


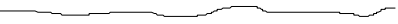

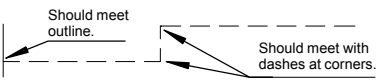
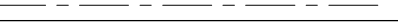
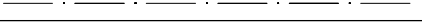




# A Student Check List for Technical Drawing, Page 1:-

## Types of line:-

Application	Description and line	
Visible outlines and edges, crests of screw threads, limit of length of full depth of thread	Continuous wide line; twice as wide as narrow line 	
Dimension, projection and leader lines, hatching, short centre lines showing centre of holes etc.	Continuous narrow line 	Short centre lines to show centre of holes etc. 
Limit of partial view	Continuous narrow irregular line 	
Limit of partial view	Continuous narrow line with "zigzags" 	
Hidden outlines and edges	Dashed narrow line of consistent length and spacing. Dashed lines should start and finish with dashes in contact with the hidden or visible lines from which they commence. The exception is when the hidden lines continues as a visible line. e.g. drawing a steady pin.	
Centre lines, lines of symmetry, pitch circles	Narrow chain line, starting and finishing with a long dash; if crossing another chain line, should cross on a long dash (PP 7308) 	Long dashed dotted line, starting and finishing with a long dash; if crossing another long dashed dotted line, should cross on a long dash (PP 8888) 
Position of cutting plane for sections	Narrow chain line with wide long dash at ends and changes in direction (PP 7308) 	Long dashed dotted wide line (PP 8888) at the ends of a cutting plane as shown in Checksheet 2 

Lines should be uniformly black, dense and bold and join precisely at junctions with other lines. Where lines coincide, the order of priority given in PP 7308 is:- 1 Visible outlines and edges; 2 hidden outlines and edges; 3 cutting planes; 4 centre lines; 5 projection lines.  
PP 8888 has a changed order of priority:- 1 Visible outlines and edges; 2 cutting planes; 3 hidden outlines and edges; 4 centre lines; 5 projection lines.

## Border and Title block:-

The page may be "portrait", intended to be viewed with the longest side vertical or "landscape", intended to be viewed with the longest side horizontal.


The border should be 10 mm wide and drawn using a wide line; the title block should be at the bottom of the sheet adjoining the bottom right hand corner of the border.

For horological drawings, the Title Block should include:-

1. title
2. projection symbol
3. original scale
4. date
4. name or examination number
5. units for dimensions, usually millimetres

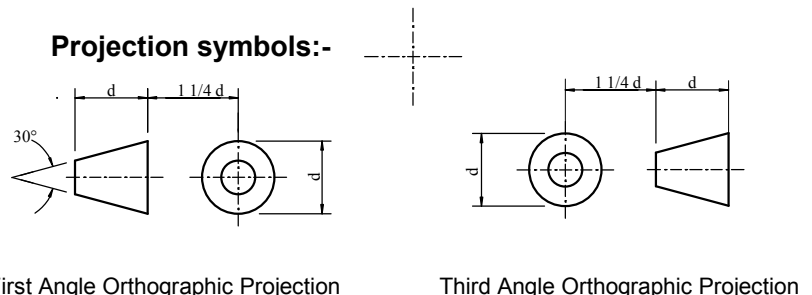
Lettering for the title block should generally be vertical capital letters 5 mm high; all lines forming the letters should be black and of uniform density. Clarity and, style and spacing of the letters is important.

### Example title block:-

DIAL CLOCK RATCHET WHEEL	SCALE 2 : 1	
ALL DIMENSIONS IN MILLIMETRES	18TH DECEMBER 2008	
EXAMINATION NUMBER:-		

The scale should be expressed as a ratio. e.g. "ORIGINAL SCALE 2:1" The words "TWICE FULL SIZE", etc. should not be used.

### Projection symbols:-



### Example lettering:-

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
1 2 3 4 5 6 7 8 9 0

# A Student Check List for Technical Drawing, Page 2:-

## Sectional views and sections:-

Sectional views and sections are produced when a cutting plane passes through the object.

**Sectional view:** the outline of the object at the cutting plane together with outlines that are visible beyond the cutting plane in the direction of viewing.

**Section:** the outline of the object at the cutting plane. Outlines that are visible beyond the cutting plane are not shown.

In horological drawings a sectional view is usually required not a section.

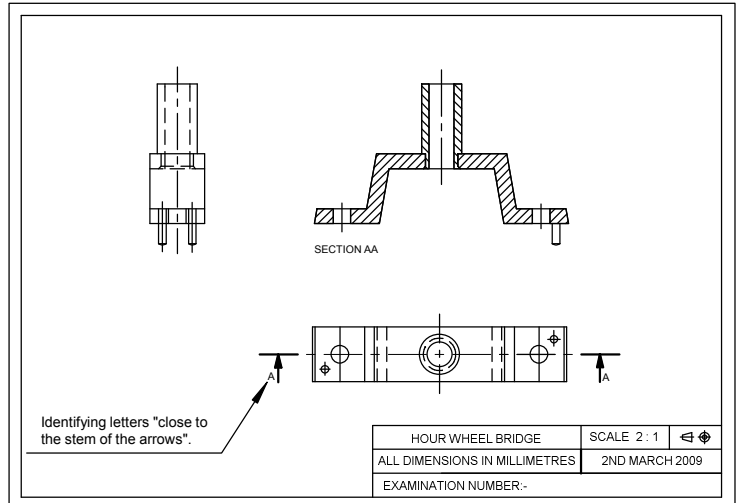
1. The cutting plane should be shown with the correct type of line :-  
PP8888 specifies the wide long-dashed dotted line should be of sufficient length for legibility.
2. The direction of viewing is shown by arrows with large heads.
3. A capital letter close to the stems of the arrows identifies the cutting plane. e.g. AA
4. The title, SECTION AA or just AA, should be placed below the section / sectional view.
5. Hatching:-  
Hatching is line shading used to denote the "cut" surface of the section plane.

Hatching consists of narrow lines, preferably at 45 degrees and not less than 4mm apart. Separate areas of the same component should be hatched with the same spacing and direction.

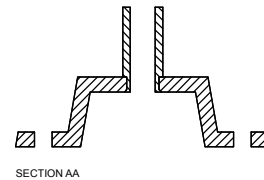
For adjacent components the direction of the hatching should be reversed.

Where there are three adjacent components the "pitch" of the hatching can be varied to create a distinction between the components.

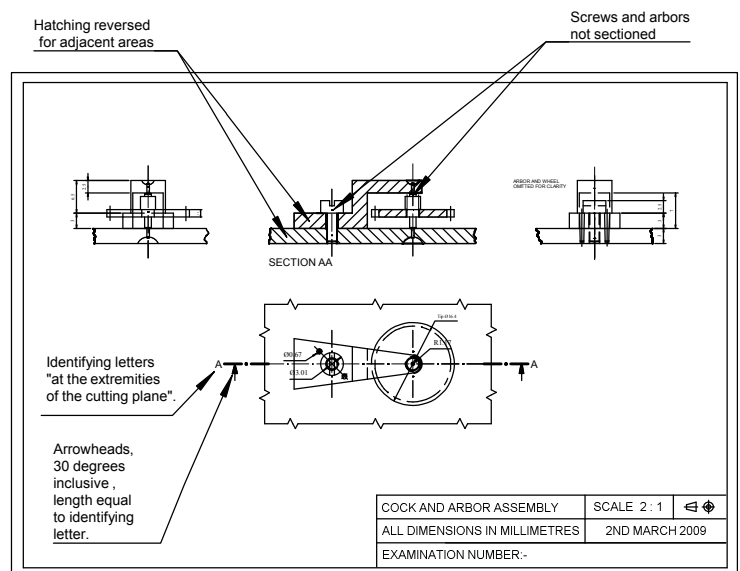
**In horological drawings, screws, steady pins and arbors are not sectioned.**



**Drawing showing a "Sectional View"; section plane shown in accordance with PP 7308.**

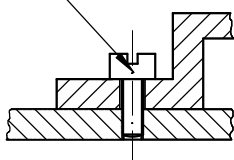


**Detail showing a "Section" of the hour wheel bridge.**

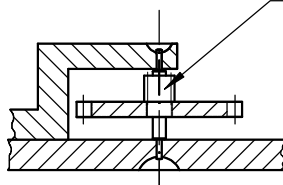


**Drawing showing a "Sectional View"; section plane shown in accordance with PP 8888.**

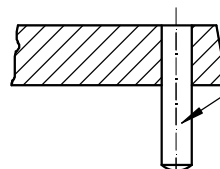
Screw not sectioned



Arbor not sectioned



Steady pin not sectioned



# A Student Check List for Technical Drawing, Page 3:-

## Dimensions:-

1. Each dimension required to make the component should be present on the drawing and should appear once only. It should not be necessary to calculate or scale dimensions.

2. There should be no extra dimensions than those required to make the component.

3. Dimensions for any particular component should be present on one elevation instead of more than one elevation. i.e. the elevation that shows it most clearly.

4. Dimensions are usually given in millimetres (unit symbol "mm"). The unit symbol may be omitted if the Title Block gives the unit used.

5. Dimensions should be expressed to the least number of significant figures. e.g. 35 not 35.0

6. The decimal marker should be a bold point (PP 7308) or a bold comma (PP 8888), given a full letter space and positioned on the baseline.

7. Dimensions of less than one should be preceded by a zero. e.g. 0.7

8. Angular dimensions should be expressed in degrees (and minutes) (PP 7308); as a decimal (PP 8888). A full space should be left between the degree symbol and the minute numeral. If an angle is less than one degree it should be preceded by zero.

9. Dimensions should read from the bottom or from the right of the page.

### Projection lines (PP 7308) / Extension Lines (PP 8888) and dimension lines

1. Projection and dimension lines should be narrow lines placed outside the outline of the elevation.

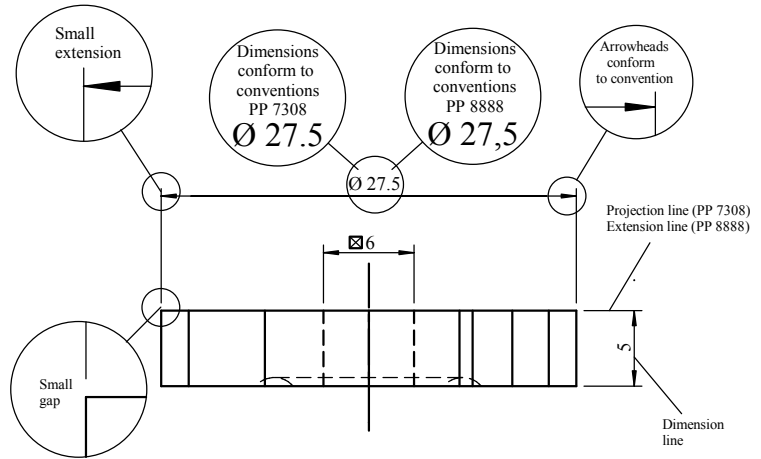
2. You should avoid crossing projection and dimension lines. If it is unavoidable neither line should be broken. Breaks are only used for clarity and then only in the projection line. The outline must never be broken.

3. There should be a gap between the outline and the start of projection lines; projection lines should extend a little beyond the dimension line.

4. Dimensions should be placed above the dimension lines.

5. Projection lines should normally be perpendicular to the dimension required.

6. Centre lines or extensions of centre lines should not be used as dimension lines. They may be used as projection lines.



### Arrowheads, PP 7308:-

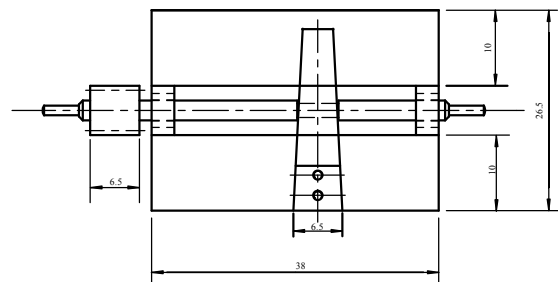
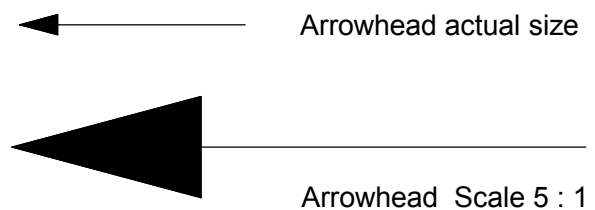
1. Arrowheads should be triangular with the length approximately three times the width, formed by straight lines symmetrically about the dimension line. Arrowheads should be filled in.

2. Arrowheads on dimension and leader lines should be 3 to 5mm long.



### Arrowheads, PP 8888:-

1. Arrowheads should be closed and filled, 30 degrees (BS 8888 default).

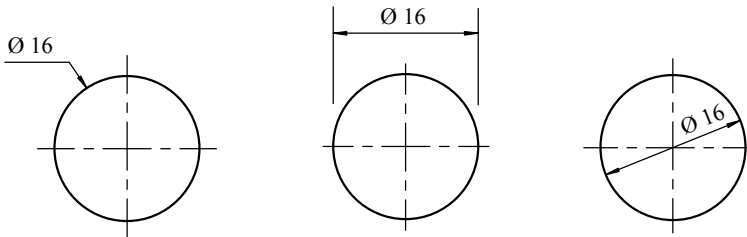


Dimensions should read from the bottom and the right hand side of the paper. Larger dimensions should be placed outside smaller dimension.

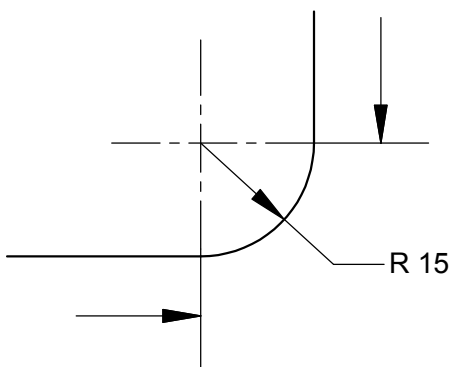
# A Student Check List for Technical Drawing, Page 4:-

## Dimensions, continued:-

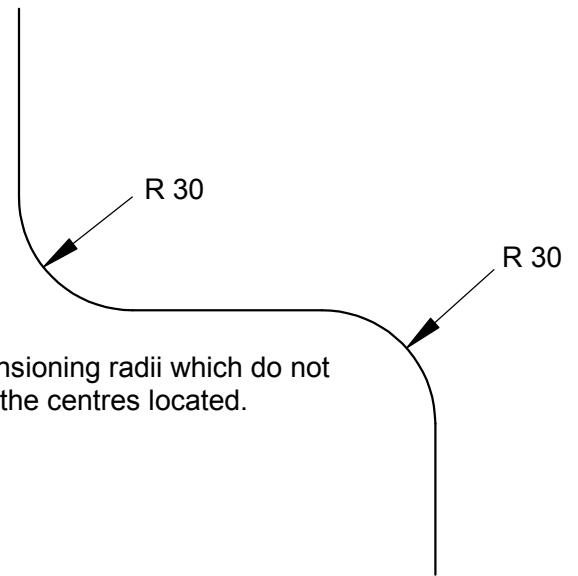
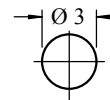
### Dimensioning Circles



### Dimensioning Radii

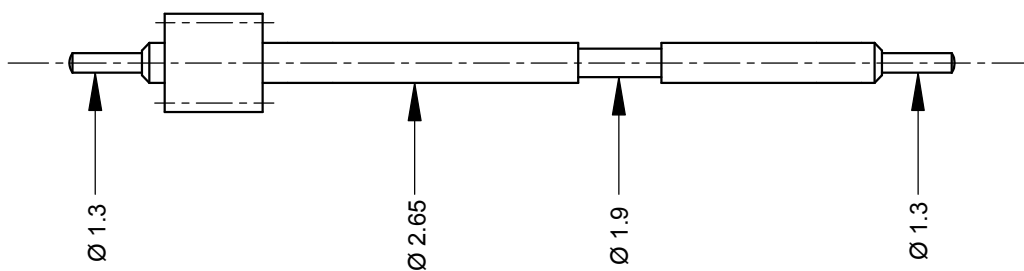


Dimensioning a radius which needs the centre to be located.



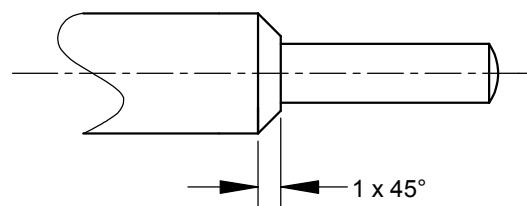
Dimensioning radii which do not need the centres located.

### Dimensions can be given by leaderlines



### Abbreviations that will be found useful when dimensioning horological drawings

Across flats	AF
Pitch circle diameter	PCD
Radius, preceding a dimension	R
Diameter, preceding a dimension	Ø
Square, preceding a dimension	□ or ☒



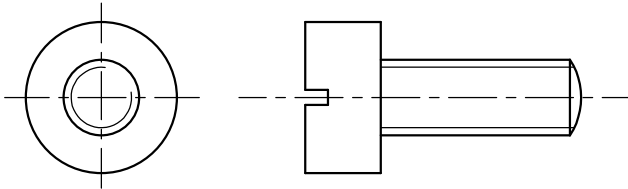
Detail showing how to dimension a chamfer

# A Student Check List for Technical Drawing, Page 5:-

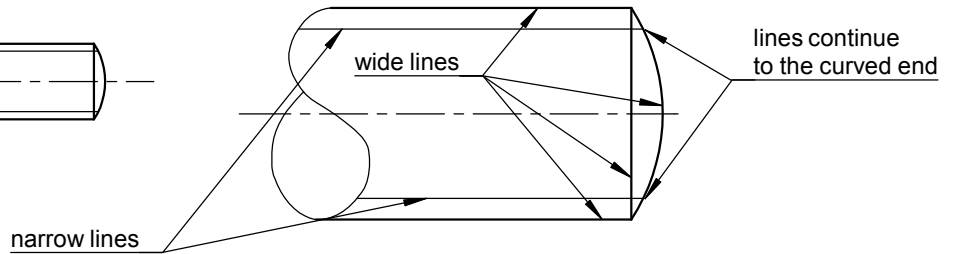
## Screw threads:-

The convention for drawing screw threads is to be adopted for horological drawings. Care should be taken to note the use of wide and narrow lines as shown in the examples. (drawn in first angle projection)

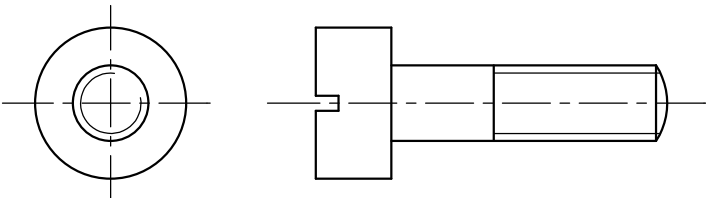
### Screw threaded to the shoulder



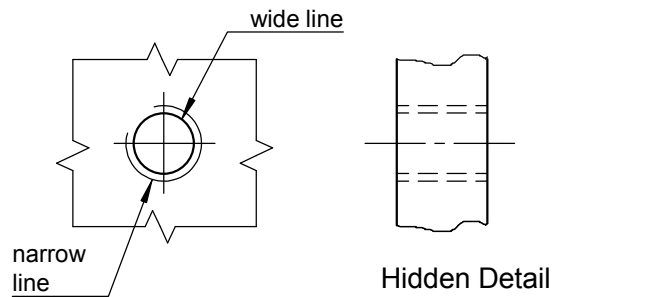
### Enlarged detail showing the end of the screw



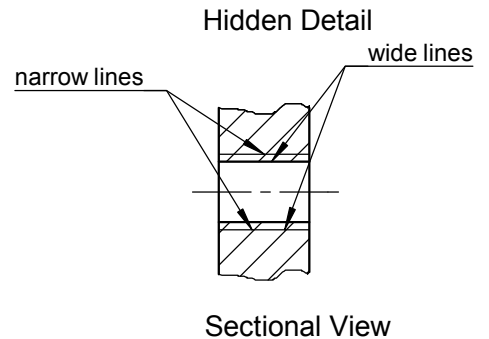
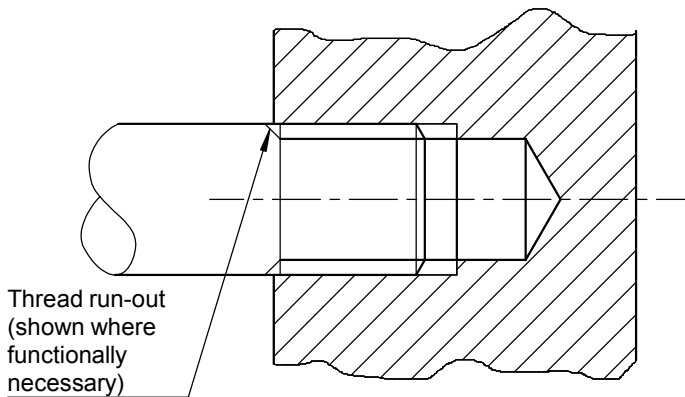
### Screw with thread run out



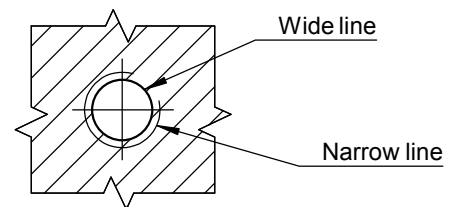
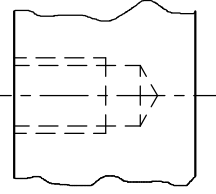
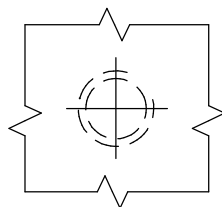
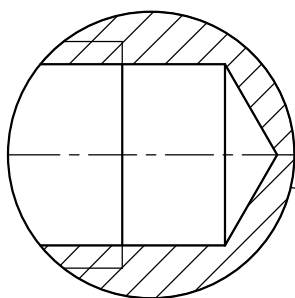
### Convention to show a thread in a "through hole".



### Enlarged sectional view showing assembled screw in a threaded hole



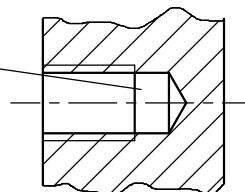
### Convention to show a thread in a "blind hole"



Hidden Detail

Sectional View

Enlarged detail of sectional view showing wide and narrow lines



Sectional View

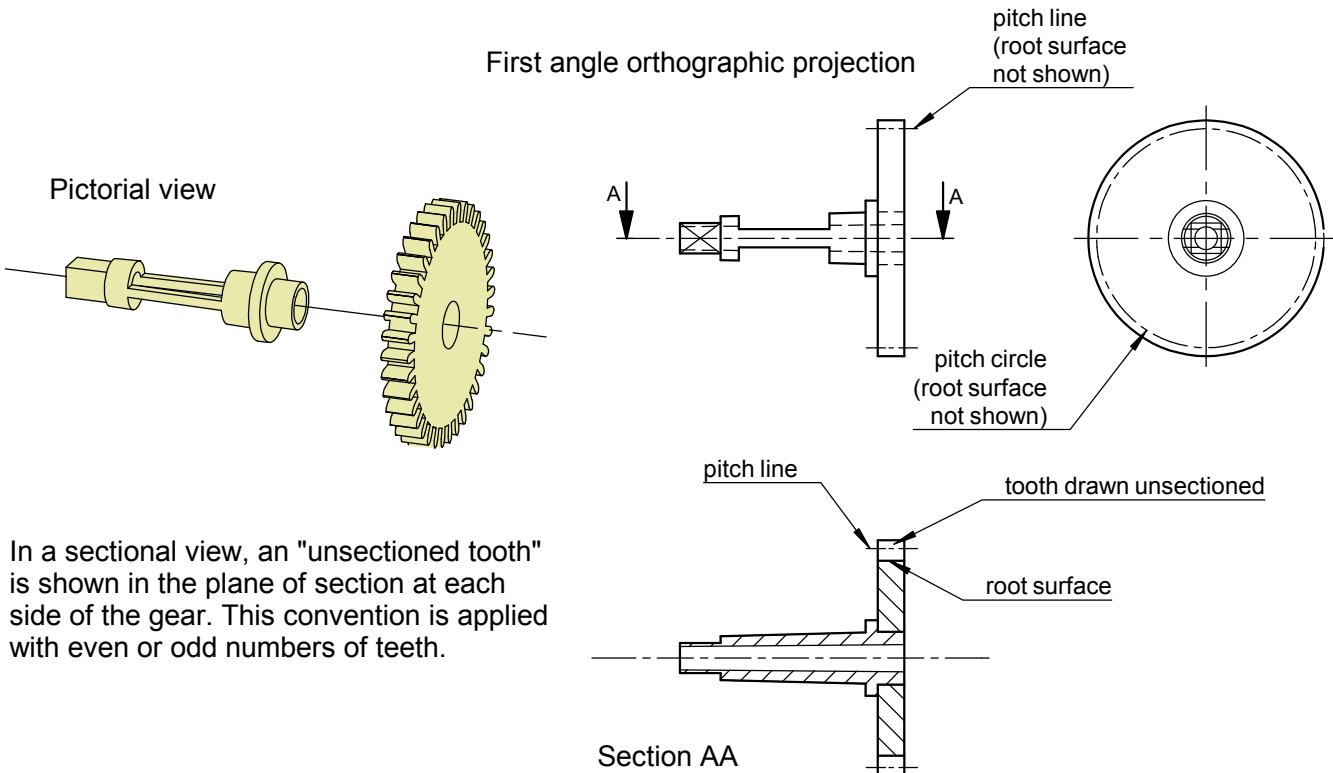
# A Student Check List for Technical Drawing, Page 6:-

## Gears:-

The convention for drawing gears is to be adopted for horological drawings. Care should be taken to note the use of wide and narrow lines as shown in the examples.

Wheels and pinions are conventionally represented as solid parts without teeth / leaves. The pitch circle and pitch lines are drawn using narrow chain lines (PP 7308); long-dashed dotted narrow lines (PP 8888).

A French cannon wheel and pipe drawn using the conventions for gears (PP 7308)



In a sectional view, an "unsectioned tooth" is shown in the plane of section at each side of the gear. This convention is applied with even or odd numbers of teeth.

A longcase fly arbor drawn using the conventions for gears (PP 8888)

