

Section 3: Line types - identification

PURPOSE
In this section you will be able to recognise and interpret different line types, and the need for variation in thickness used on engineering drawings.

Objectives

At the end of this section you should be able to:

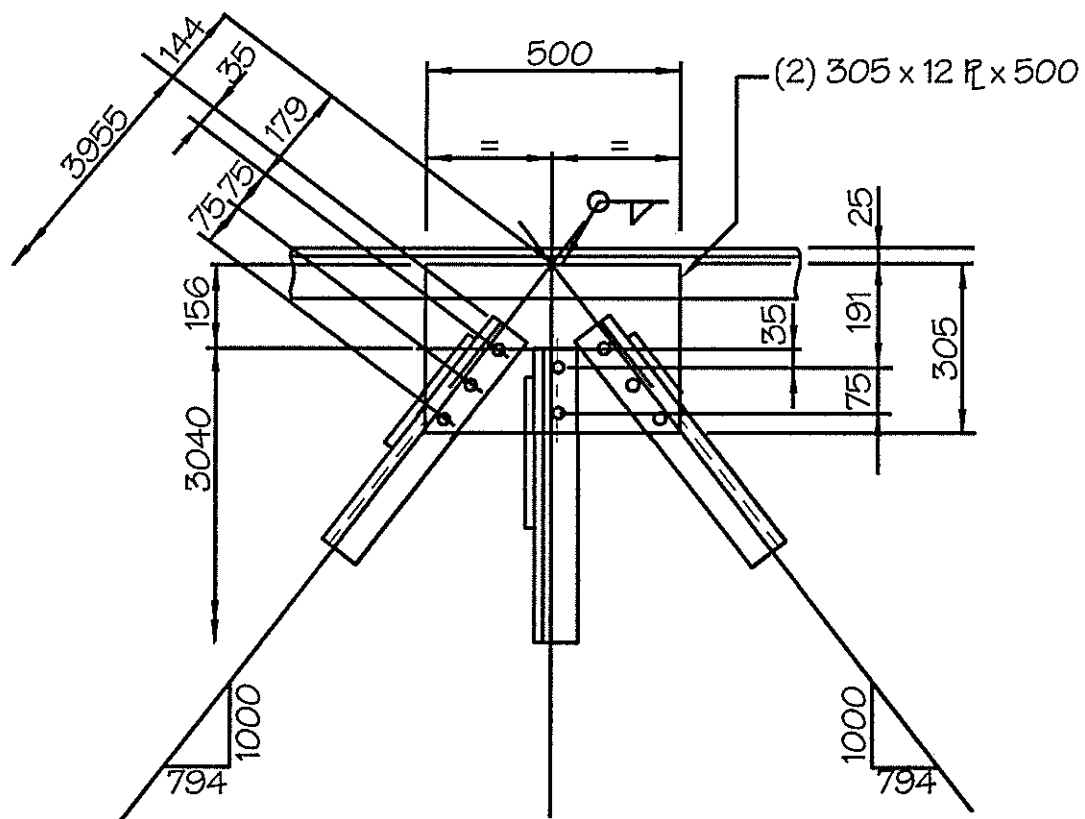
- ☐ Identify line types used on engineering drawings.
 - Outlines
 - Hidden lines
 - Leader lines
 - Centre lines
 - Dimension lines
 - Break lines
 - Cross hatching lines

Completion guidance

The work may need to be completed inside and outside the classroom if the majority of exercises are attempted.

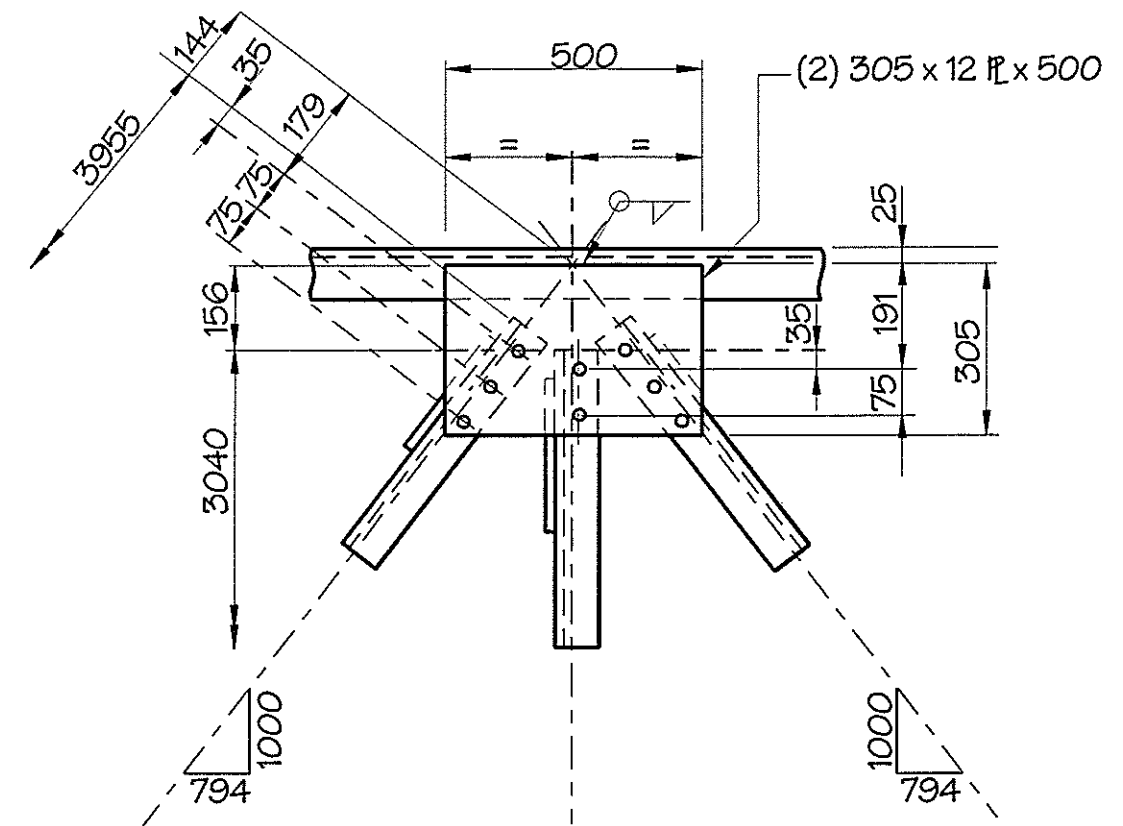
Line thickness

If all lines on a drawing were equally thick, the drawing is confusing and difficult to interpret, as the outlines do not stand out from the dimension lines, with small objects made obscure from the intersection of many thick lines.



All line shown here are the same thickness

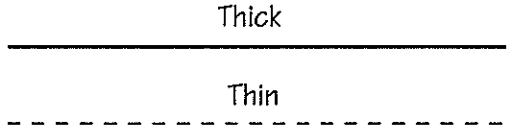
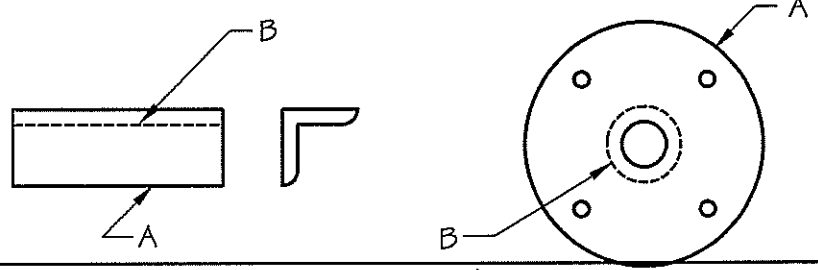
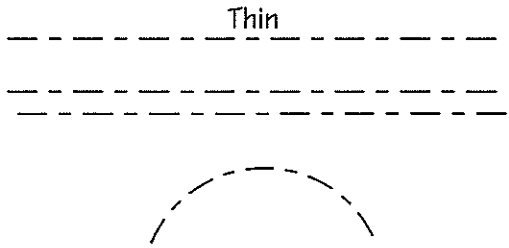
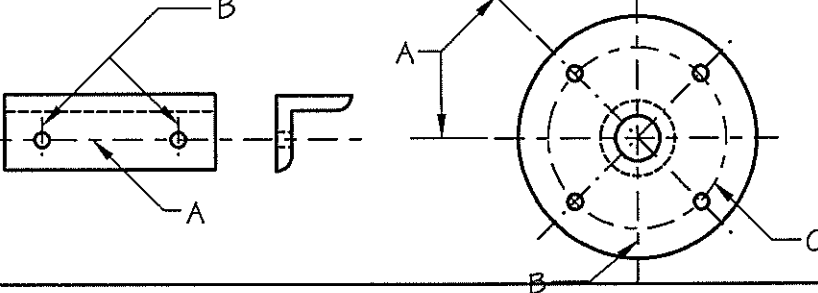
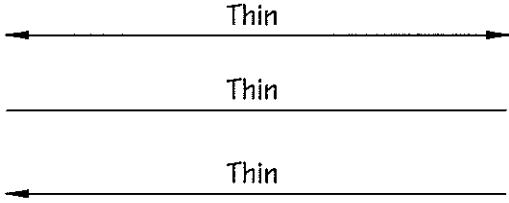
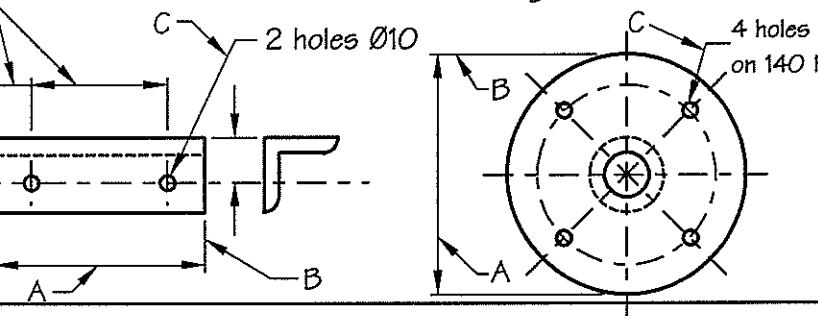
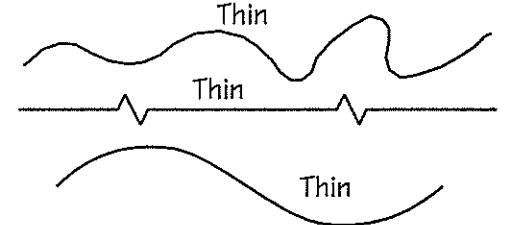
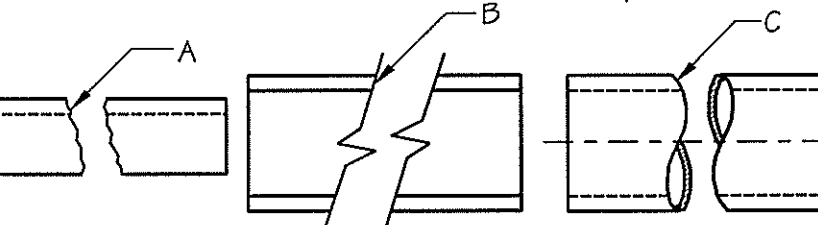
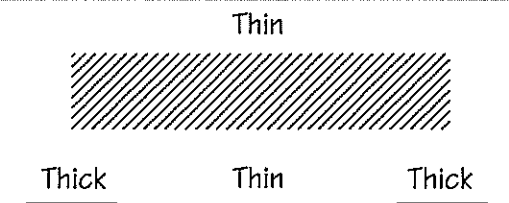
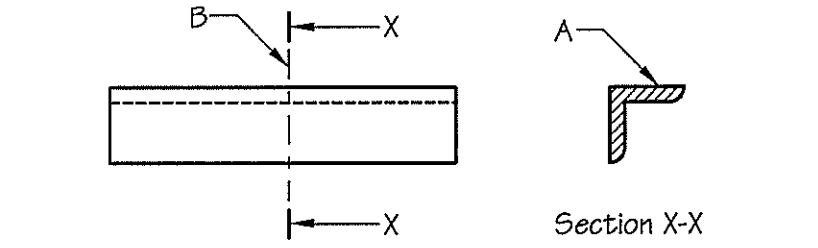
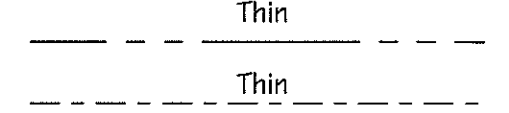
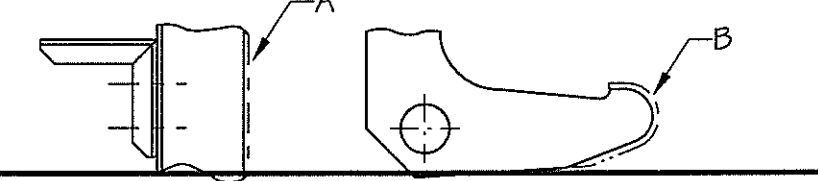
By varying the thickness and construction of lines on a drawing, we can express meaning which is otherwise difficult to express. To make sure everyone interprets drawings the same way, the use of each type and thickness of lines is defined in Australian Standard 1100 Drawing Practice.



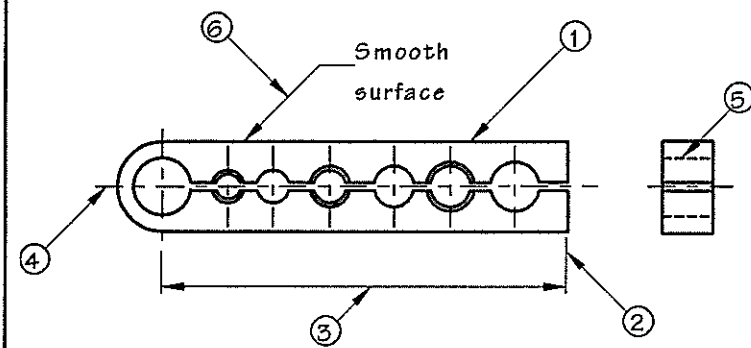
Line shown here in varying thicknesses

You should follow the same basic principles in any sketching or drawing. By using pencils with soft leads to draw dark and thick lines, and hard leads to draw light and thin lines, it will assist.

Types of lines used in engineering drawing

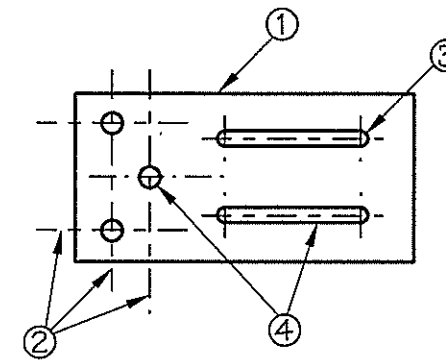
Types of lines		Example of line	Example of application
1. Outlines	a) Visible outlines b) Hidden outlines		
2. Centres	a) Centre lines b) Pitch lines c) Pitch circles		
3. Dimensions	a) Dimension lines b) Extension lines c) Leader lines		
4. Breaks	a) Break lines b) break lines c) S break lines		
5. Sections	a) Hatching lines b) Cutting plane lines		
6. Existing & adjacent parts	a) Existing & adjacent parts b) Material to be removed		

Exercise 3-1 Name the type of line indicated

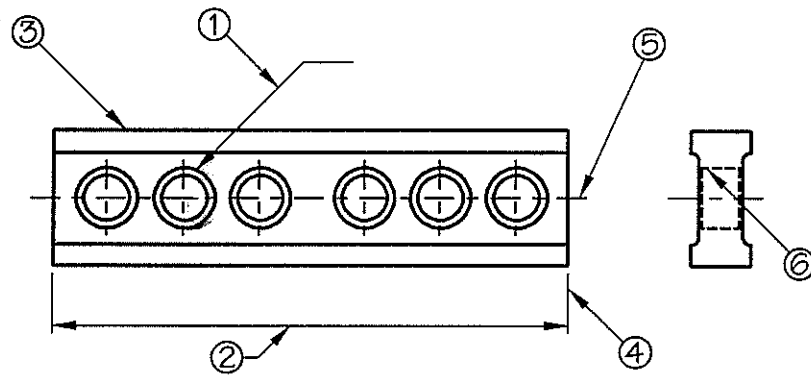


1. Outline
2. Extension line
3. Dimension line
4. Centre line
5. Hidden outline
6. Leader line

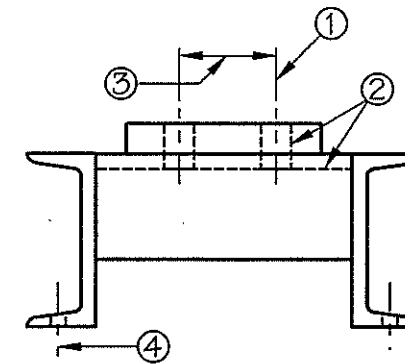
Discussion should be allowed before and after the exercise.



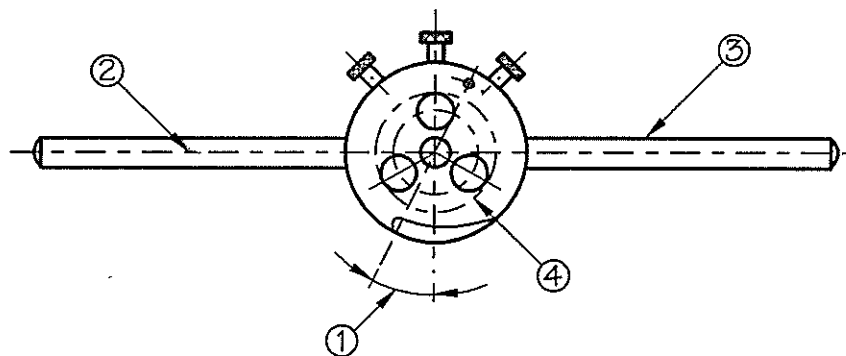
1. _____
2. _____
3. _____
4. _____



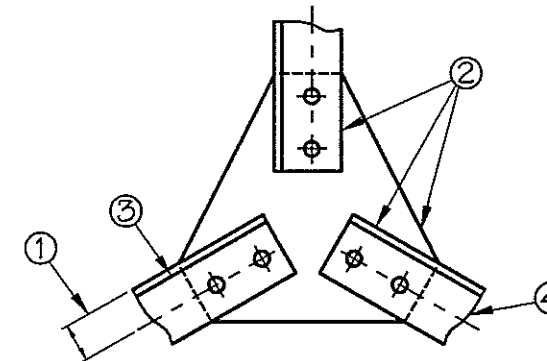
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____



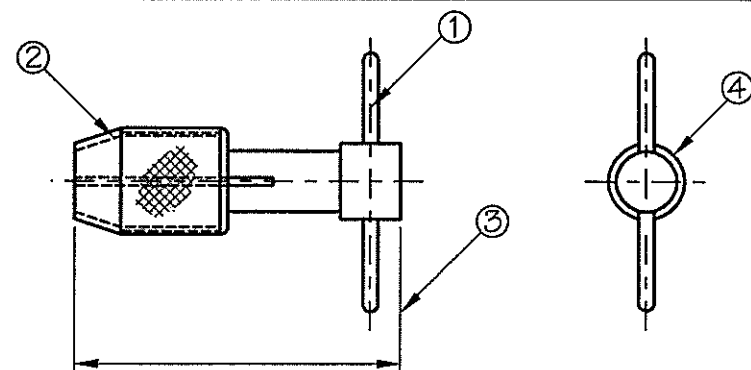
1. _____
2. _____
3. _____
4. _____



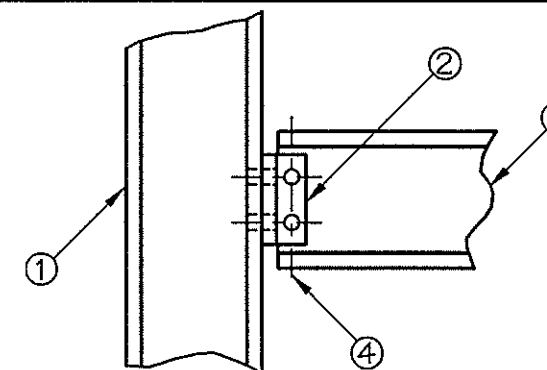
1. _____
2. _____
3. _____
4. _____



1. _____
2. _____
3. _____
4. _____



1. _____
2. _____
3. _____
4. _____

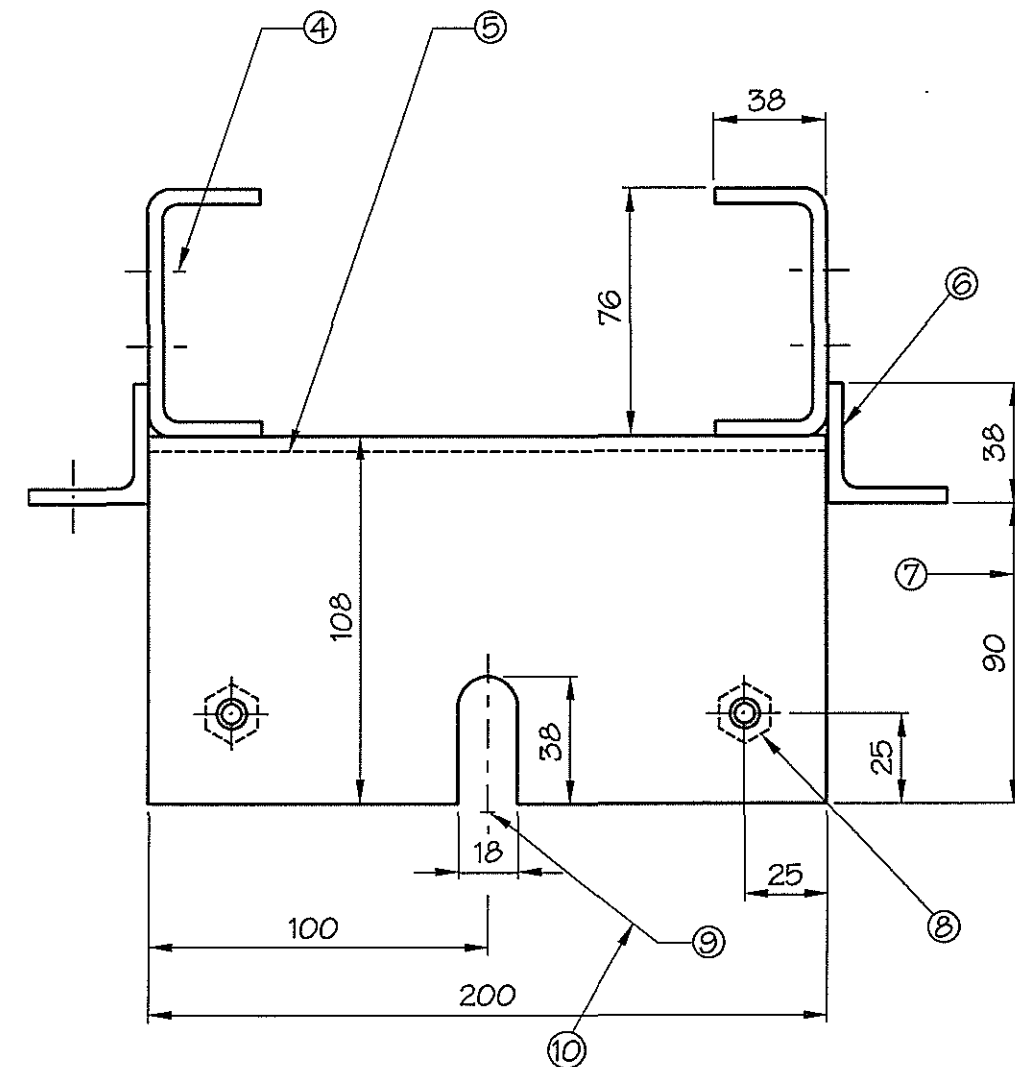
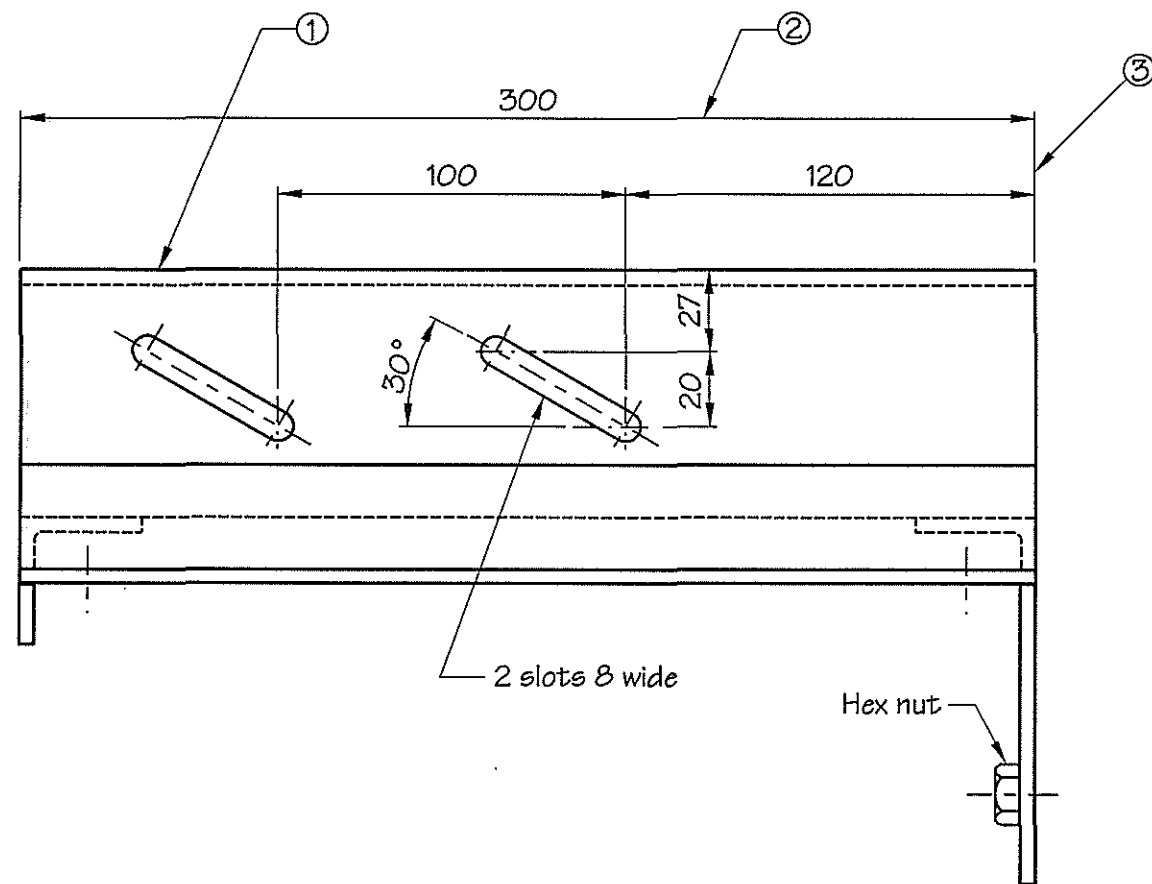


1. _____
2. _____
3. _____
4. _____

Exercise 3-2 - Types of lines

Discussion should be allowed before and after the exercise.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____
6. _____ 7. _____ 8. _____ 9. _____ 10. _____



Exercise 3-3 Discussion should be allowed before and after the exercise.

Referring to drawing 95-B-100 sheet 1 of 1 on sheet MEC076 - 3 - 7 (page 42) answer the following questions.

1. Name the different line types used. (a) is shown as an example

- | | |
|--------------------|----------|
| a. Visible outline | d. _____ |
| b. _____ | e. _____ |
| c. _____ | |

2. Indicate if the lines are either thick or thin. (a) is shown as an example

- | | |
|----------|----------|
| a. Thick | d. _____ |
| b. _____ | e. _____ |
| c. _____ | |

3. A line is shown in zones A5, B5, C5 which looks like this. — — — — — What is this type of line called?

4. How many dimension lines are shown on the drawing?

5. How many extension lines are shown in the right side view?

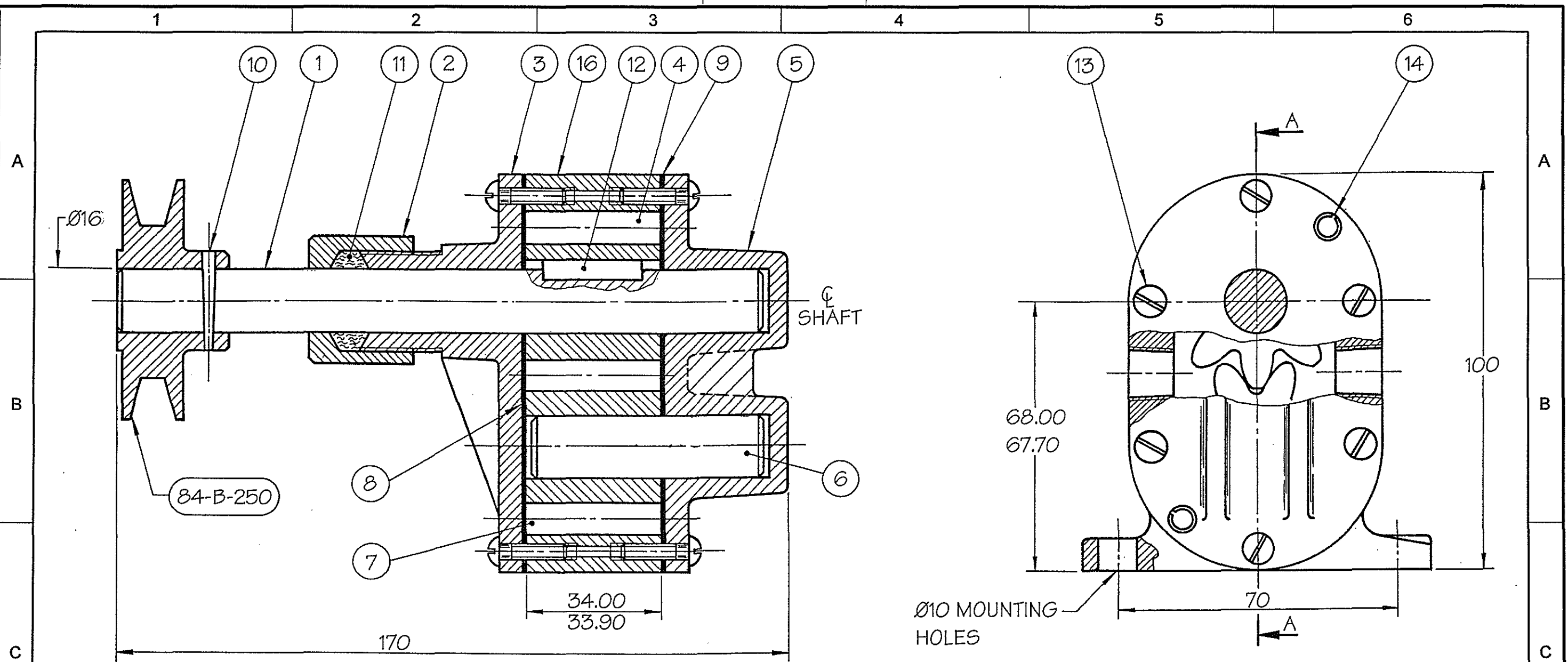
6. How many of the extension lines in question (5) also serve as centre lines?

7. Are the dimensions on this drawing unidirectional or aligned? (Teacher to explain).

8. Numbers are shown in circles with leader lines pointing to components. What do these identify?

9. Identify the three freehand lines shown on the right side view.

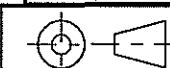
10. Hidden outlines are shown on the front view. Identify the zone. _____



NOTE:

1. END FLOAT OF GEARS IN ASSEMBLED PUMP MUST BE 0.1 TO 0.3mm.
2. PUMP BODY MAY BE GROUND WITHIN LIMITS SHOWN.
3. THIN JOINTING ONLY TO BE USED UNDER COVER ITEM 5. EXTRA JOINTING MAY BE USED TO GIVE CORRECT END FLOAT.

16	95-B-120	BODY EXTRUSION	1	8	95-B-108	JOINTING 0.05mm	
15				7	95-B-107	GEAR DRIVEN	1
14	COMML		2	6	95-B-106	SHAFT STUB	1
13	COMML	M4	6	5	95-B-105	COVER	1
12	COMML	5 x 5 x 25	1	4	95-B-104	GEAR DRIVING	1
11	COMML	OIL RESISTANT PACKING	3 gm	3	95-B-103	COVER DRIVE SIDE	1
10	COMML		1	2	95-B-102	GLAND NUT	1
9	95-B-109	JOINTING 0.1 mm	AS REQD	1	95-B-101	SHAFT DRIVING	1
ITEM	DWG No	DESCRIPTION	QTY	ITEM	DWG No	DESCRIPTION	QTY



MATERIAL
AS NOTED

FINISH
N/A

DRAWN J D
TRACED W P
CHECKED W L
APPROVED K A
ISSUED 15 - 5 - 97
RECORD OF ISSUE

TAFE NSW

MANUFACTURING AND ENGINEERING
EDUCATIONAL SERVICES DIVISION

TITLE

GEAR PUMP ASSY

SCALE
NTS

SIZE
A3

DRG N° 95 - B - 100

SHT
1 OF 1

UNLESS NOTED OTHERWISE TOLERANCES ARE:			
LINEAR AS SHOWN			
ANGULAR			
DRAWING PRACTICE AS 1100			
ISSUE	DATE	ZONE	CHANGE
A	15 - 5 - 97		DRAWING RELEASED
AMENDMENTS			
ECN	BY	CKD	