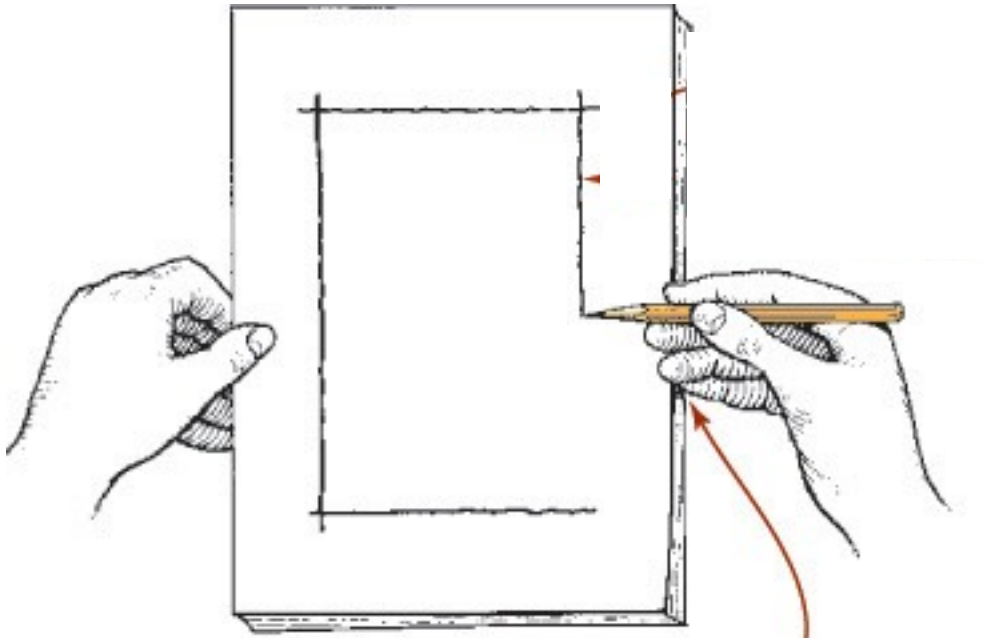


Source: F. Giesecke: Technical Drawing with Engineering Graphics

Electronic Engineering (ELE):

ENGINEERING DESIGN: EXERCISE 2

Engineering Design: **Exercise Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
3. Exercise 3: Section views and Dimensions
4. Exercise 4: Tolerances and Surface finish
5. Exercise 5: Screws
6. Exercise 6: Basic Machine Elements

Engineering Design: **Organization of Module**

	Day	Time	Group	Remark
Lecture	Friday	8:30-10:00	A,B,C	16.4.;30.4.;14.5.;28.5.;11.6.;25.6.
Exercise	Friday	10:15-11:45	A, B, C	16.4.;30.4.;14.5.;28.5.;11.6.;25.6.
Practicum	Thursday	12:15-13:45	B	every week (not on 5.4., 13.5, 3.6.)

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
3. Exercise 3: Section views and Dimensions
4. Exercise 4: Tolerances and Surface finish
5. Exercise 5: Screws
6. Exercise 6: Basic Machine Elements

Engineering Design: **Exercise 2**
Type of Lines

Type of Lines:

1. Wide continuous line for edges, outlines, undercuts, etc. ——————— 0,7 or 0,5 mm

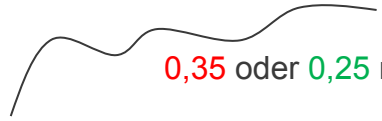
2. Narrow continuous line for dimensions- and dimension extension lines, hatching, bending edges, etc. ——————— 0,35 oder 0,25 mm

3. Narrow dashed line for hidden edges – – – – – – – – – 0,35 oder 0,25 mm

4. Narrow dashed dotted line for lines of symmetry, pitch circles for gears and holes —·—·—·—·— 0,35 oder 0,25 mm

5. Wide dashed dotted line for cutting planes etc. ——·——·– 0,7 oder 0,5 mm

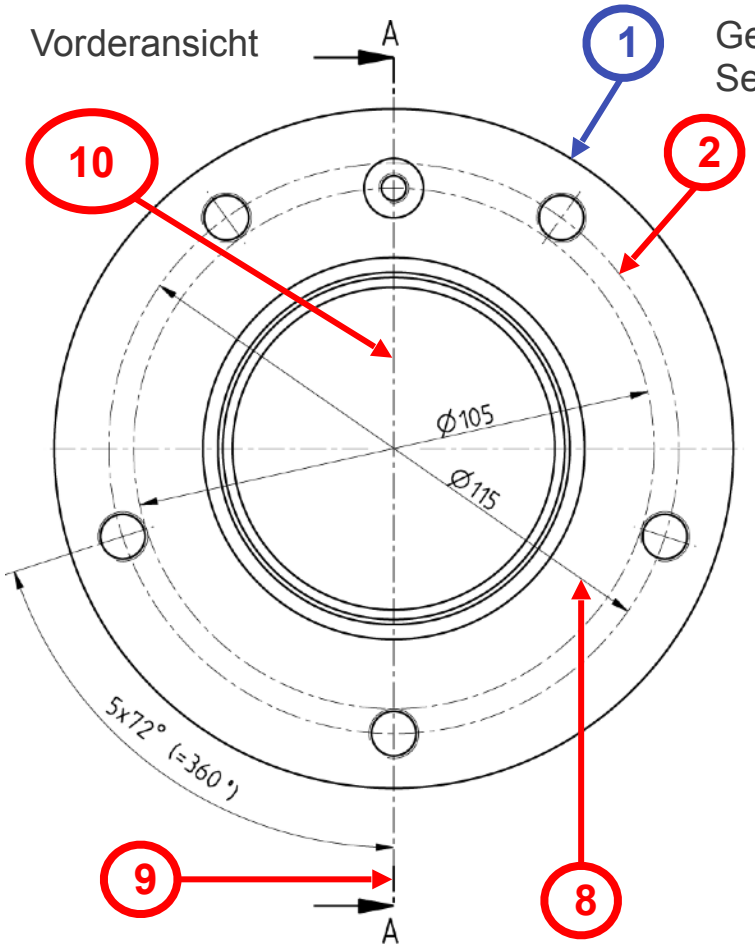
6. Narrow long-dashed double dotted line for outlines of adjacent parts, extreme positions of movable parts, etc. —··—··—··— 0,35 oder 0,25 mm

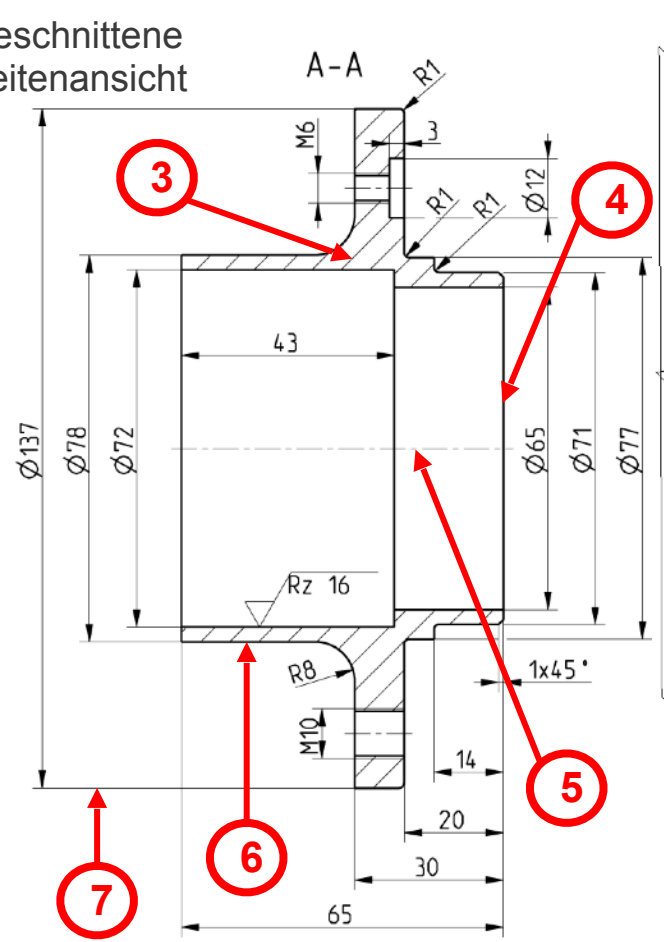
7. Narrow continuous irregular (freehand) line for limits of partial or interrupted views  0,35 oder 0,25 mm

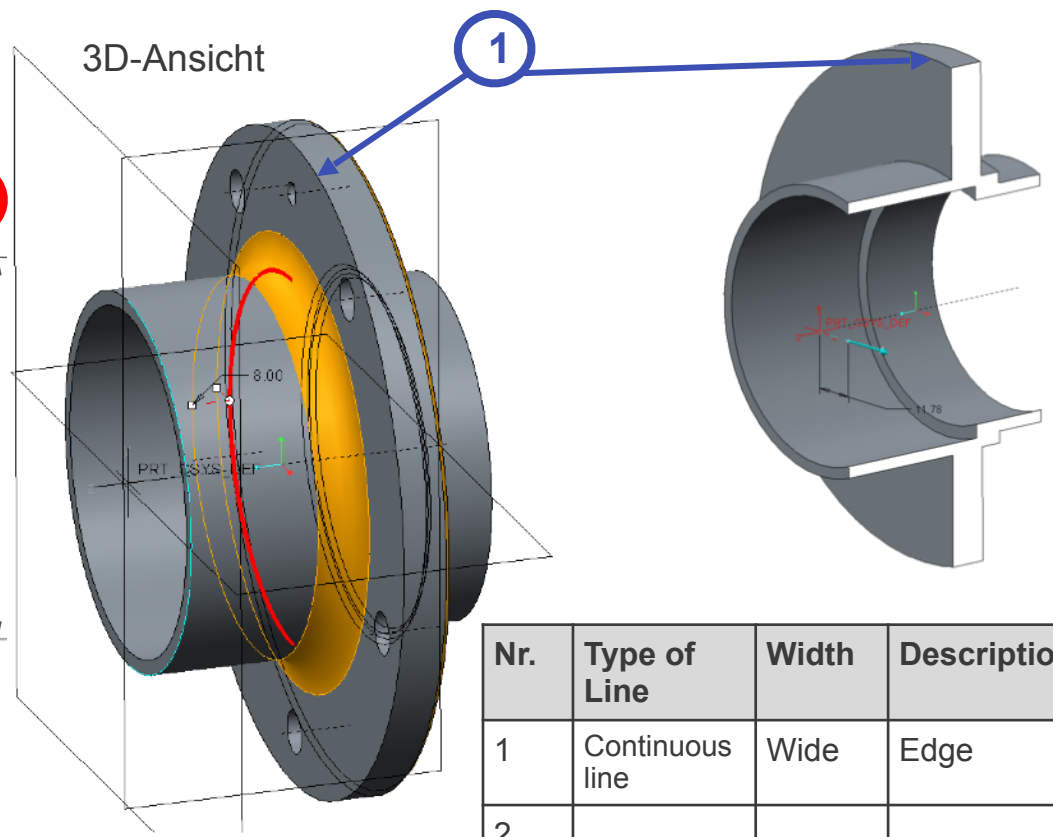
For drawing size (DIN A4-A2) use only Line group 0,5 (0,5 and 0,25) and for drawing size (DIN A1-A0) lines of Line group 0,7 (0,7 und 0,35).

Source: A. Nagarajah

Engineering Design: **Exercise 2**
Type of Lines: Name the right Type of Line on the hub



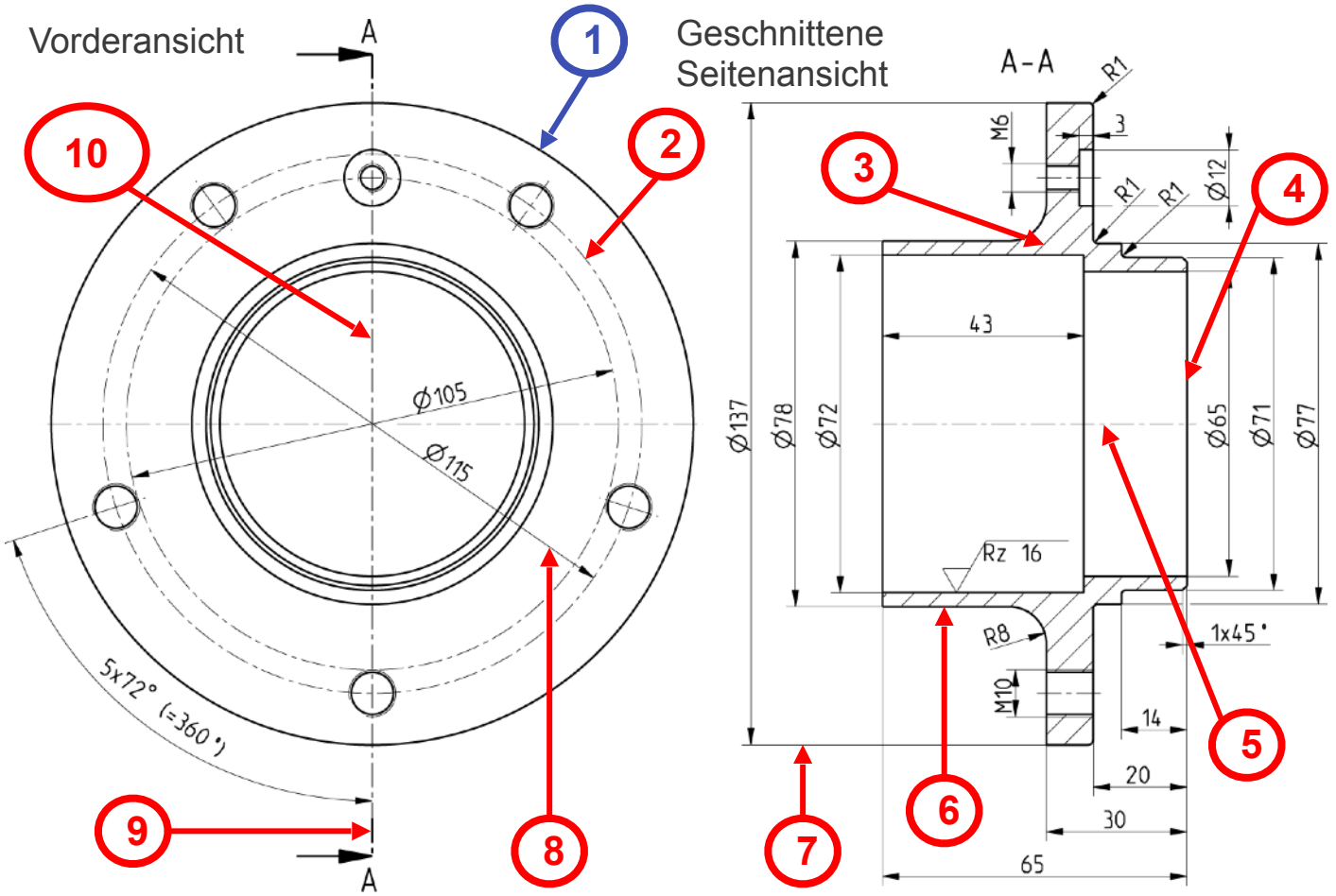




Nr.	Type of Line	Width	Description
1	Continuous line	Wide	Edge
2	…	…	…
…	…	…	…

Source: A. Nagarajah

Engineering Design: **Exercise 2**
Type of Lines: Name the right Type of Line on the hub



Solution

Nr.	Type of Line	Width	Description
1	Continuous line	Wide	Edge
2	Dashed dotted line	Narrow	Centerline / line of symmetry
3	Continuous line	Narrow	Hatching
4	Continuous line	Wide	Circualting edge
5	Dashed dotted line	Narrow	Centerline
6	Continuous line	Wide	Edge
7	Continuous line	Narrow	Dimension extension line
8	Continuous line	Narrow	Dimension Line
9	Dashed dotted line	Wide	Cutting line
10	Dashed dotted line	Narrow	Centerline

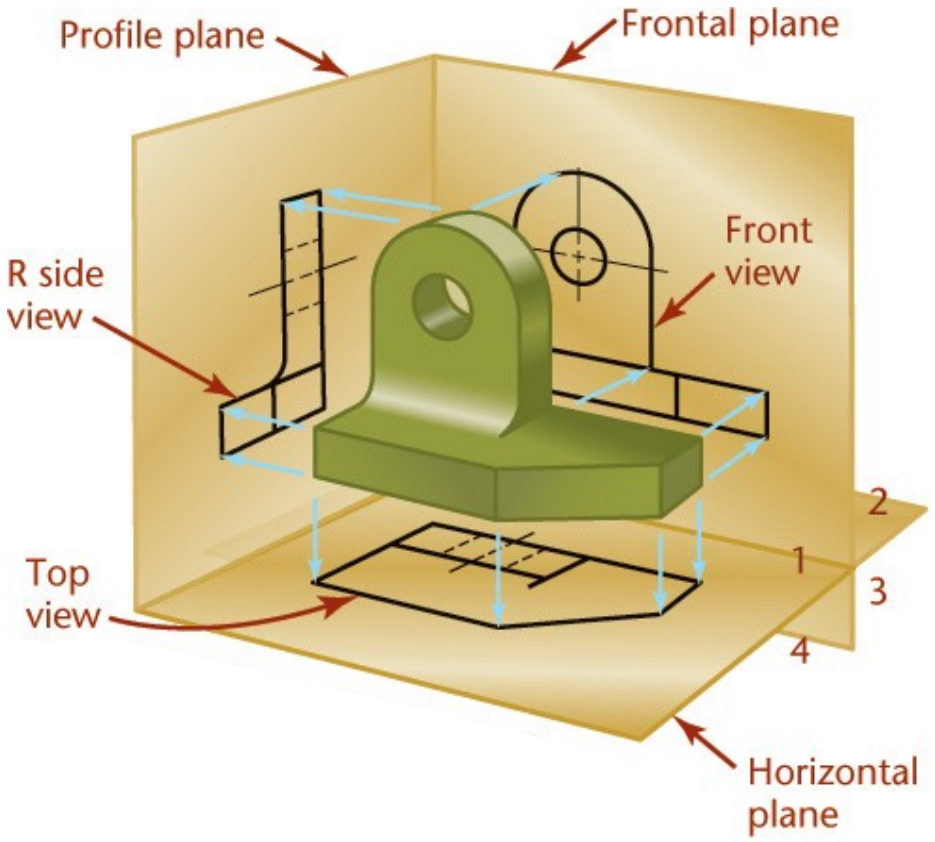
Source: A. Nagarajah

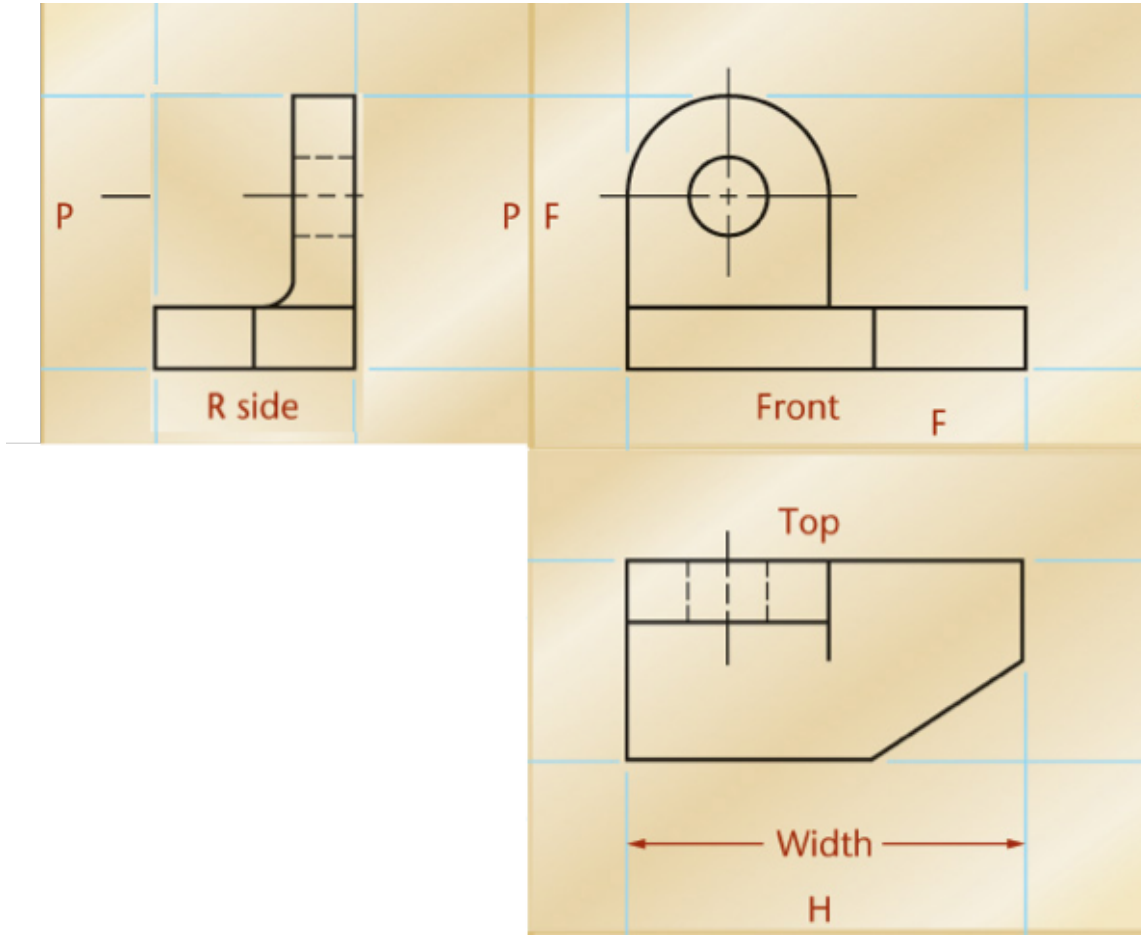
Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
3. Exercise 3: Section views and Dimensions
4. Exercise 4: Tolerances and Surface finish
5. Exercise 5: Screws
6. Exercise 6: Basic Machine Elements

Engineering Design: **Exercise 2**
Multiview Projection: Repetition

Unfolding the projection planes:



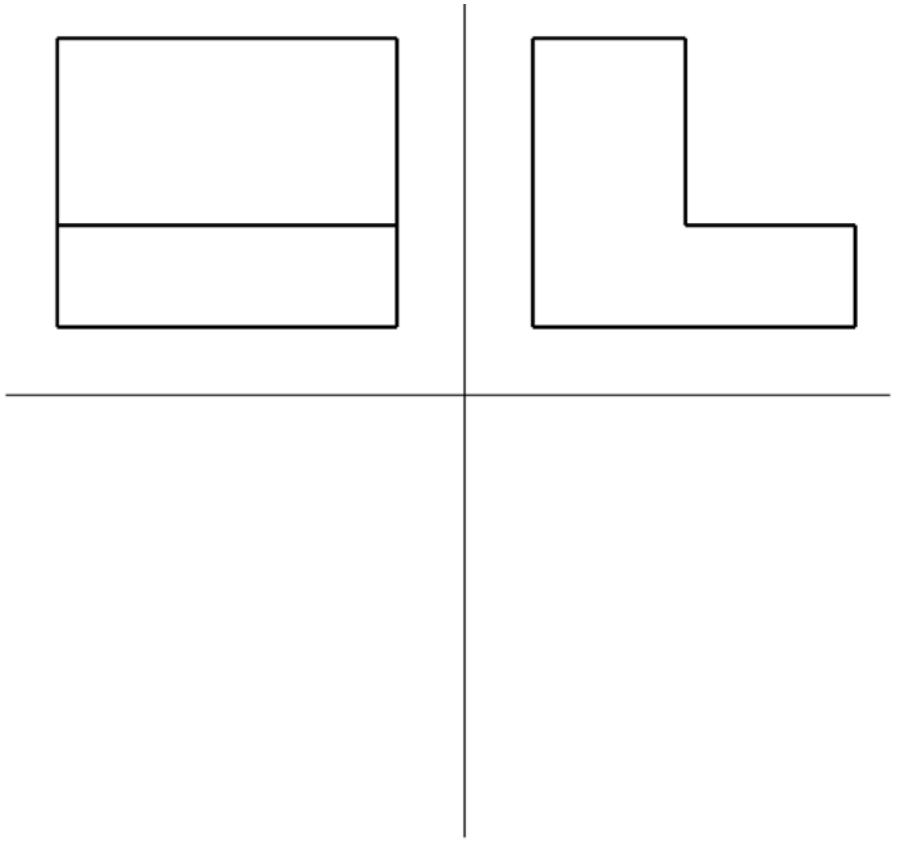


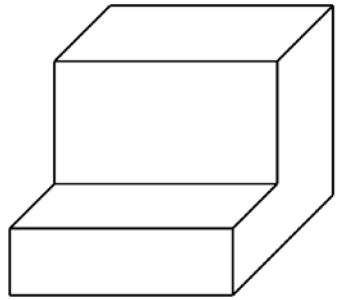
Source: F. Giesecke: Technical Drawing with Engineering Graphics

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2.

Engineering Design: **Exercise 2.0**
Multiview Projection: Warm up: Draw the missing third view

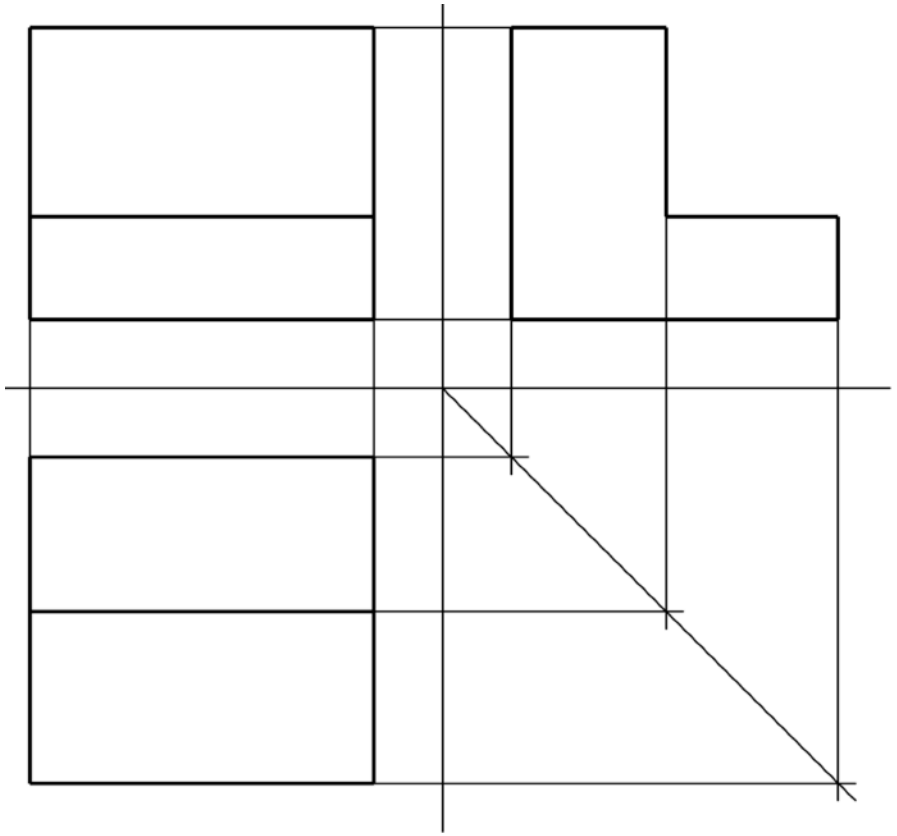


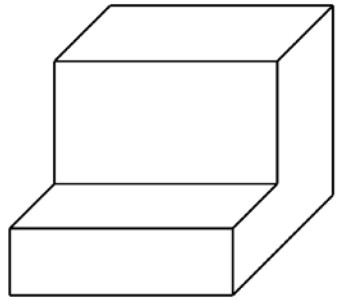


Source: pro-norm.de

Engineering Design: **Exercise 2.0**
Multiview Projection: Warm up: Draw the missing third view

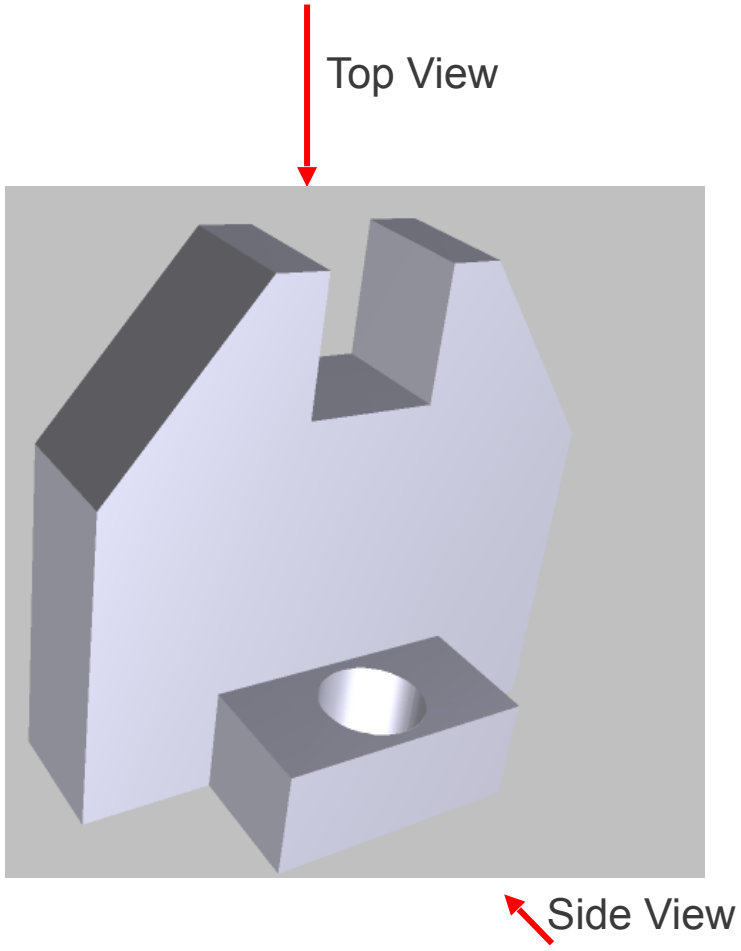
Solution

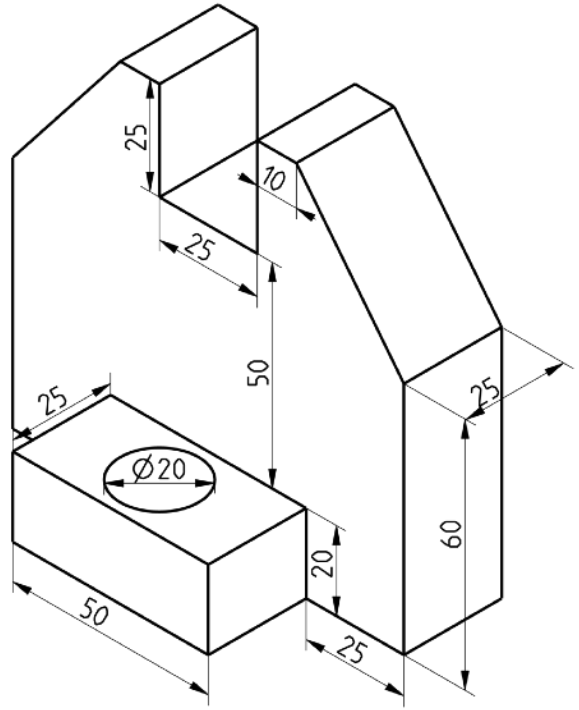




Source: pro-norm.de

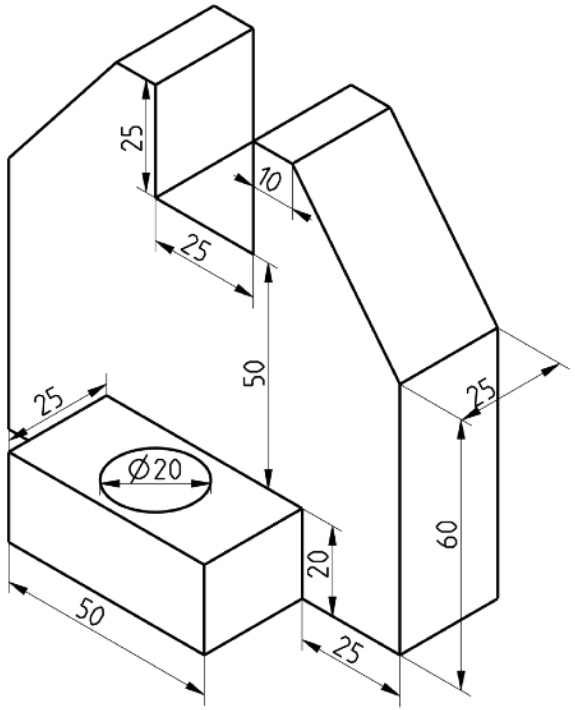
Engineering Design: **Exercise 2.1**
Multiview Projection: Draw Front-, Top- and Side View





Source: A. Nagarajah

Solution



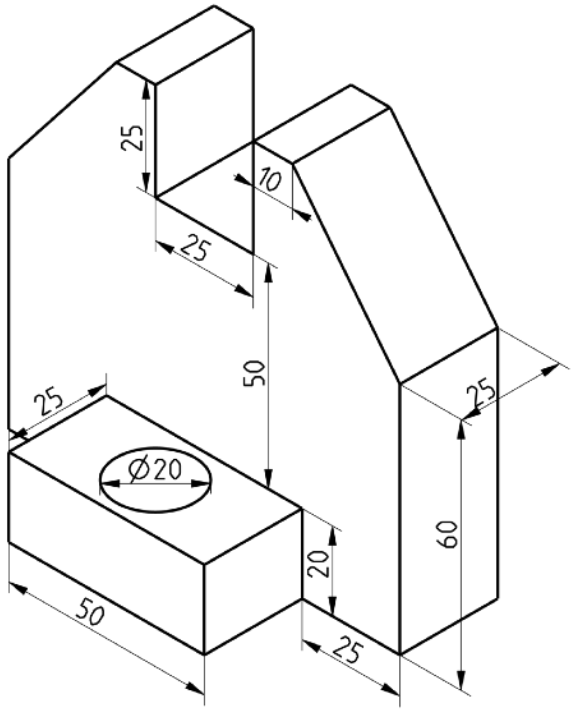
Front View

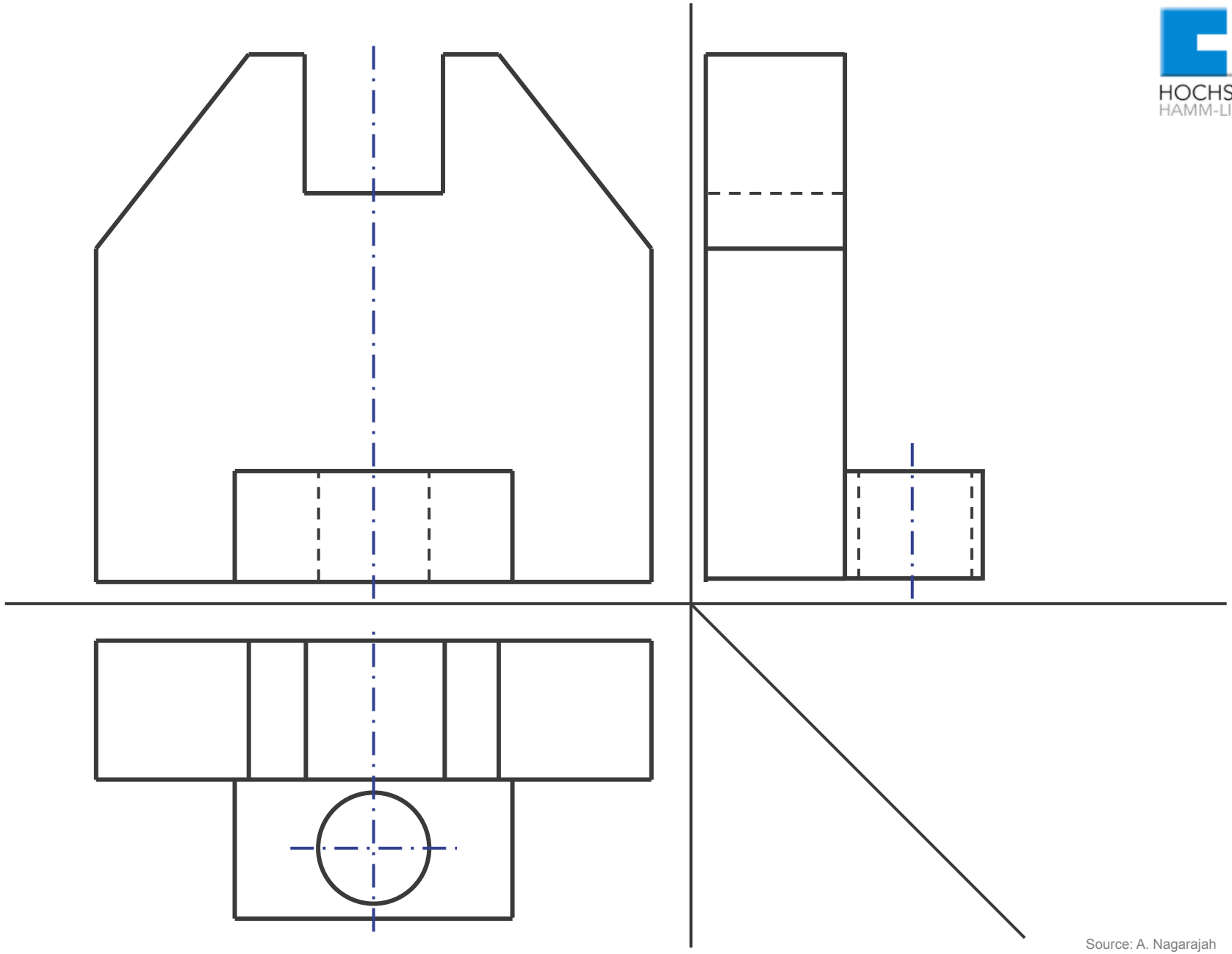
Side View

Top View

Source: A. Nagarajah

Solution



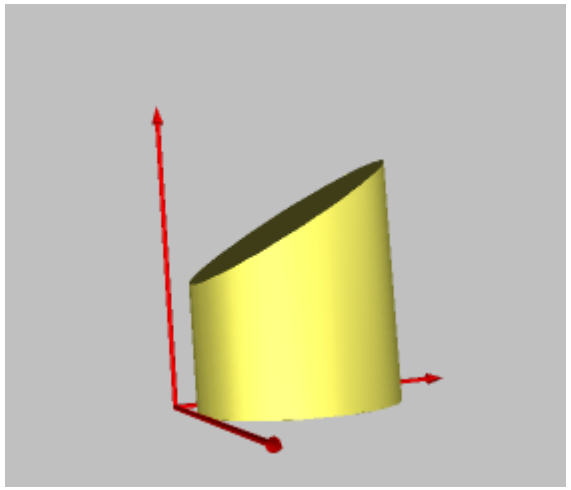


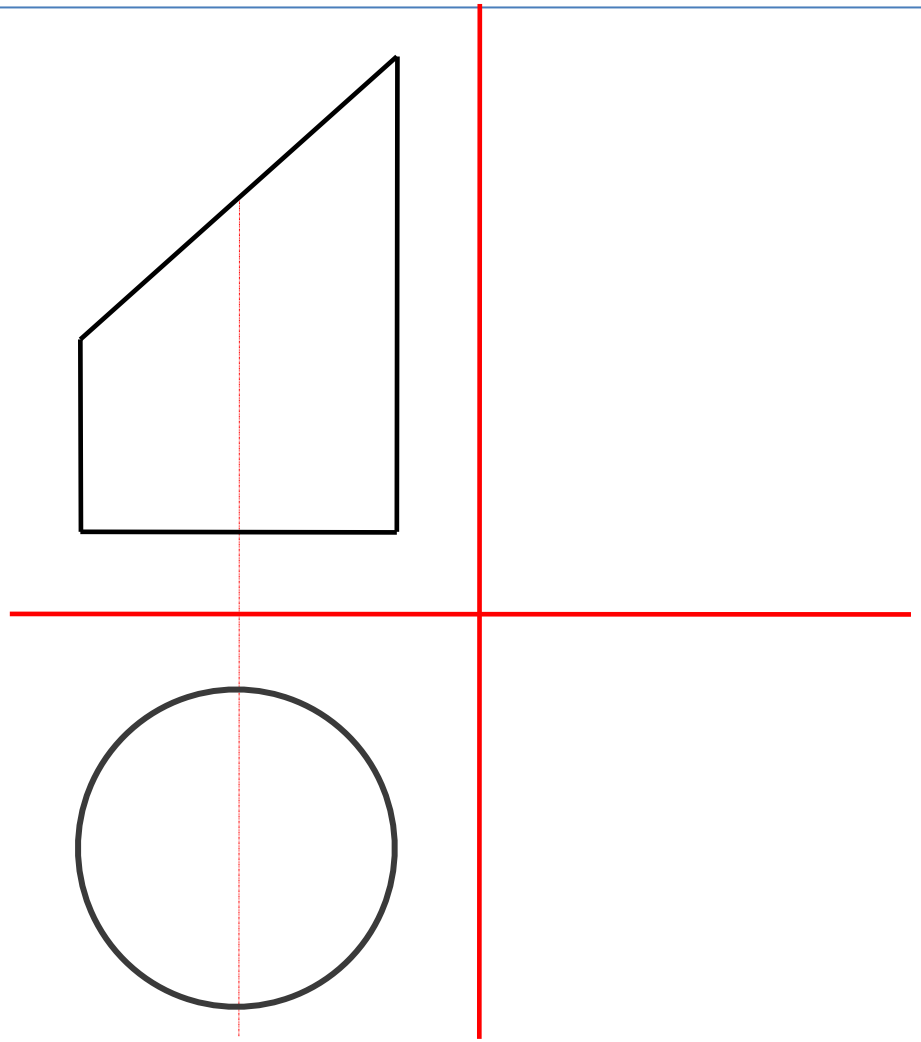
Source: A. Nagarajah

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2. Sliced Cylinder

Engineering Design: **Exercise 2.2**
Draw the missing third view of the sliced cylinder!

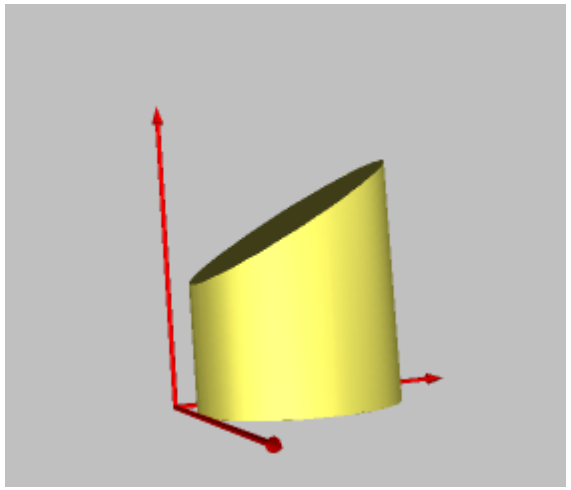


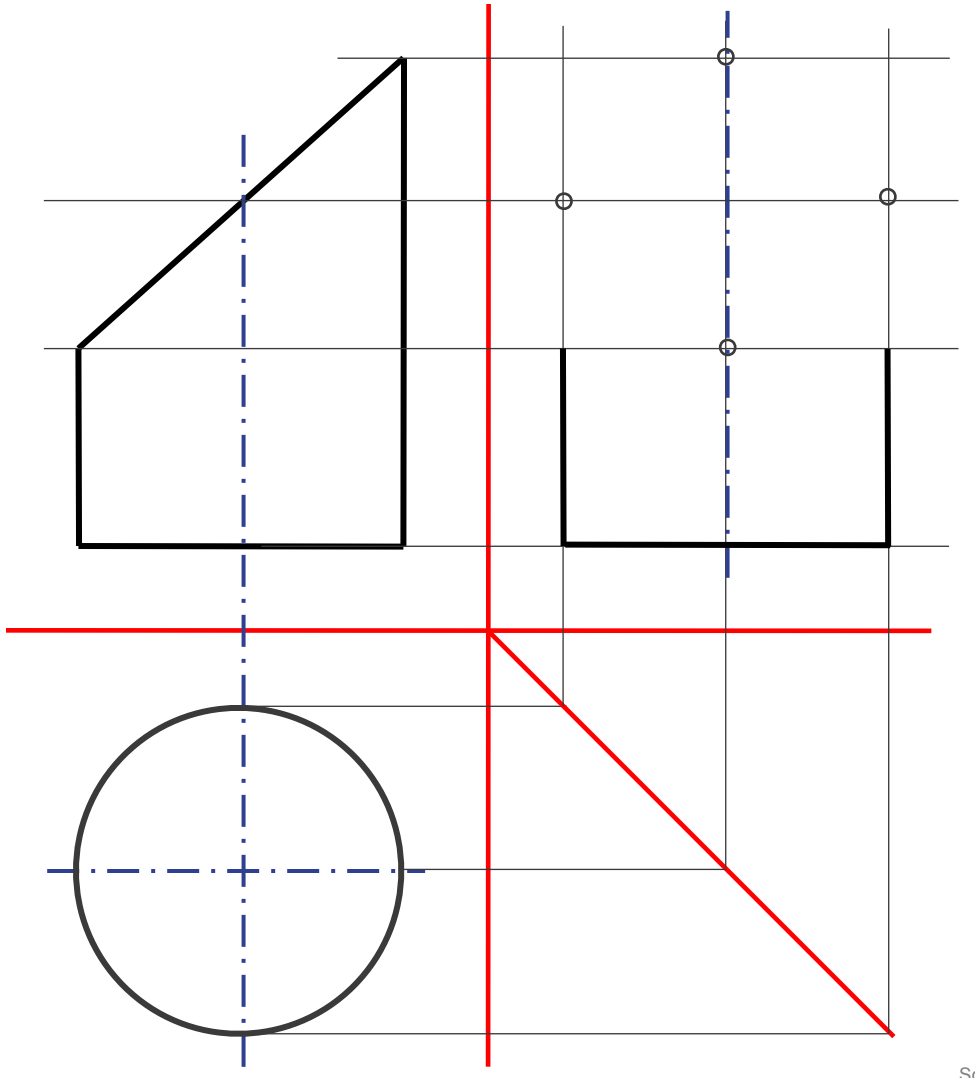


Source: A. Nagarajah

Engineering Design: **Exercise 2.2**
Draw the missing third view of the sliced cylinder!

Solution
Step 1

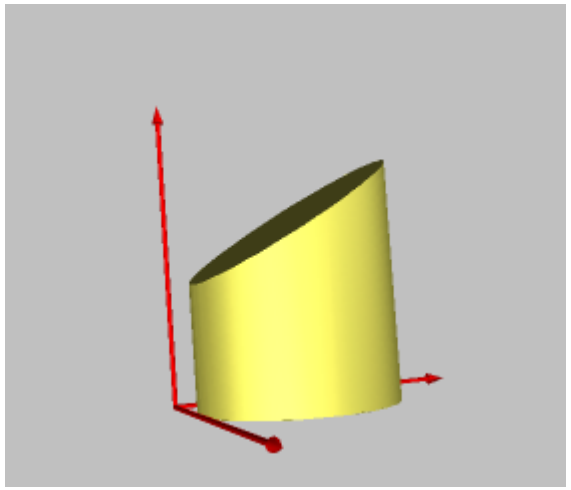


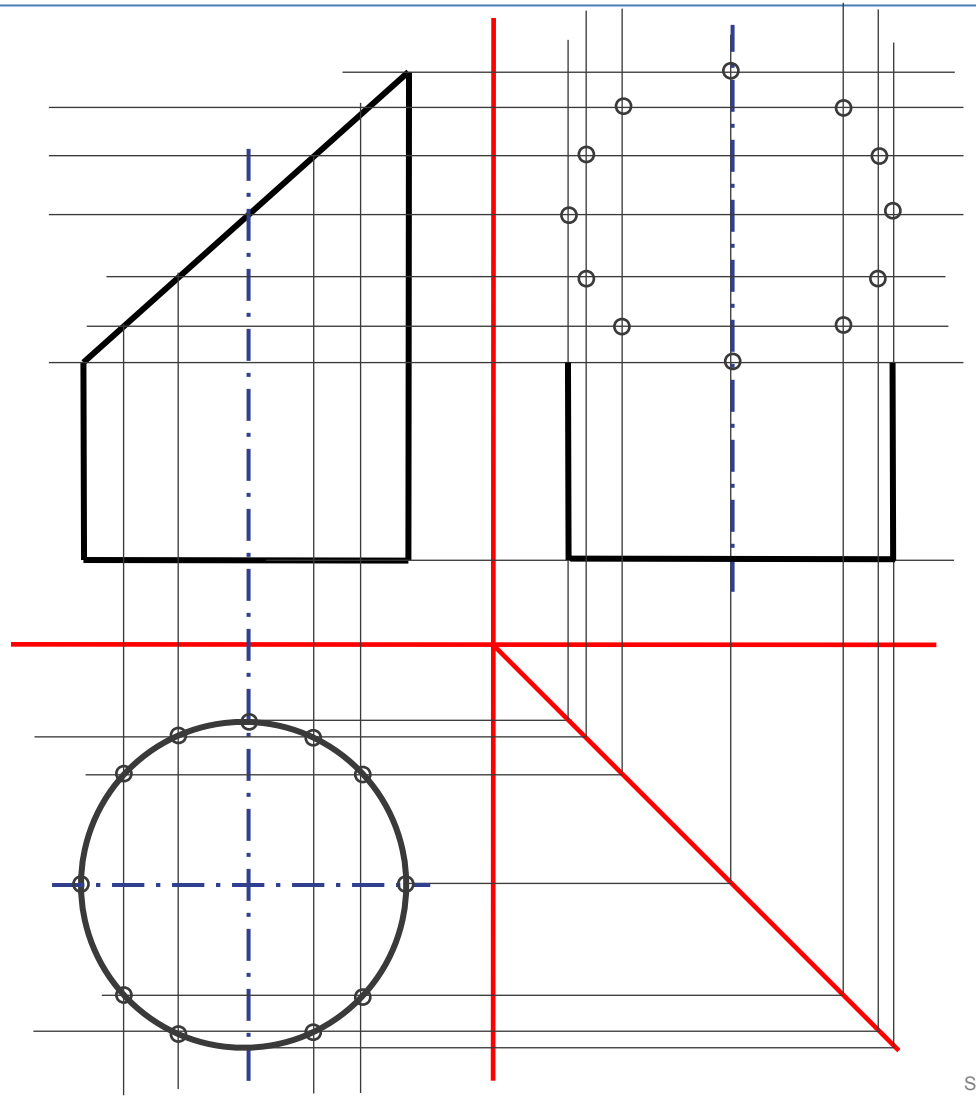


Source: A. Nagarajah

Engineering Design: **Exercise 2.2**
Draw the missing third view of the sliced cylinder!

Solution
Step 2

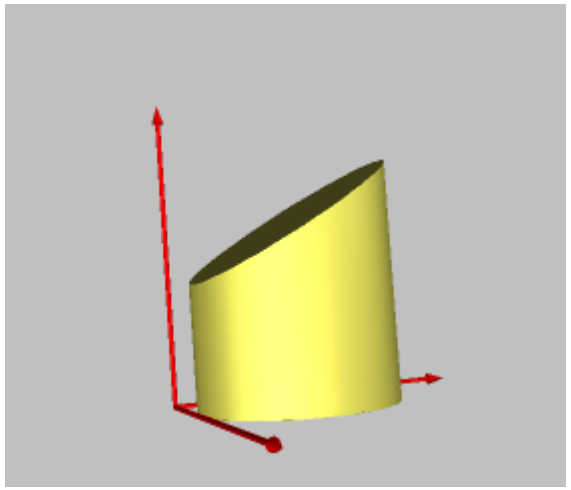


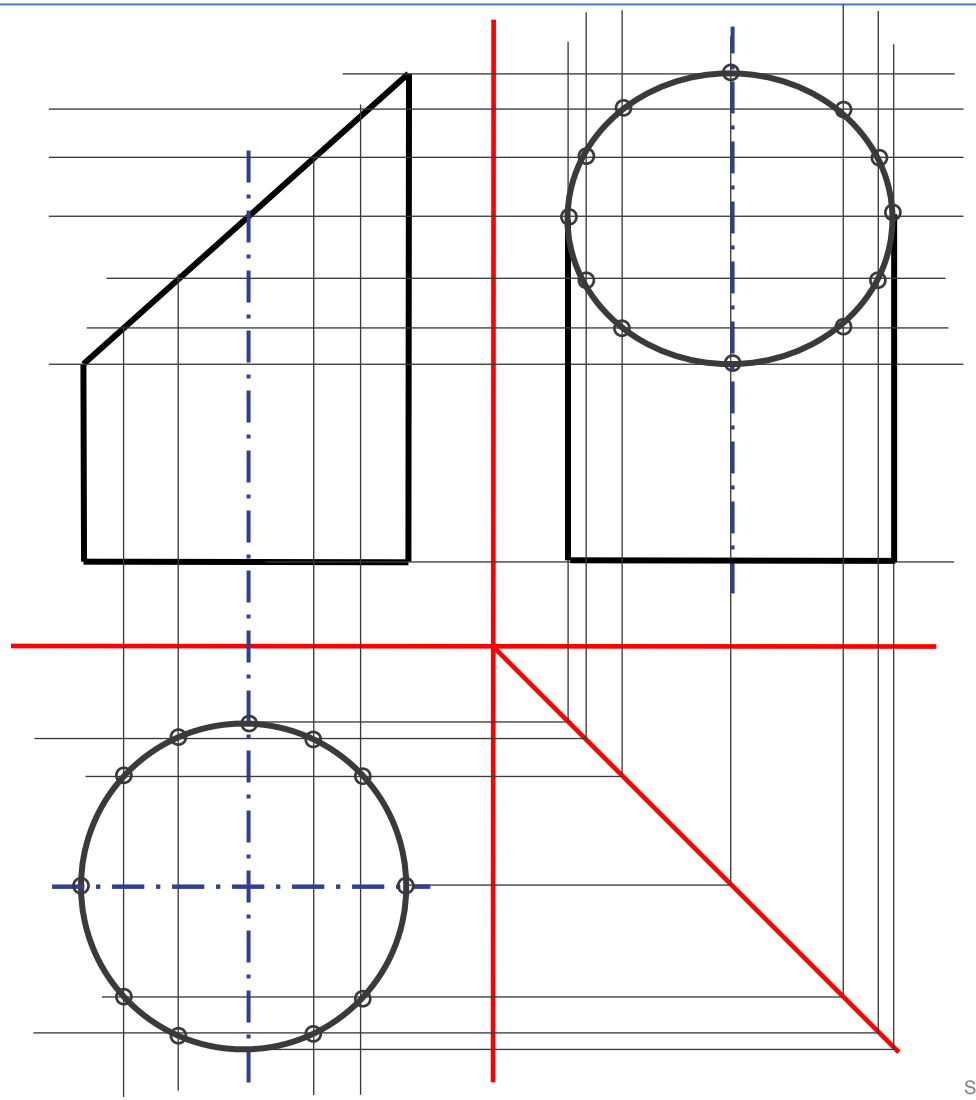


Source: A. Nagarajah

Engineering Design: **Exercise 2.2**
Draw the missing third view of the sliced cylinder!

Solution
Step 3

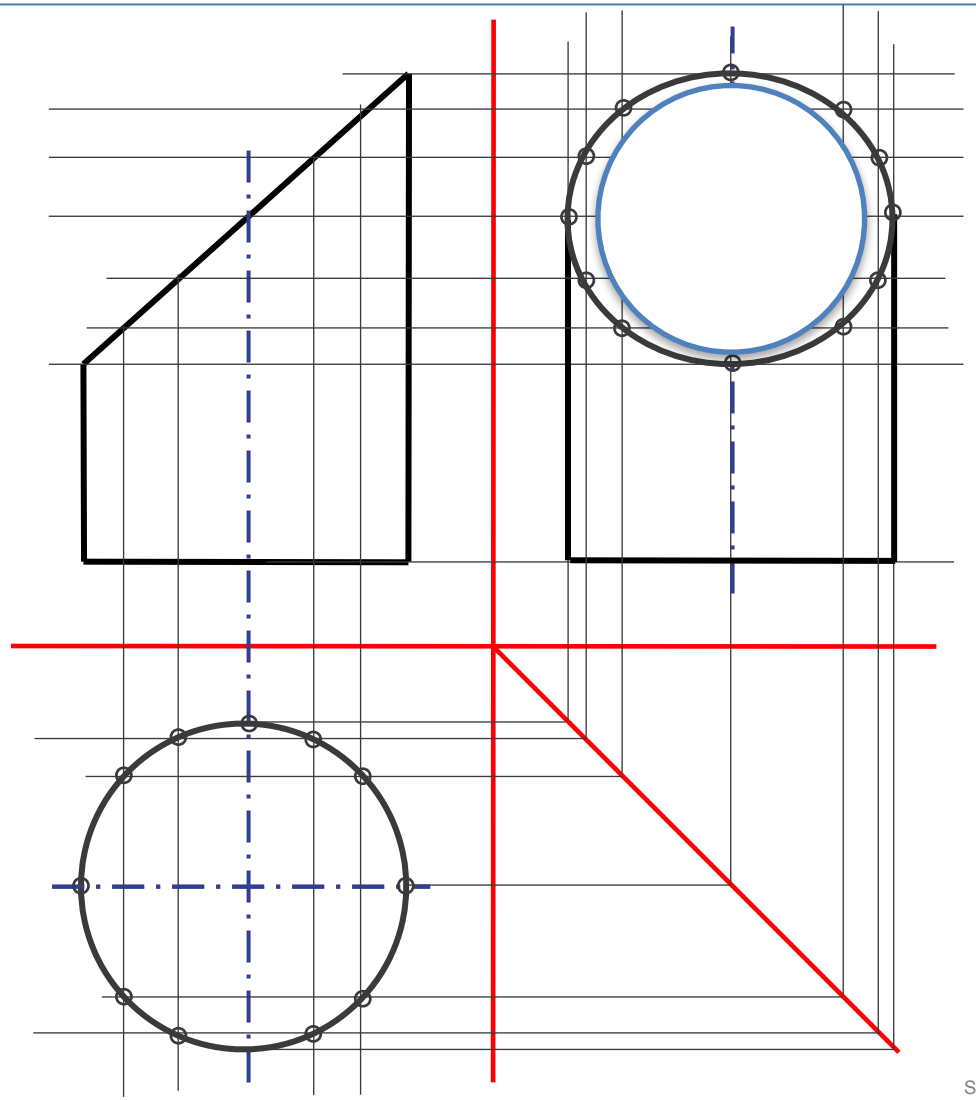




Source: A. Nagarajah

Engineering Design: **Exercise 2.2**
Draw the missing third view of the sliced cylinder!

Is this a circle?

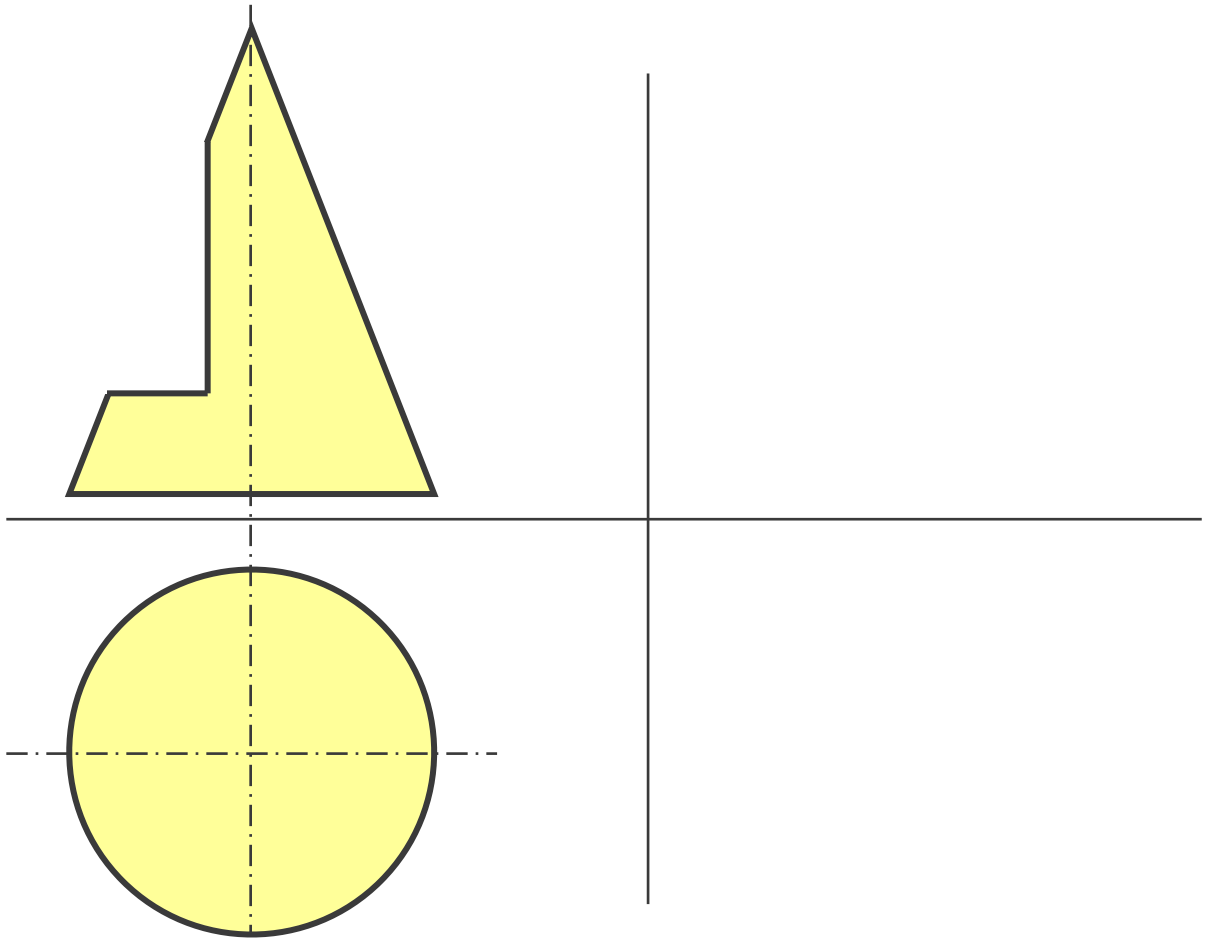


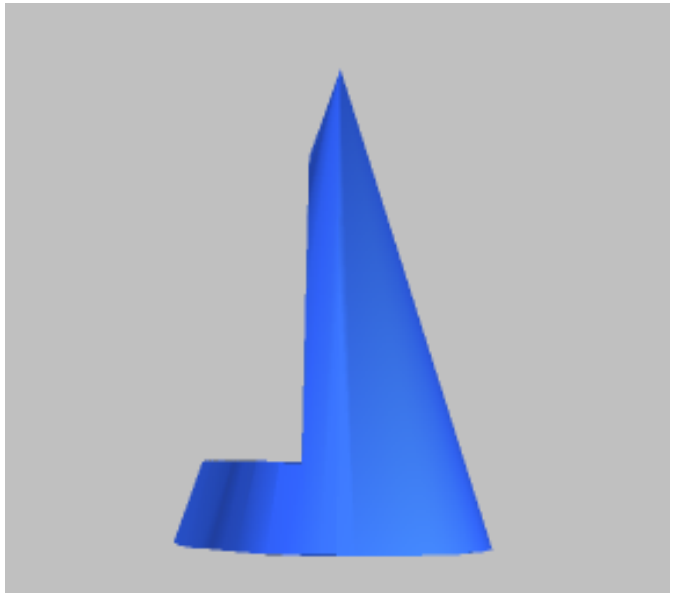
Source: A. Nagarajah

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2. Sliced Cylinder
        3. Sliced Cone

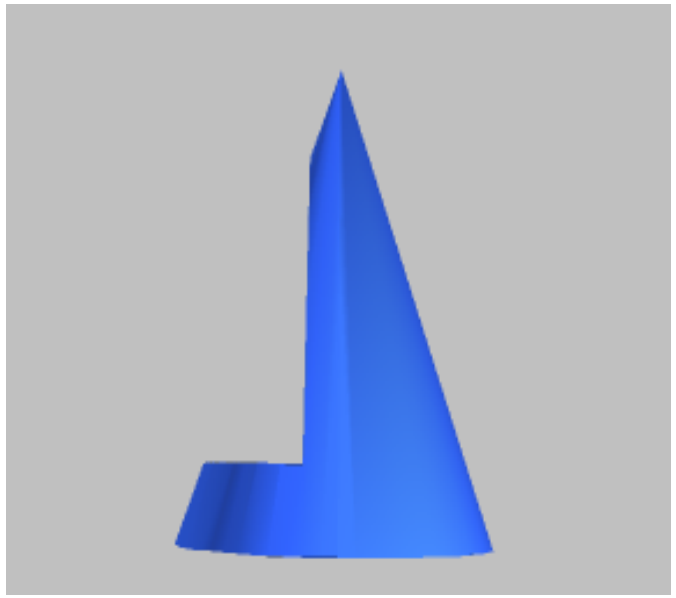
Engineering Design: **Exercise 2.3**
Draw the missing lines and views of the sliced cone!

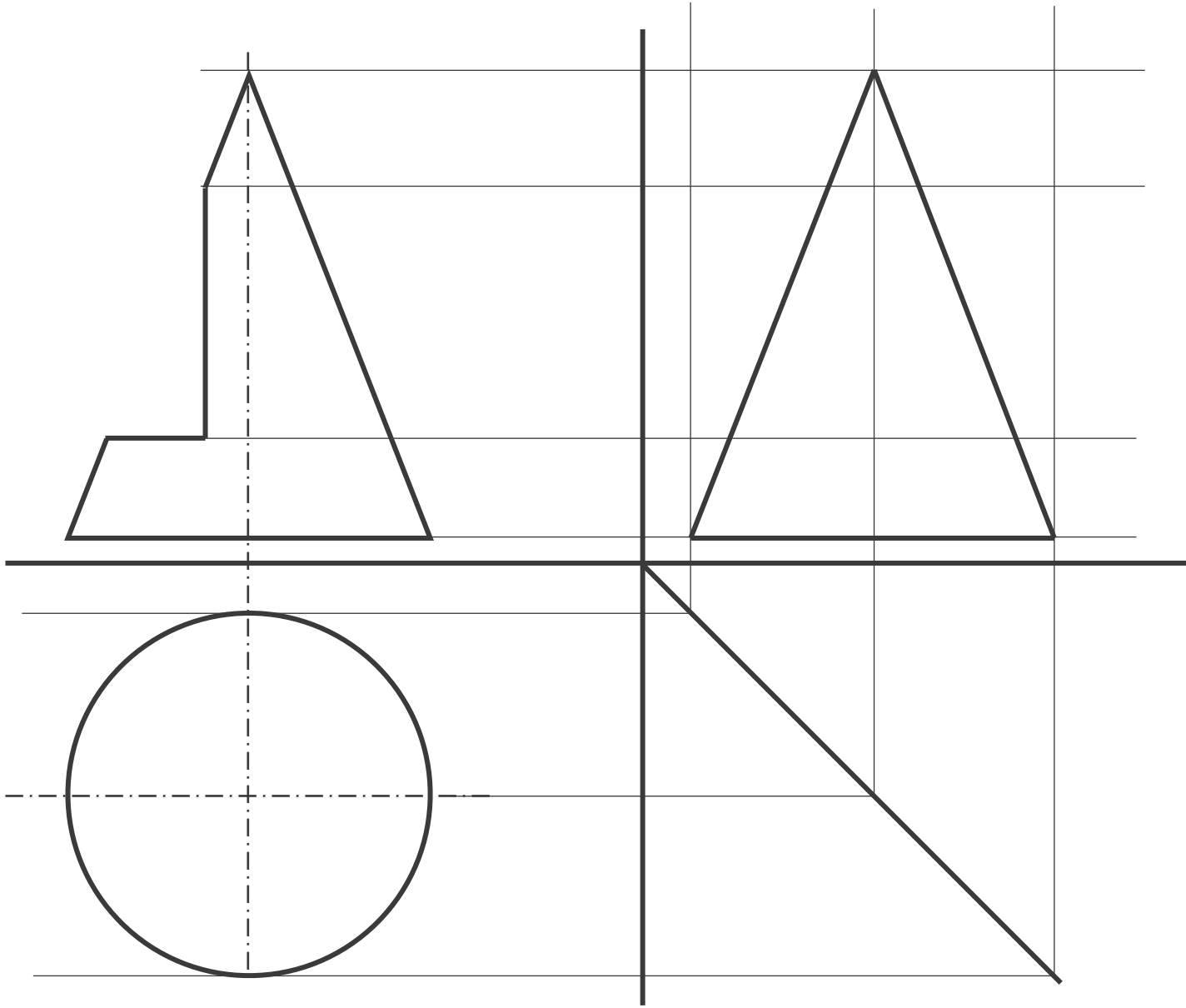




Source: A. Nagarajah

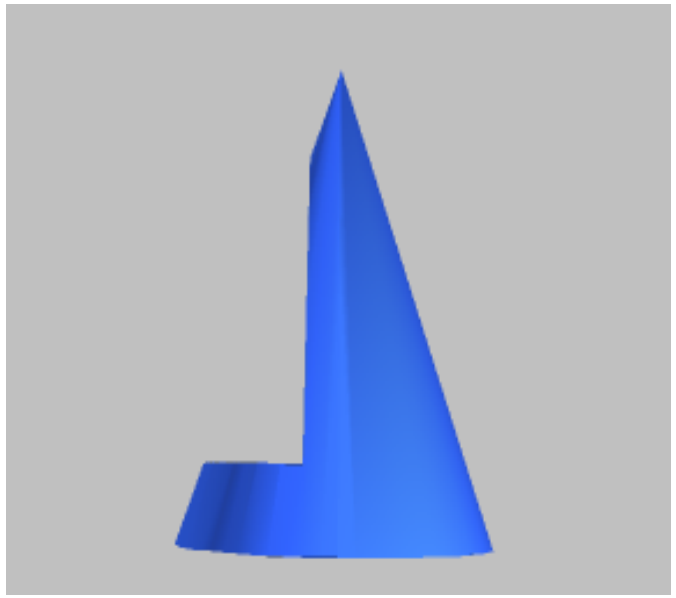
Solution
Step 1

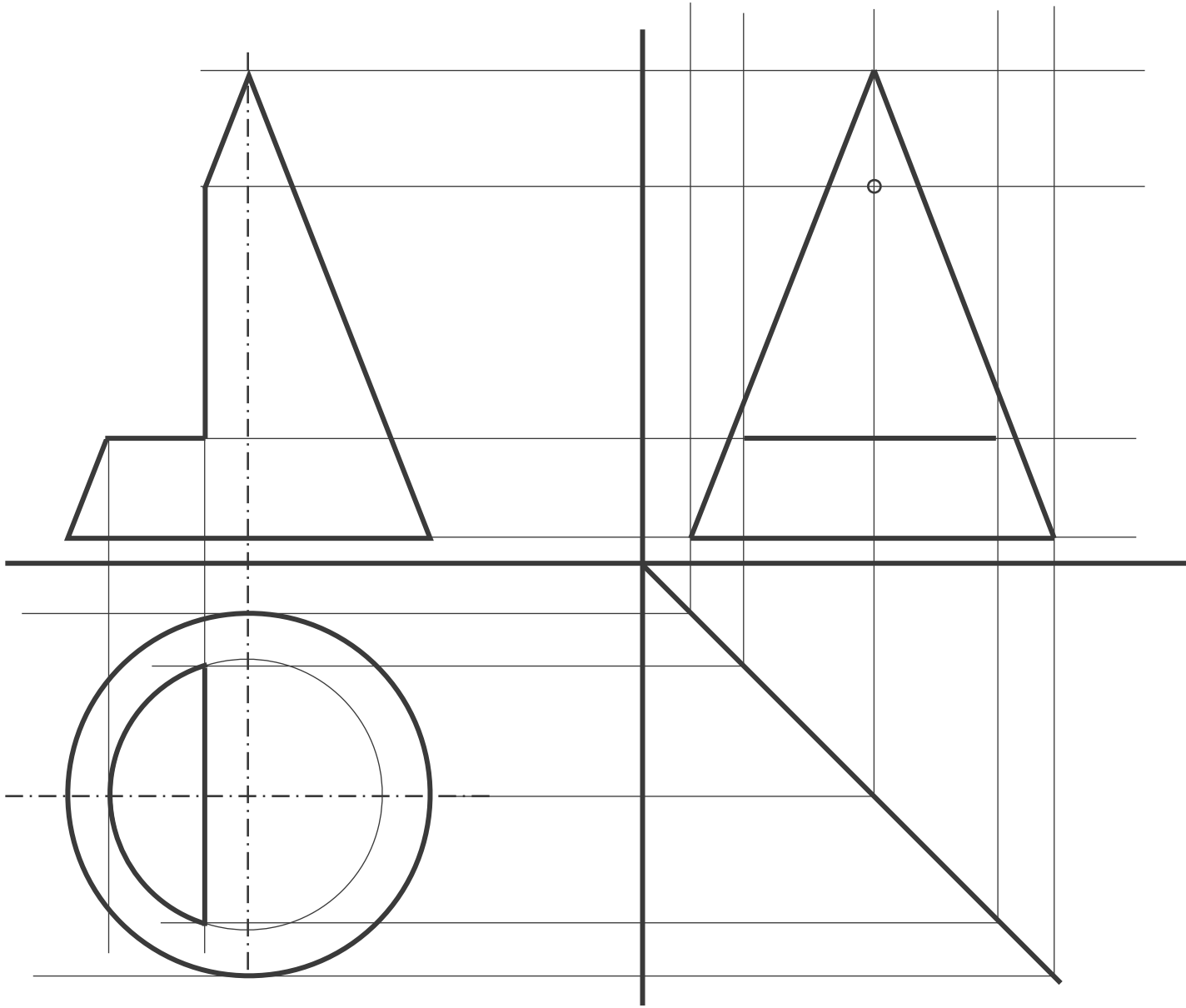




Source: A. Nagarajah

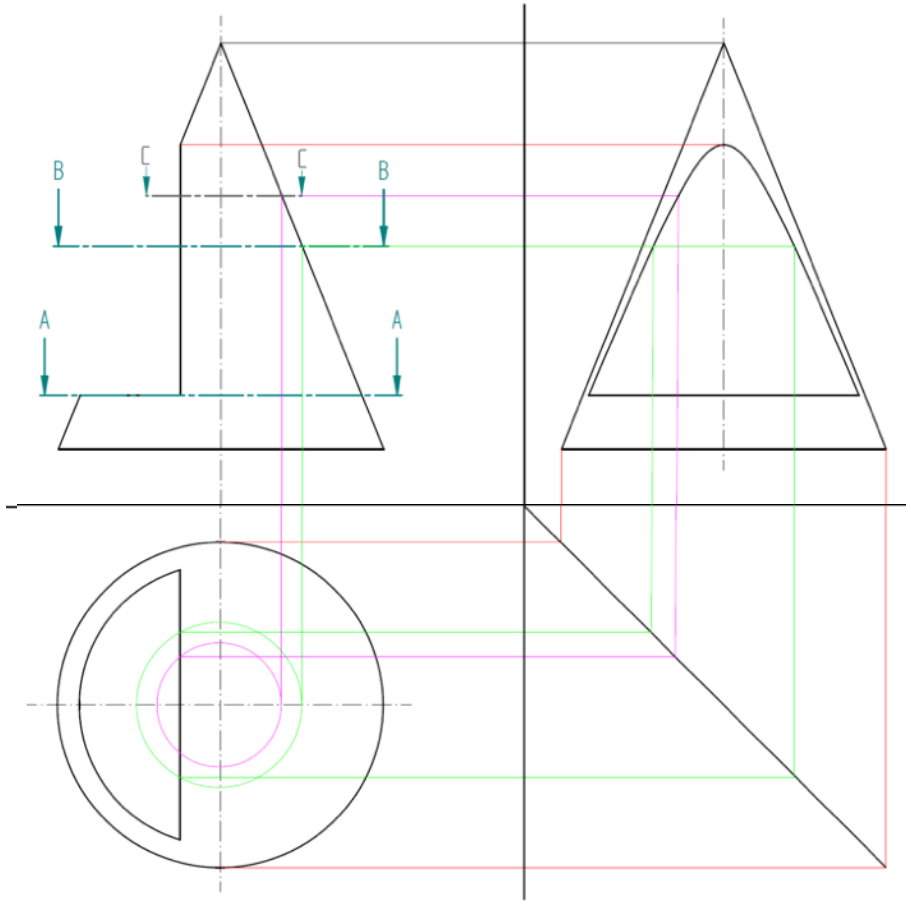
Solution
Step 2

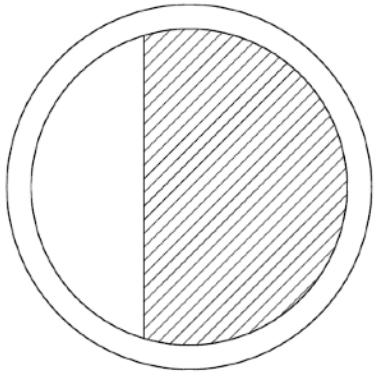




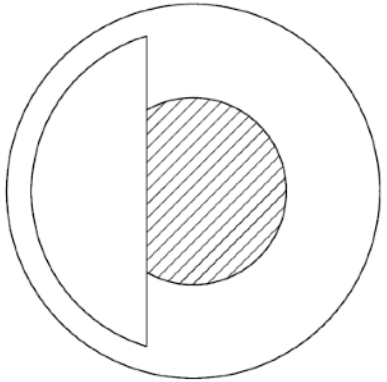
Source: A. Nagarajah

Engineering Design: **Exercise 2.3**
Draw the missing third view of the sliced cone!

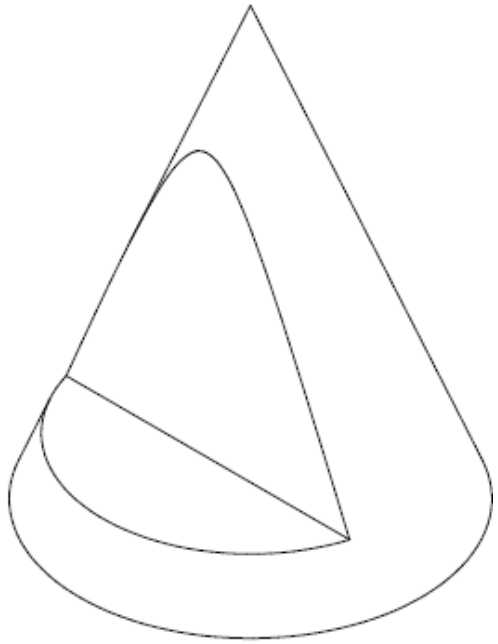




Schnitt A-A



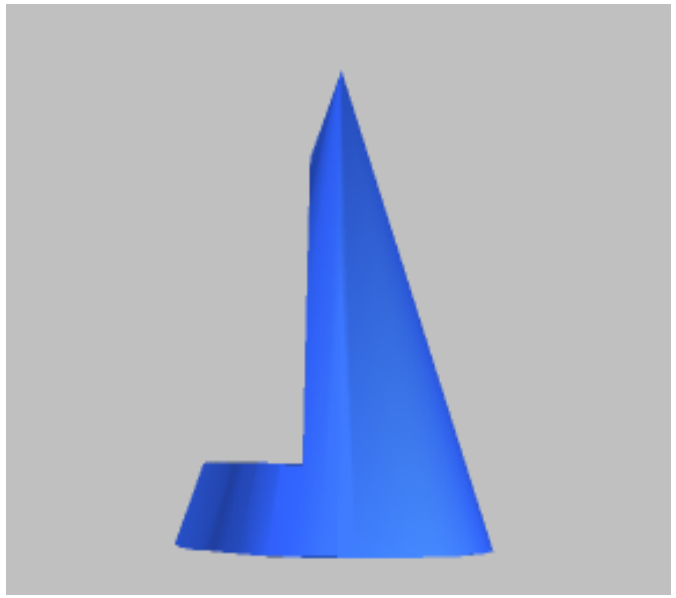
Schnitt B-B

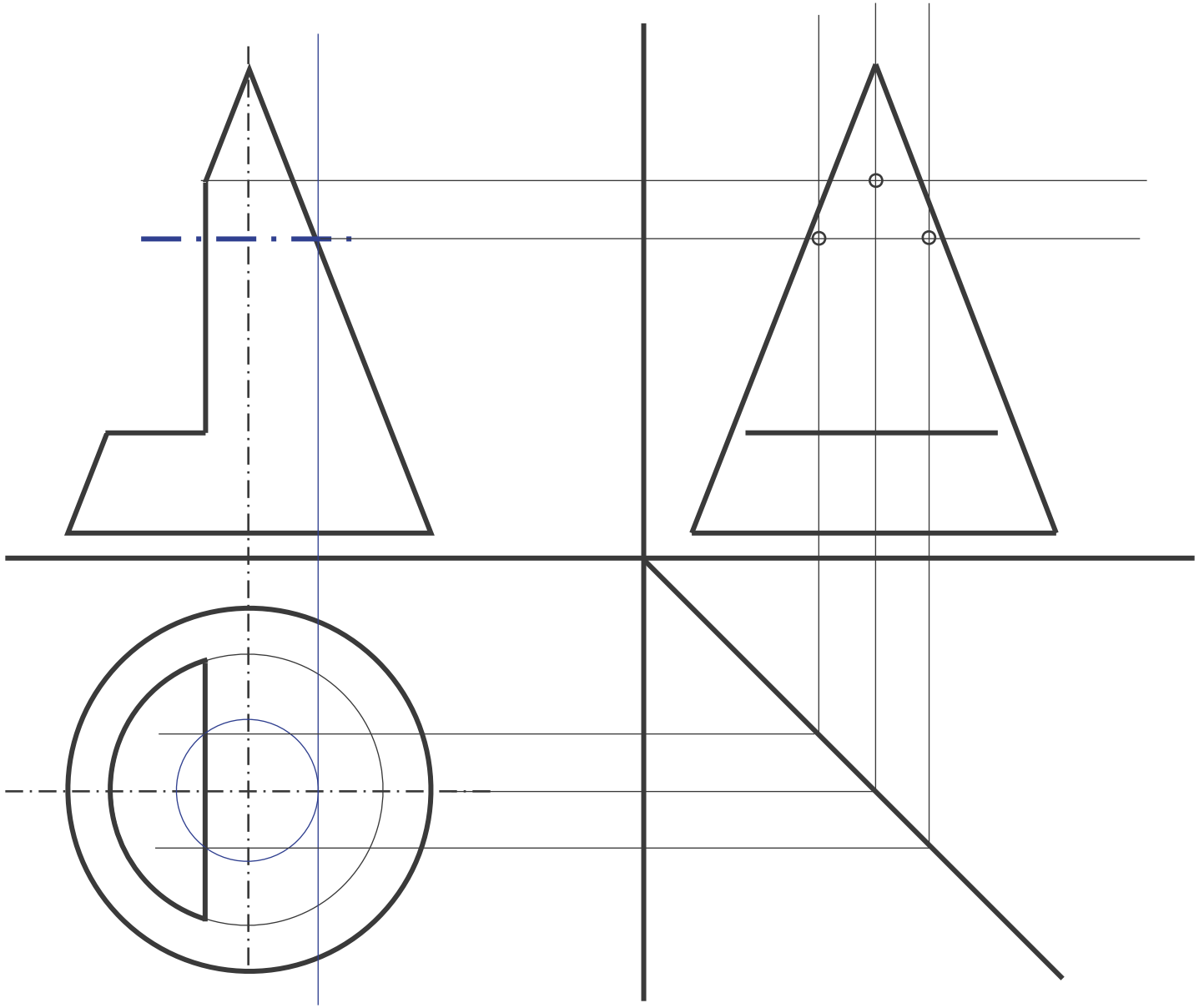


Hyperbola design with the help of cuts.

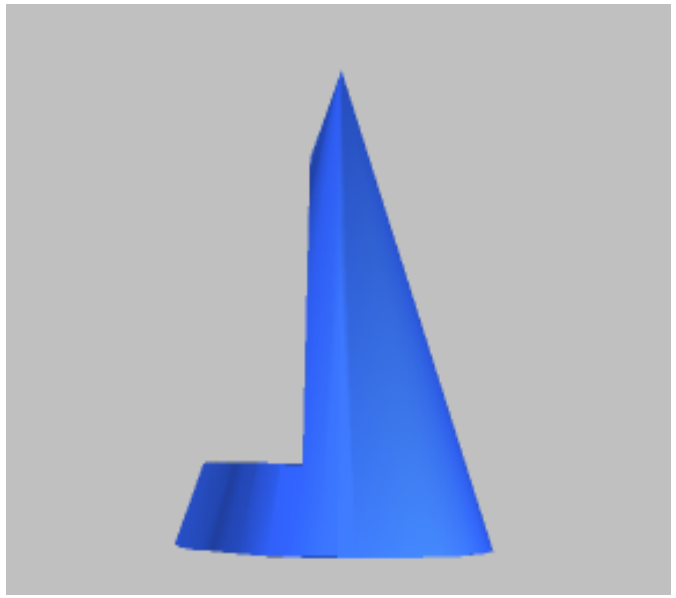
Source: A. Nagarajah

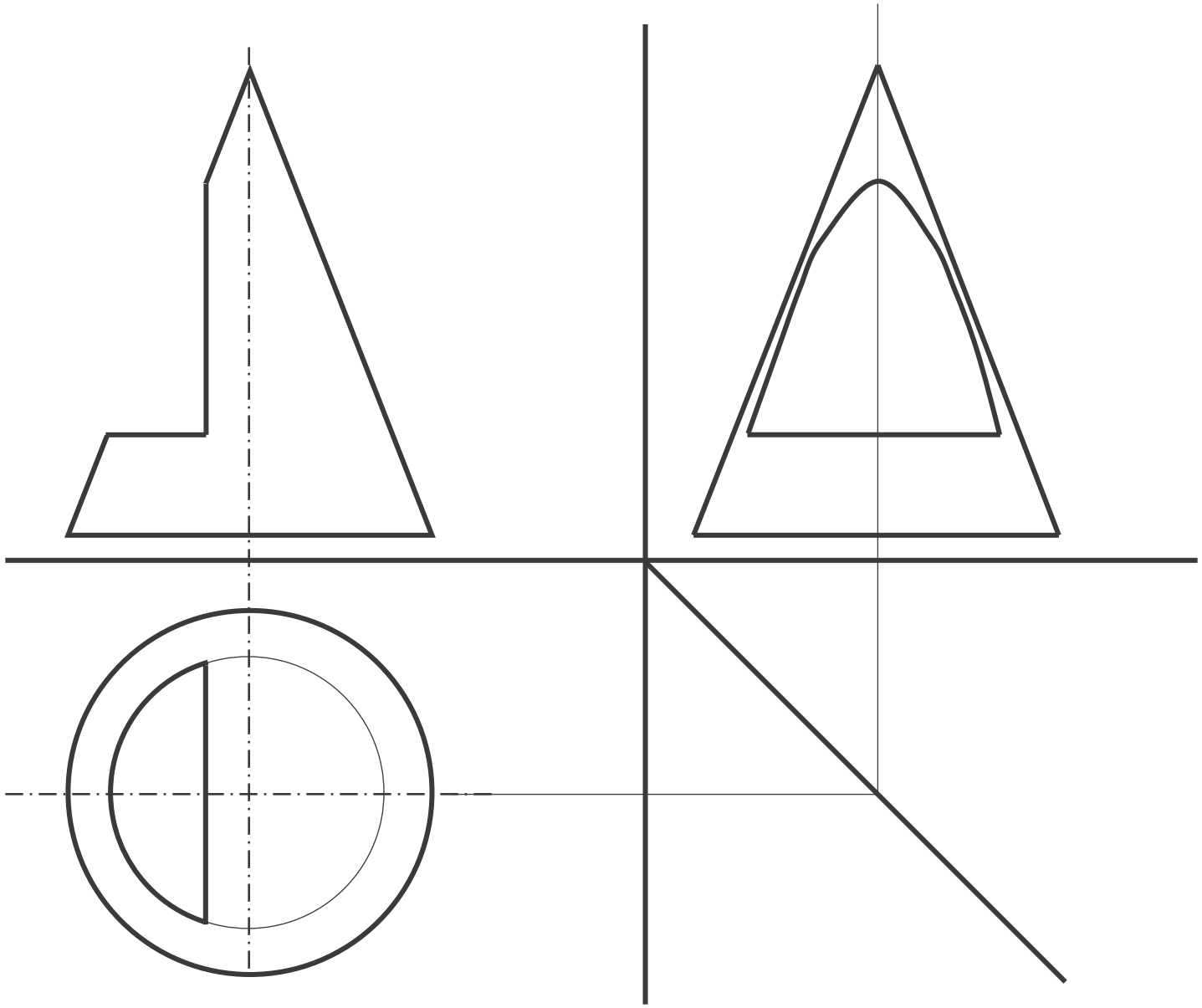
Solution
Step 3



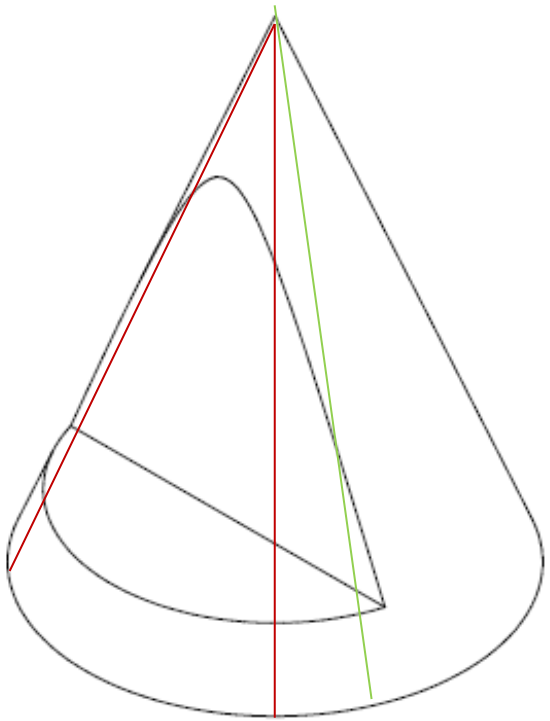


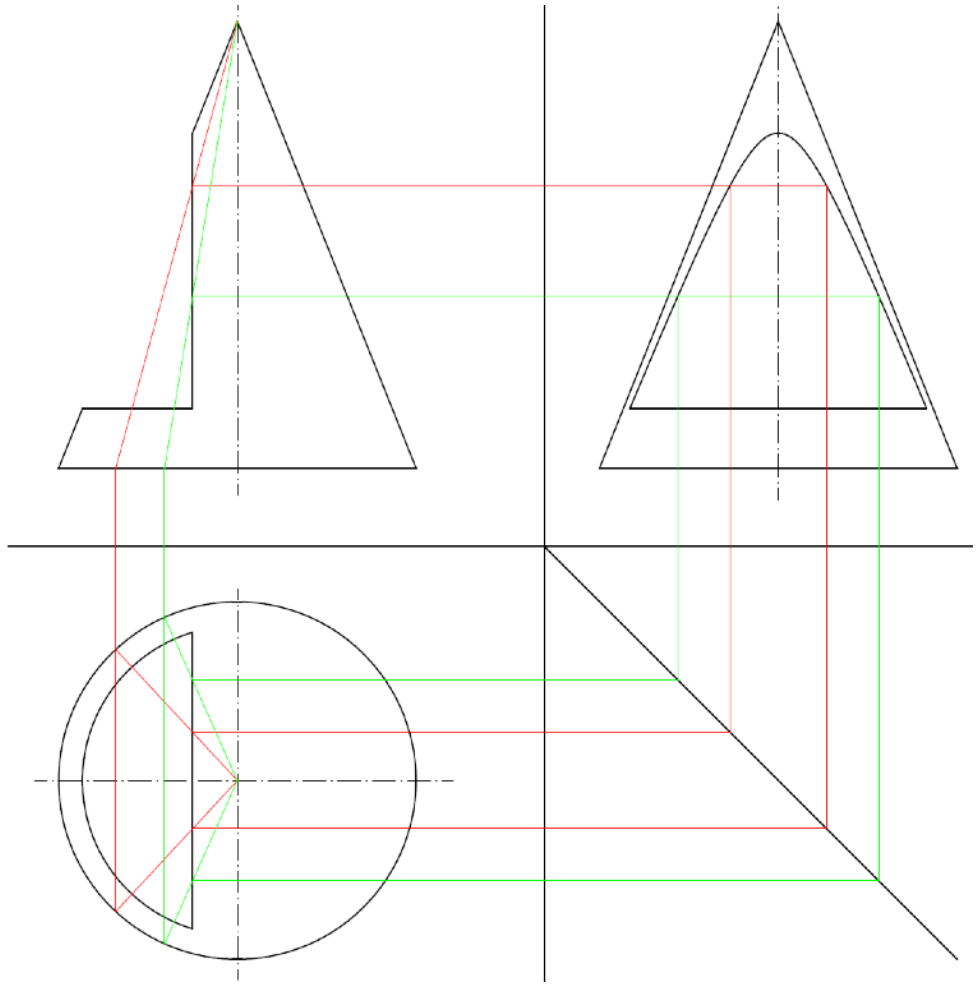
Solution
Step 4





Engineering Design: **Exercise 2.3**
Draw the missing third view of the sliced cone!





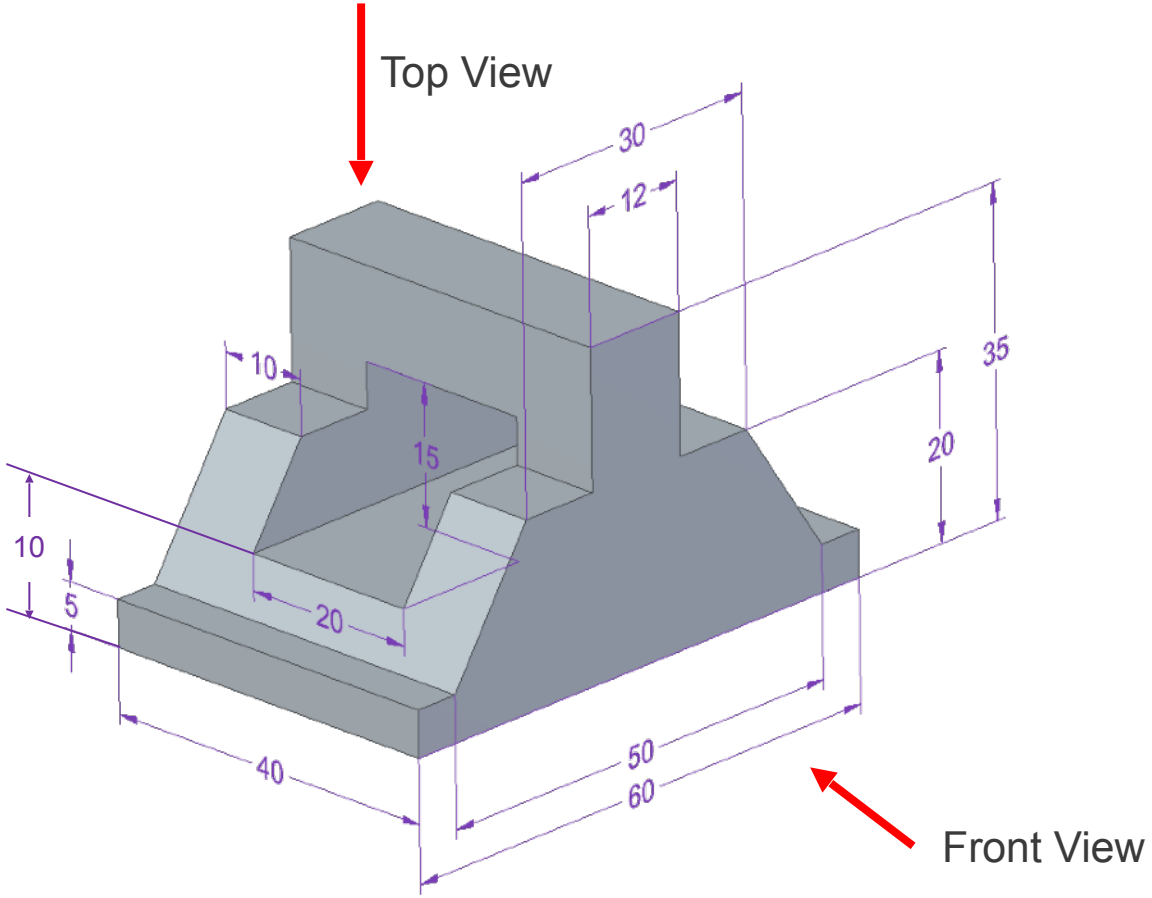
Hyperbola design with surface lines

Source: A. Nagarajah

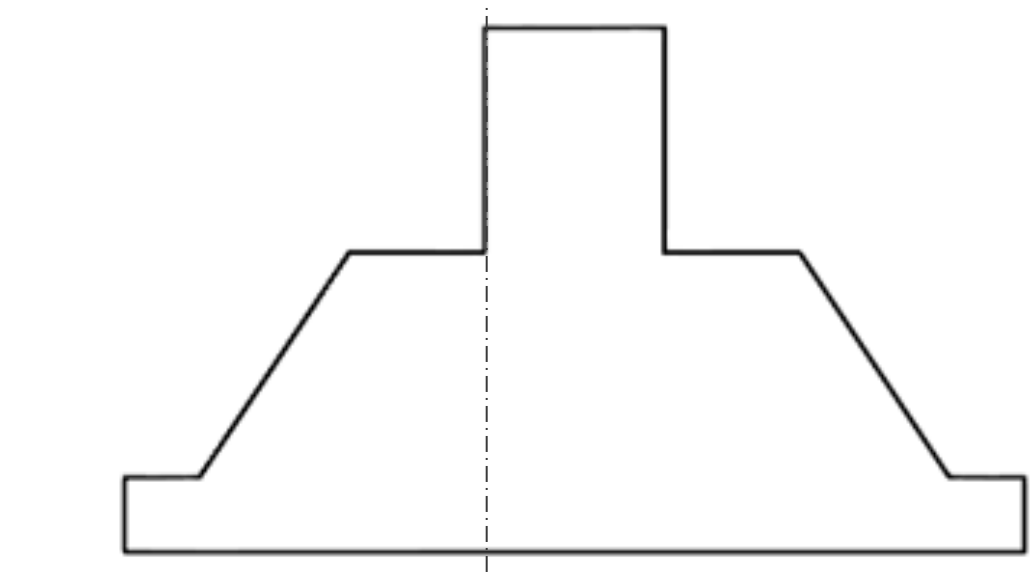
Engineering Design: **Exercise 2: Agenda**

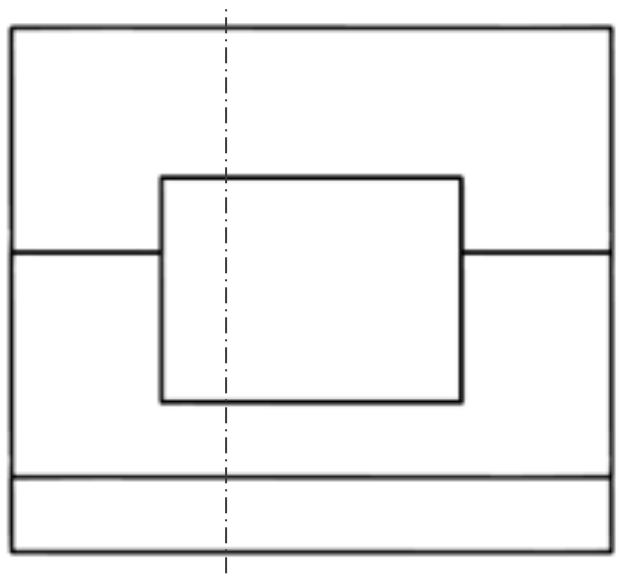
0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2. Sliced Cylinder
        3. Sliced Cone
        4. Complex Part

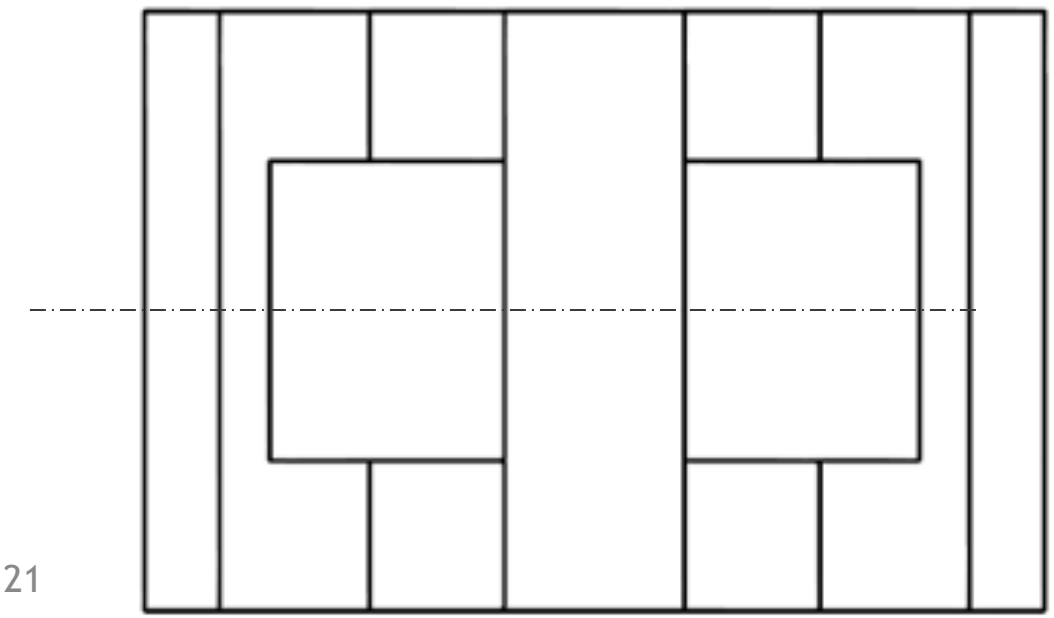
Engineering Design: **Exercise 2.4**
Draw top view, front view and left side view of the part!

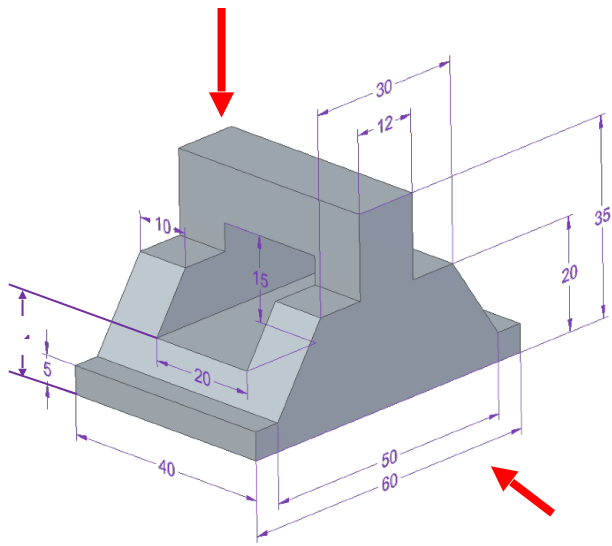


Source: A. Nagarajah







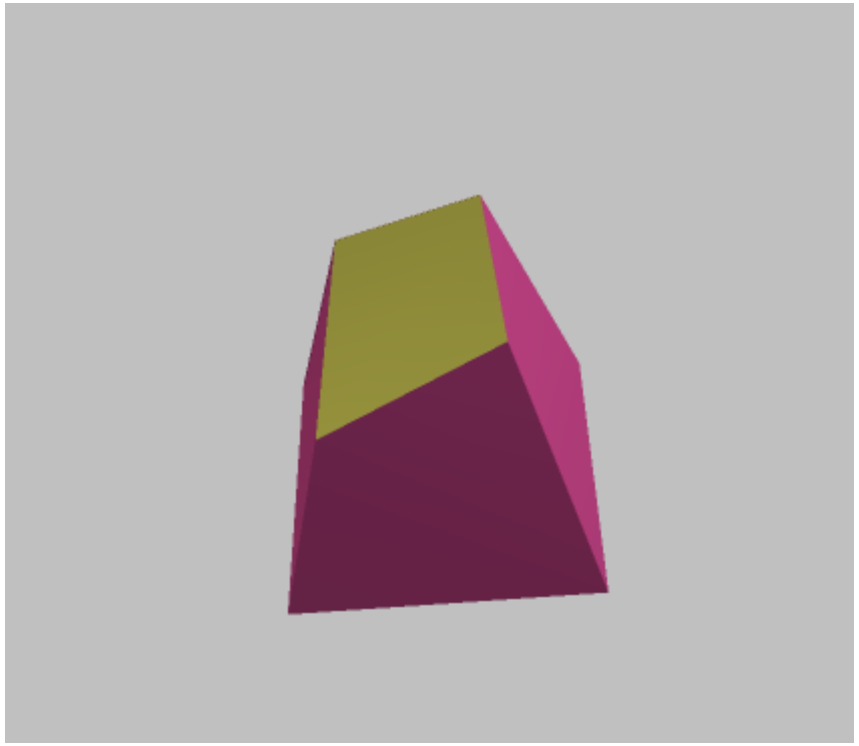


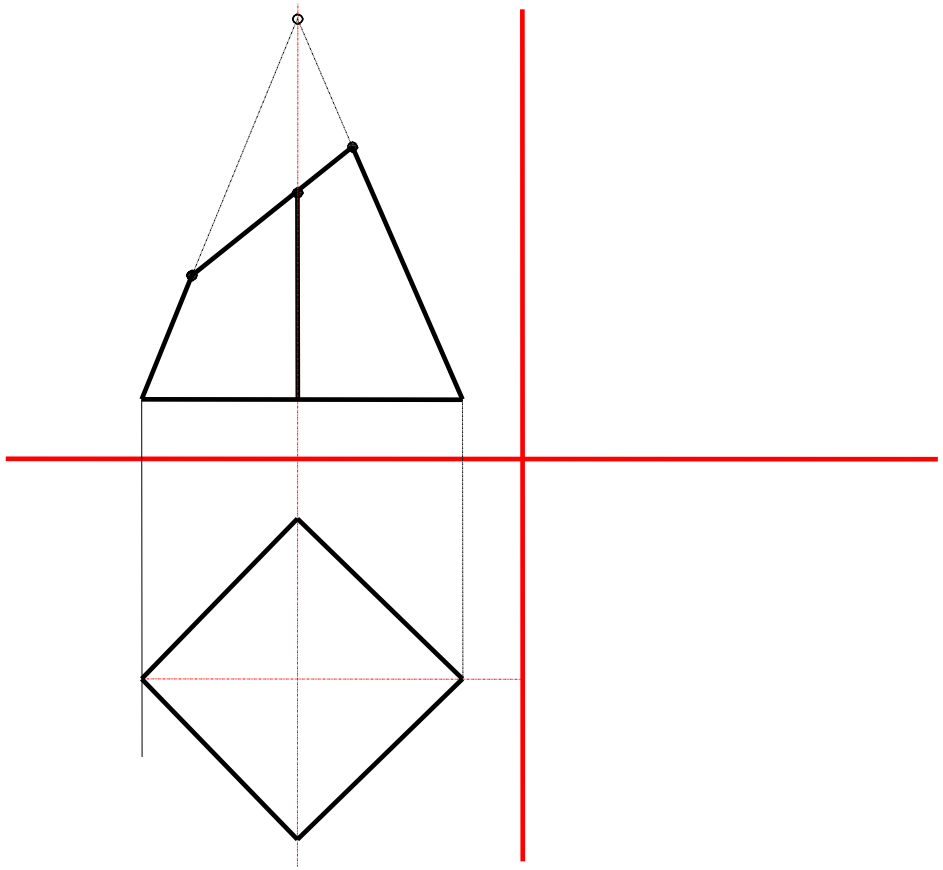
Source: A. Nagarajah

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2. Sliced Cylinder
        3. Sliced Cone
        4. Complex Part
        5. Sliced Pyramid

Engineering Design: **Exercise 2.5**
Draw all three views of the sliced pyramid!

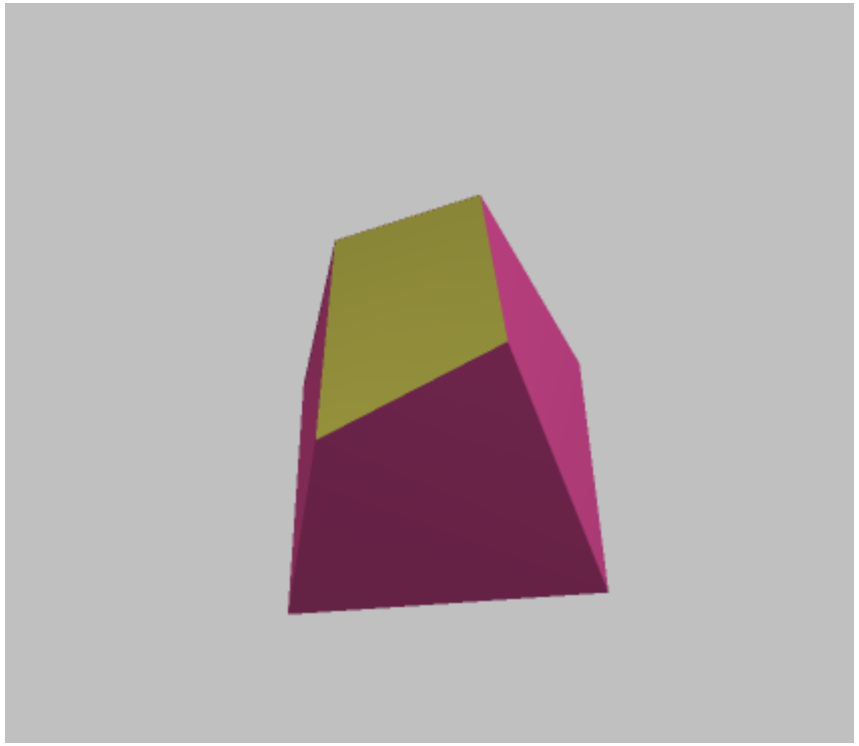


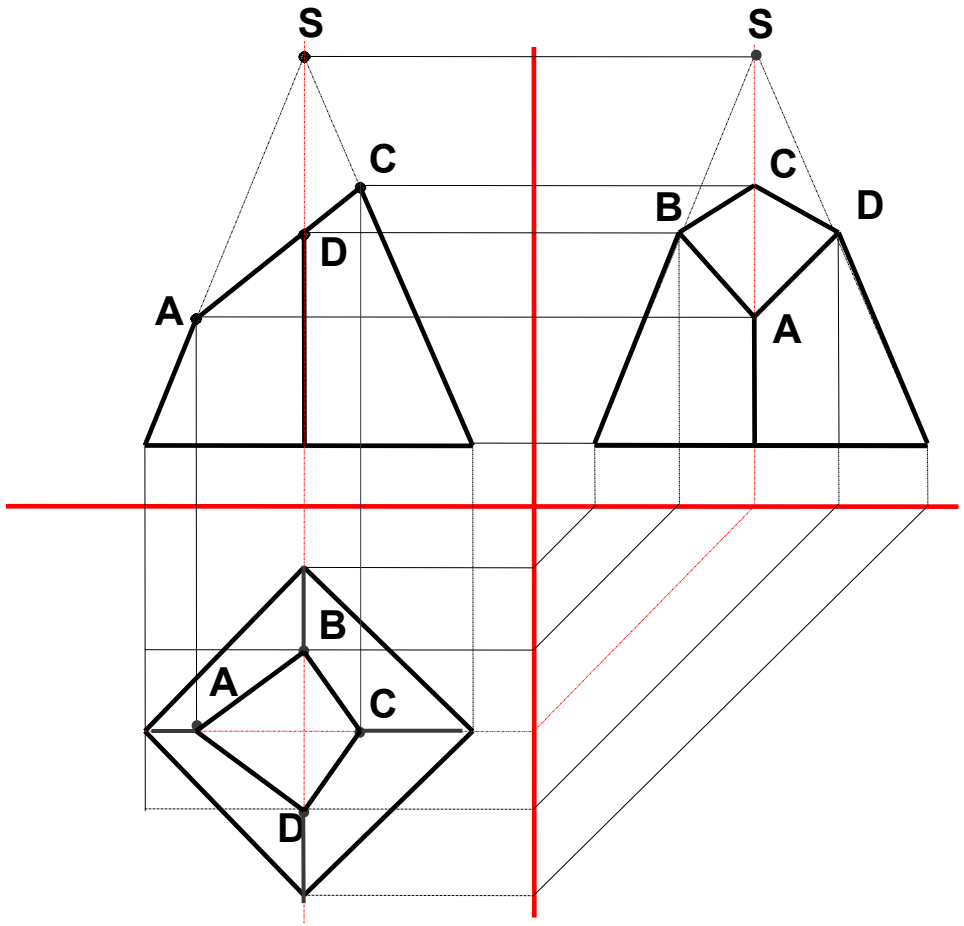


Source: A. Nagarajah

Engineering Design: **Exercise 2.5**
Draw all three views of the sliced pyramid!

Solution



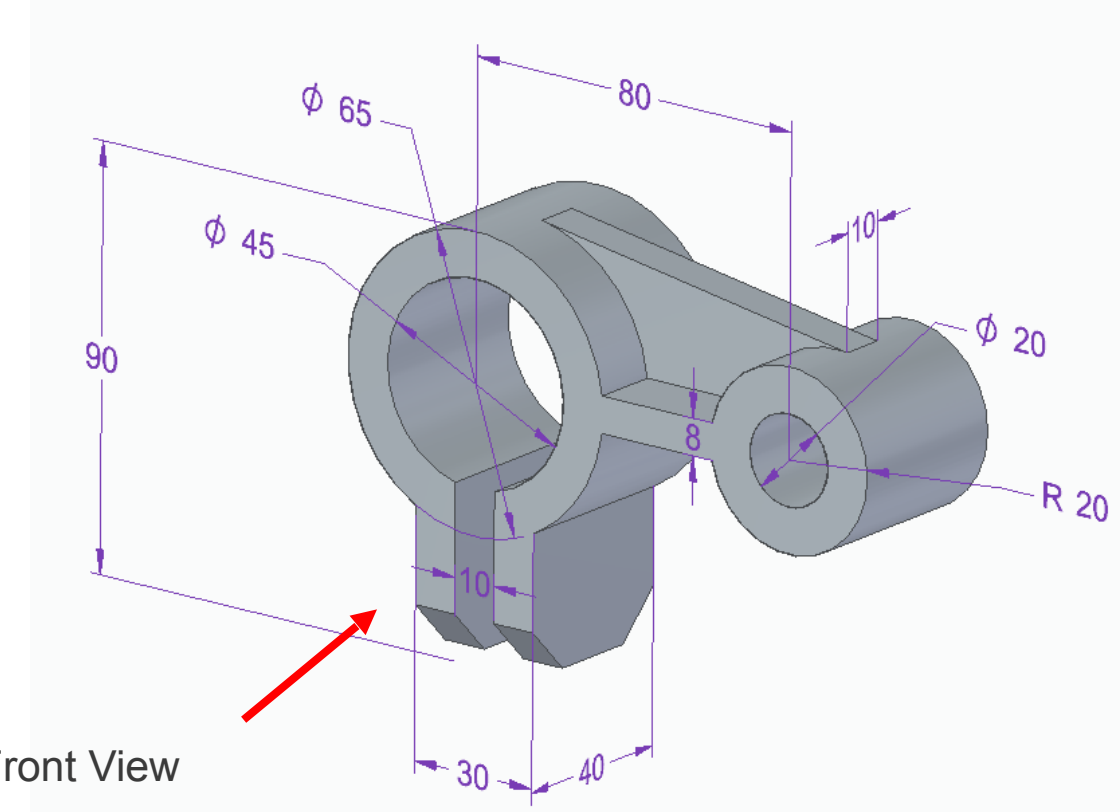


Source: A. Nagarajah

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2. Sliced Cylinder
        3. Sliced Cone
        4. Complex Part
        5. Sliced Pyramid
        6. Cylindrical Part

Engineering Design: **Exercise 2.6**
Draw all necessary views of the shown part!



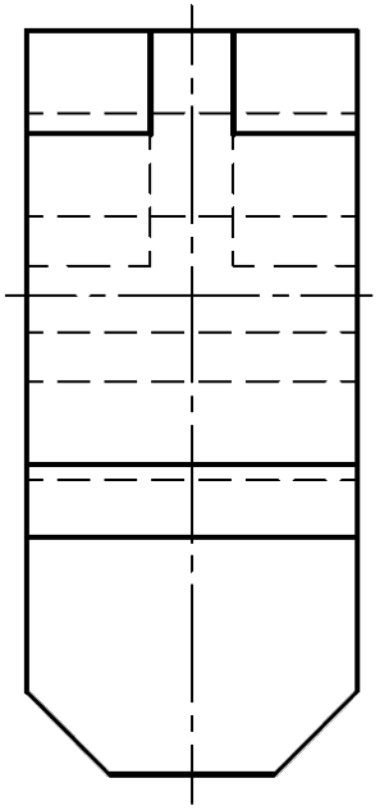
Front View

Source: A. Nagarajah

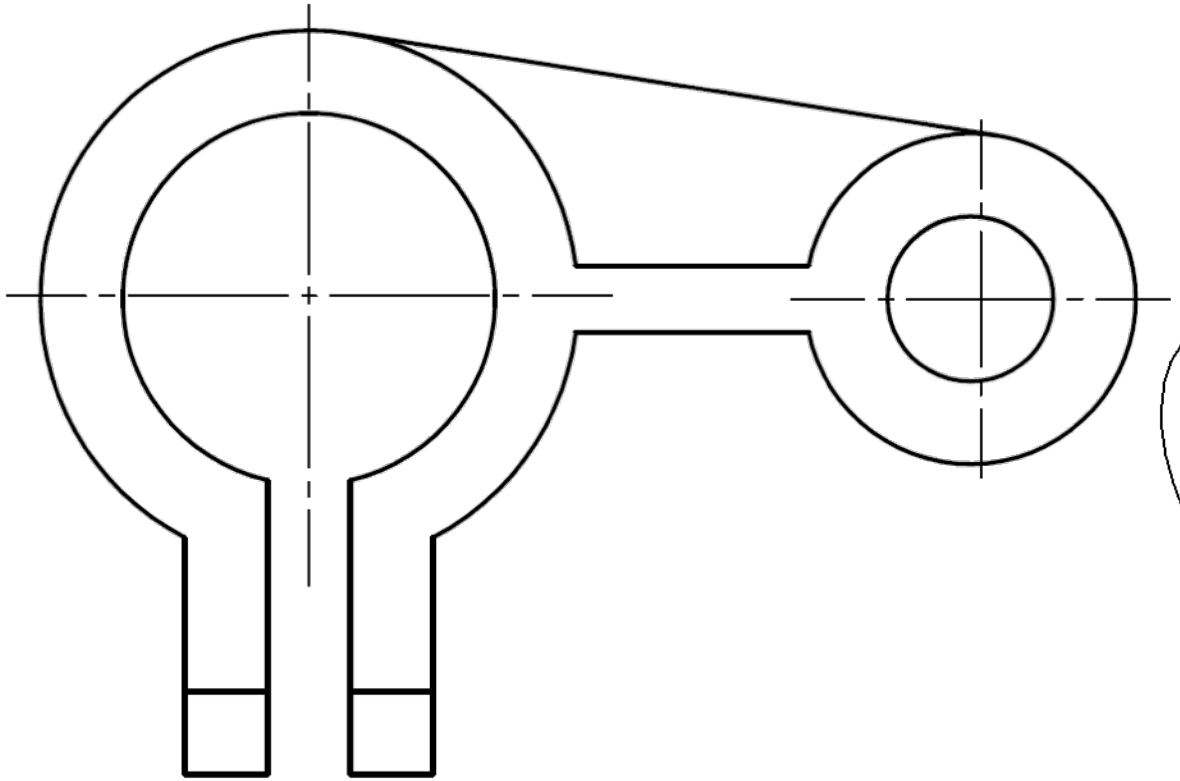
Engineering Design: **Exercise 2.6**
Draw all necessary views of the shown part!

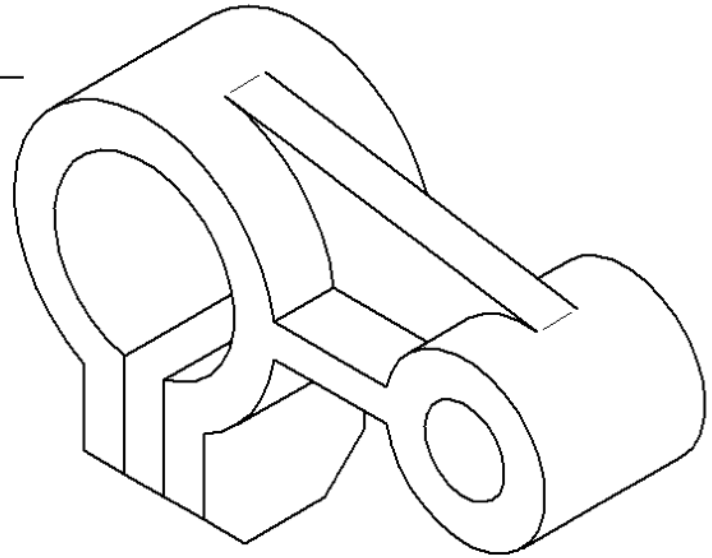
Solution

Right Side View



Front View



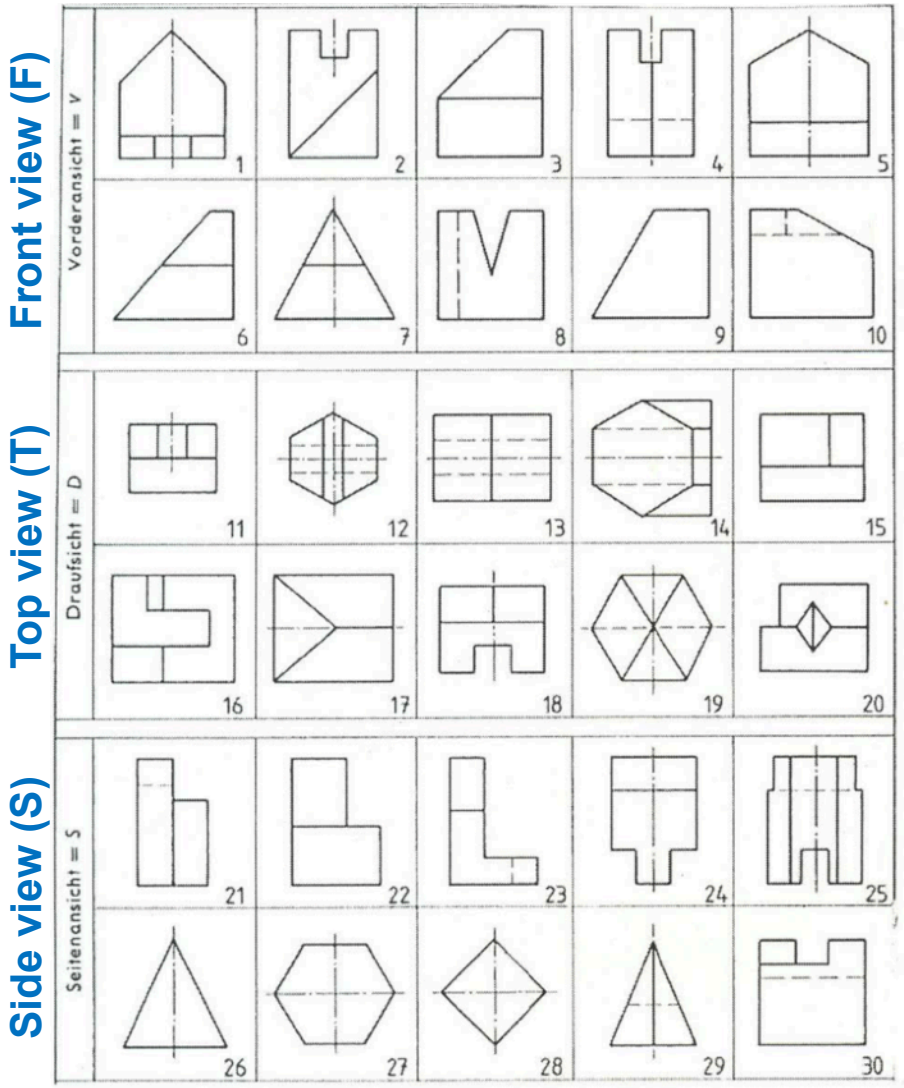


Source: A. Nagarajah

Engineering Design: **Exercise 2: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
    1. Type of Lines
    2. Projections
        1. Prism
        2. Sliced Cylinder
        3. Sliced Cone
        4. Complex Part
        5. Sliced Pyramid
        6. Cylindrical Part
        7. Exercises to train Views

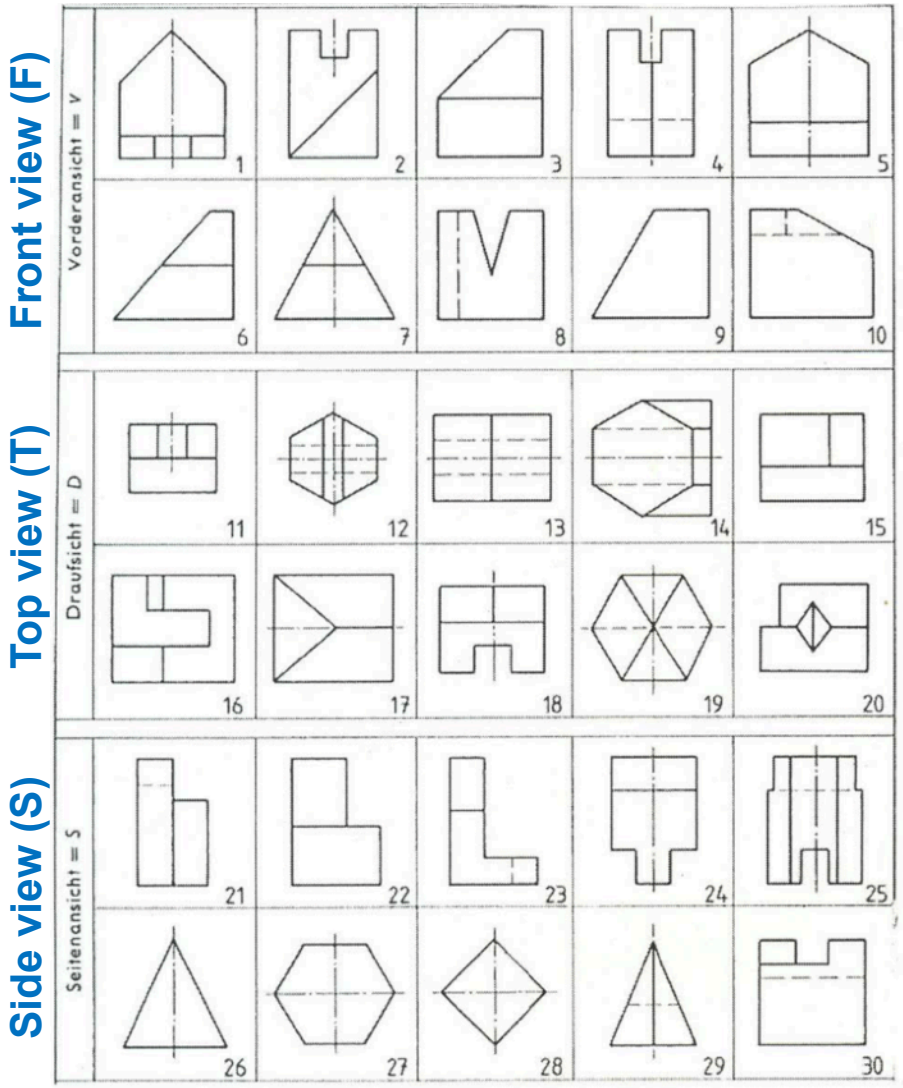
Engineering Design: **Exercise 2.7**
Find the corresponding Views!



F	1	2	3	4	5	6	7	8	9	10
T										
S										

Source: A. Nagarajah

Engineering Design: **Exercise 2.7**
Find the corresponding Views!



F	1	2	3	4	5	6	7	8	9	10
T	18	11	15	12	13	14	19	20	17	16
S	23	21	22	25	24	27	28	29	26	30

Source: A. Nagarajah

Engineering Design: Exercise 2
Additional Information

https://learning.oreilly.com/library/view/manual-of-engineering/9780080943626/content/kindle_split_14.html

Source: a. Nagarajah / F. Giesecke: Technical Drawing with Engineering Graphics