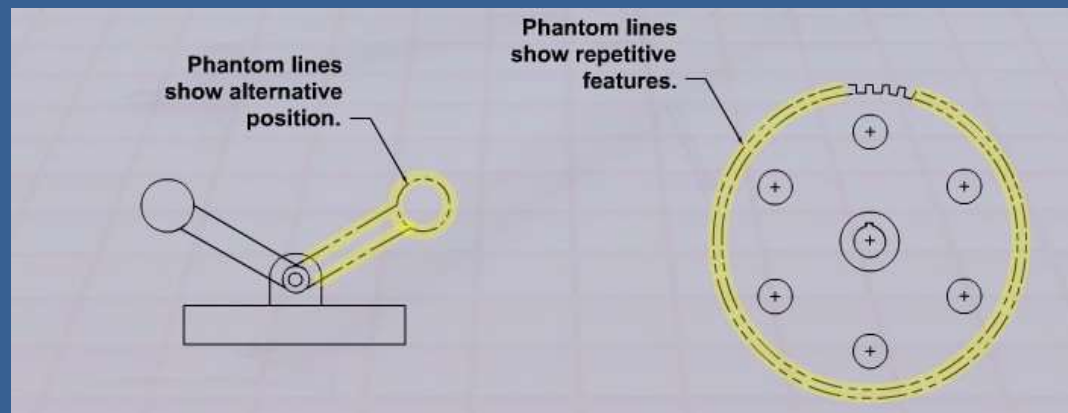
Cylindrical conventional breaks for a solid and tube;
where $R = \text{Radius}$

PHANTOM LINES

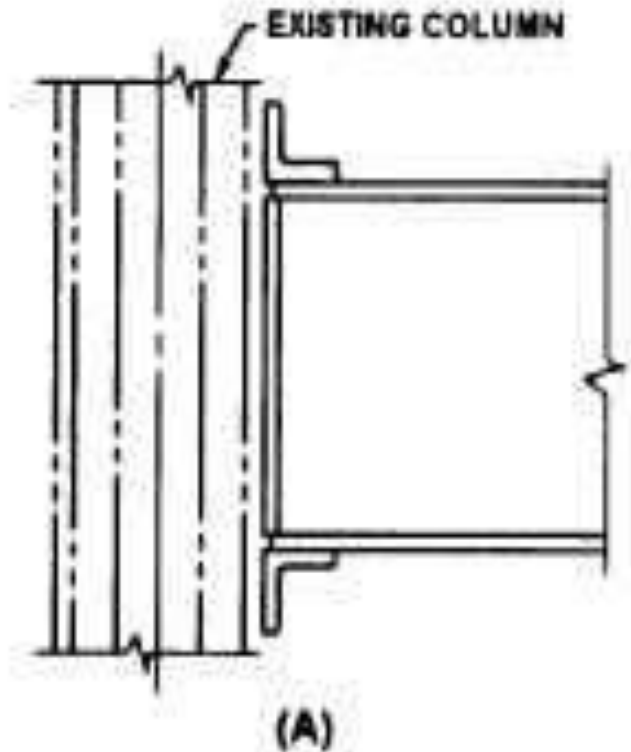
Thin lines made up of long dashes alternating with pairs of short dashes.

Three purposes in drawings

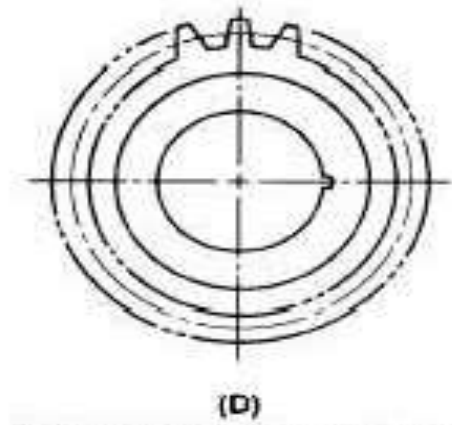
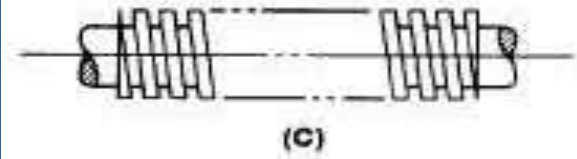
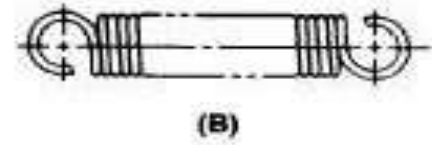
- a) *To show the alternate position of moving parts.*
- b) *To show the relationship of parts that fit together.*
- c) *To show repeated detail.*



PHANTOM LINES



INDICATION OF ADJACENT PARTS



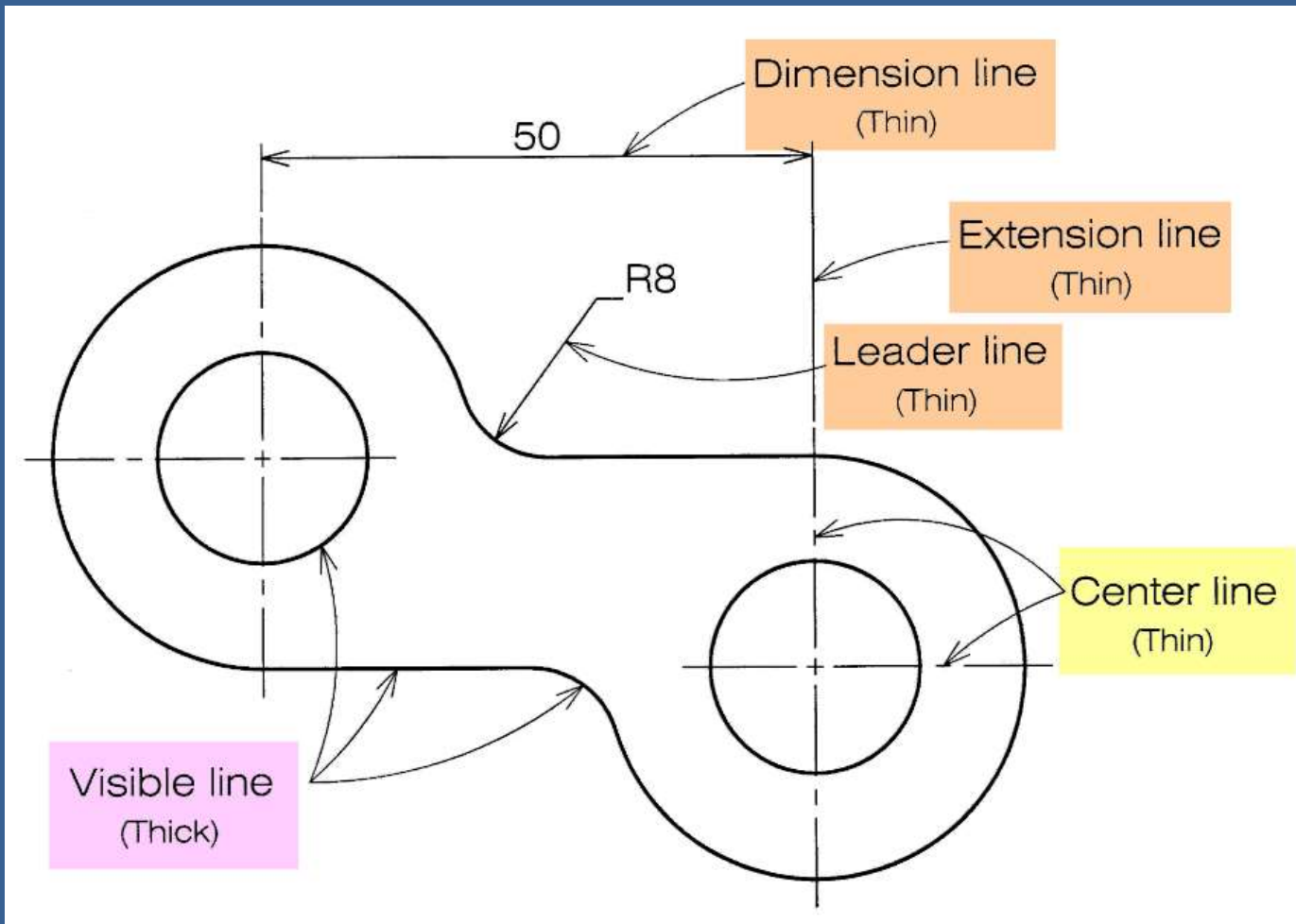
INDICATION OF REPEATED DETAIL

GRADES OF PENCILS USED IN LINES

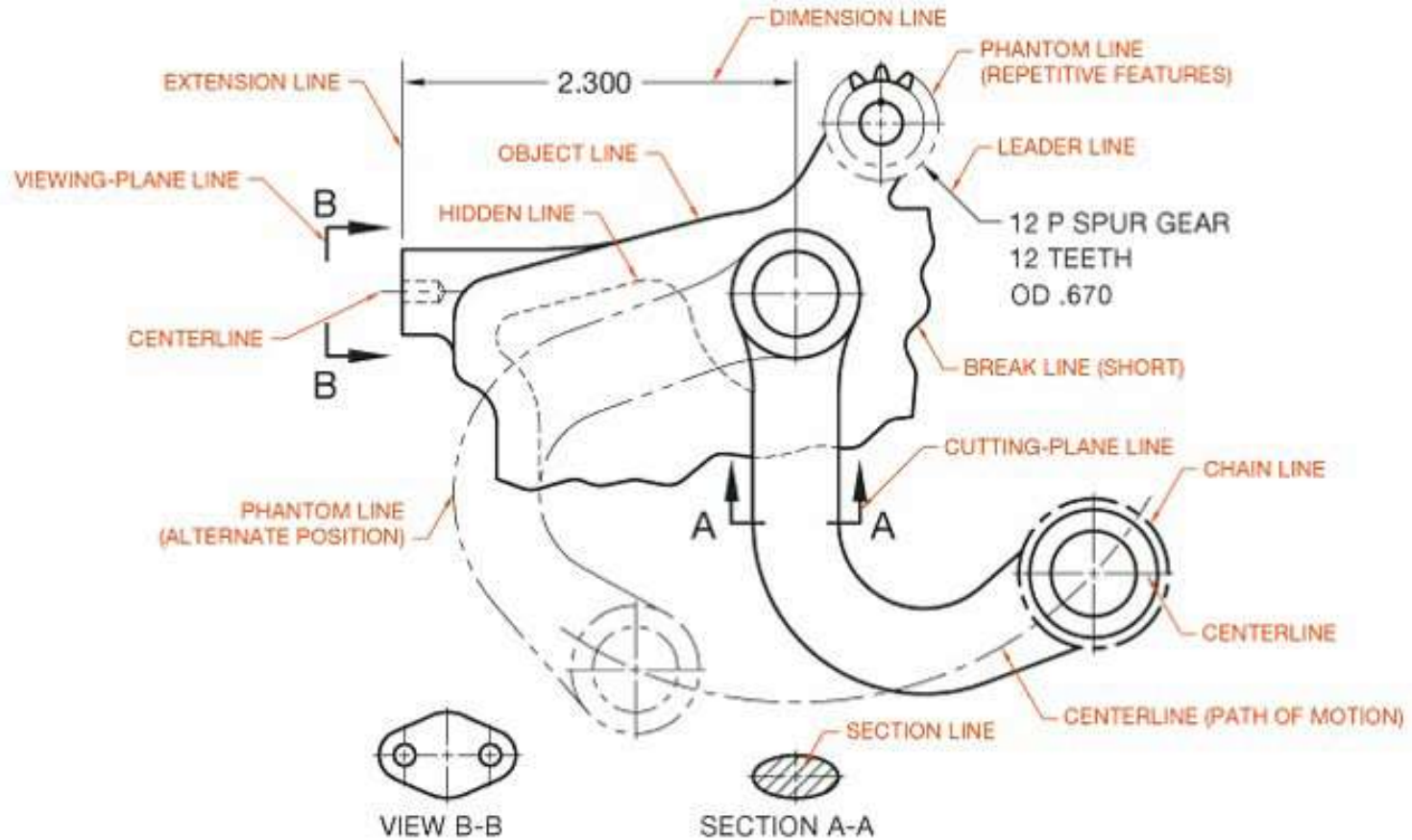
TASK	LEAD
CONSTRUCTION LINES	3H, 2H
GUIDE LINES	3H, 2H
LETTERING LINES	H, F, HB
DIMENSION LINES	2H, H
LEADER LINES	2H, H
HIDDEN LINES	2H,H
CROSS HATCHING LINES	2H, H
CENTER LINES	2H, H
PHANTOM LINES	2H, H
STITCH LINES	2H, H
LONG BREAK LINES	2H, H
VISIBLE LINES	H, F, HB
CUTTING PLANE LINES	H, F, HB
EXTENSION LINES	2H, H
FREEHAND BREAK LINES	H, F, HB

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EXAMPLE 1



EXAMPLE 2



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Thank
you!