



2023. M80A

2023L562G1EL

# Coimisiún na Scrúduithe Stáit

## State Examinations Commission

**Leaving Certificate Examination, 2023**

# **Design & Communication Graphics**

## **Ordinary Level**

### **Section A (60 marks)**

Centre No.

**Thursday, 22 June**  
**Morning, 9:30 - 12:30**

**This examination is divided into three sections:**

- SECTION A (Core - Short Questions)  
SECTION B (Core - Long Questions)  
SECTION C (Applied Graphics - Long Questions)

#### **SECTION A**

- Four questions are presented.
- Answer **any three** questions on the A3 sheet overleaf.
- All questions in Section A carry **20 marks** each.

#### **SECTION B**

- Three questions are presented.
- Answer **any two** questions on drawing paper.
- All questions in Section B carry **60 marks** each.

#### **SECTION C**

- Five questions are presented.
- Answer **one** question (i.e. the option you have studied) on drawing paper.
- All questions in Section C carry **60 marks** each.

#### **General Instructions:**

- *Construction lines must be shown on all solutions.*
- *Write the question number distinctly on the answer paper in Sections B and C.*
- *Work on one side of the drawing paper only.*
- *All dimensions are given in metres or millimetres.*
- *Write your Examination number in the box below and on all other sheets used.*

**Examination Number**

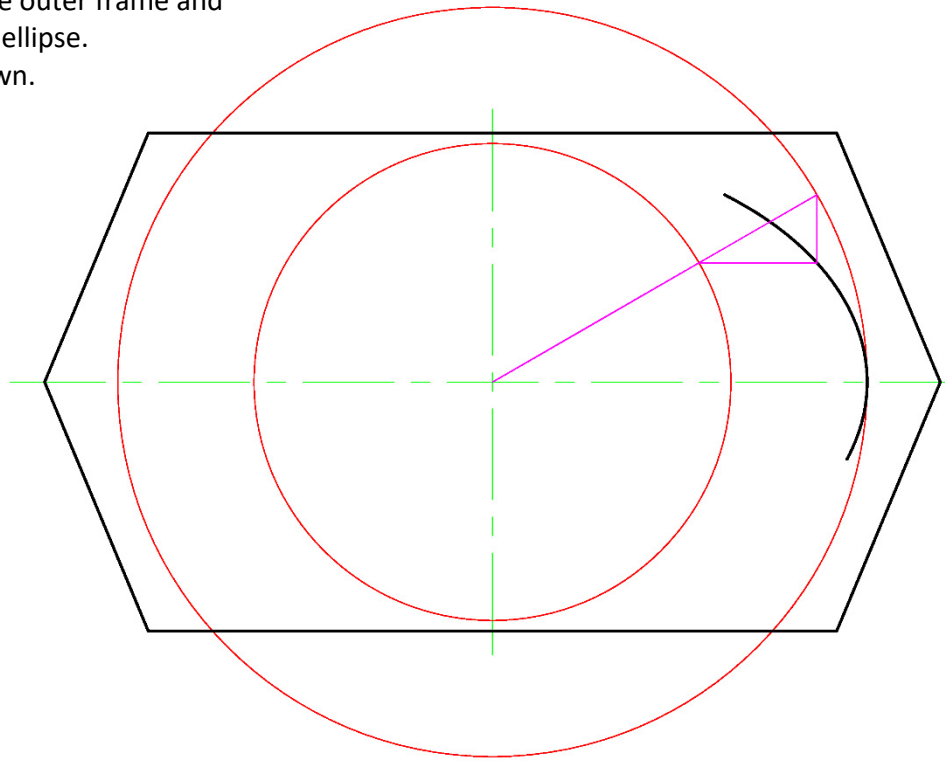
The 2023 examination papers were adjusted to compensate for disruptions to learning due to COVID-19. This examination paper does not necessarily reflect the same structure and format as the examination papers of past or subsequent years.

**SECTION A - Core - Answer any three of the questions on this A3 sheet.**

**A-1.** The image below shows an elliptical pool table from a science museum. The top of the pool table consists of an ellipse and an outer frame.

The drawing on the right shows the outer frame and the major and minor circles of the ellipse. A portion of the ellipse is also shown.

- (a) Locate the remaining points on the ellipse.
- (b) Draw the curve.
- (c) Locate the focal points of the ellipse.

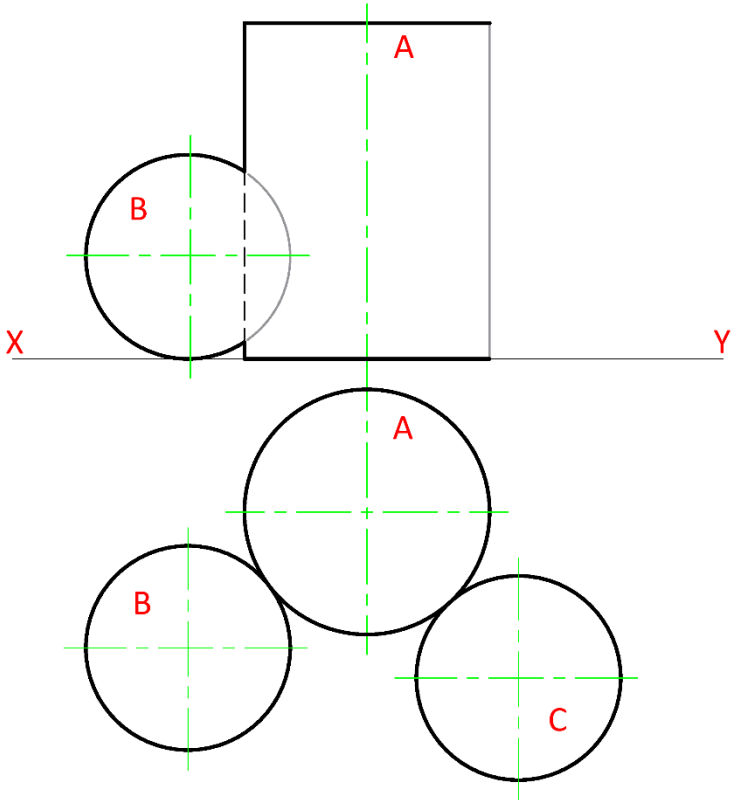


**A-3.** The image below shows three tennis balls and a cylindrical container **A** which are in mutual contact.

The drawing on the right shows the partially completed elevation and plan of similar solids.

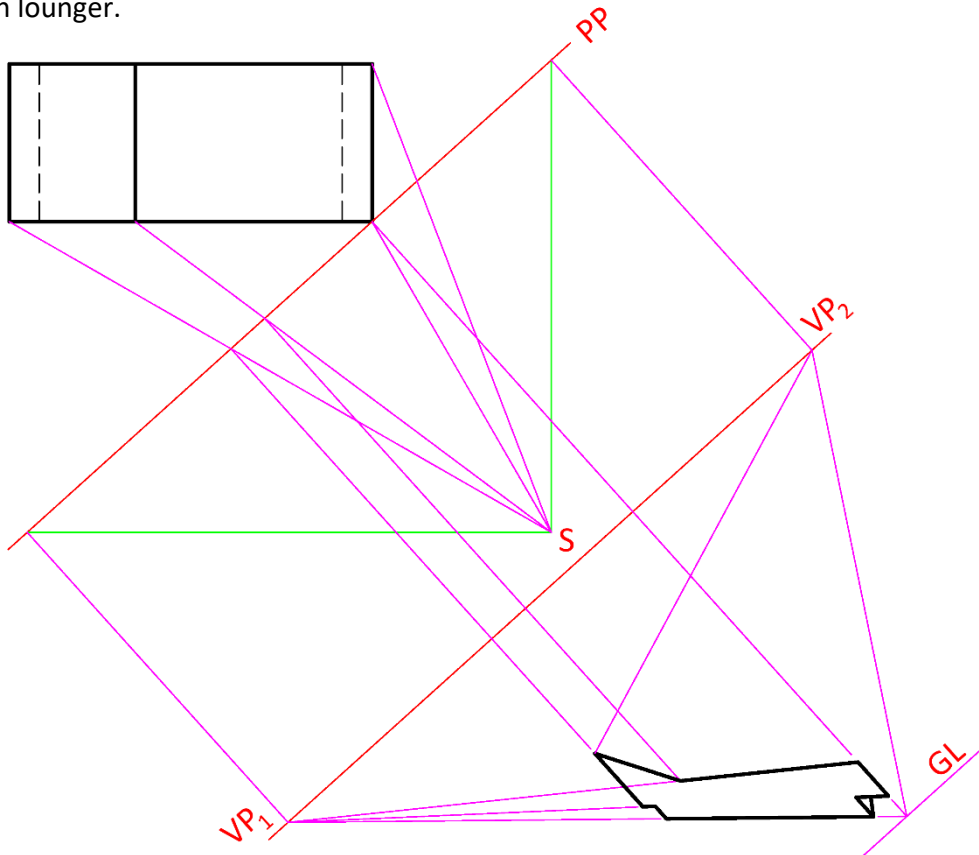
The spherical tennis balls **B**, **C**, and **D** are all of the same diameter.

- (a) Draw the elevation of sphere **C**.
- (b) Draw the elevation and plan of sphere **D** which is in contact with sphere **B** and sphere **C**.



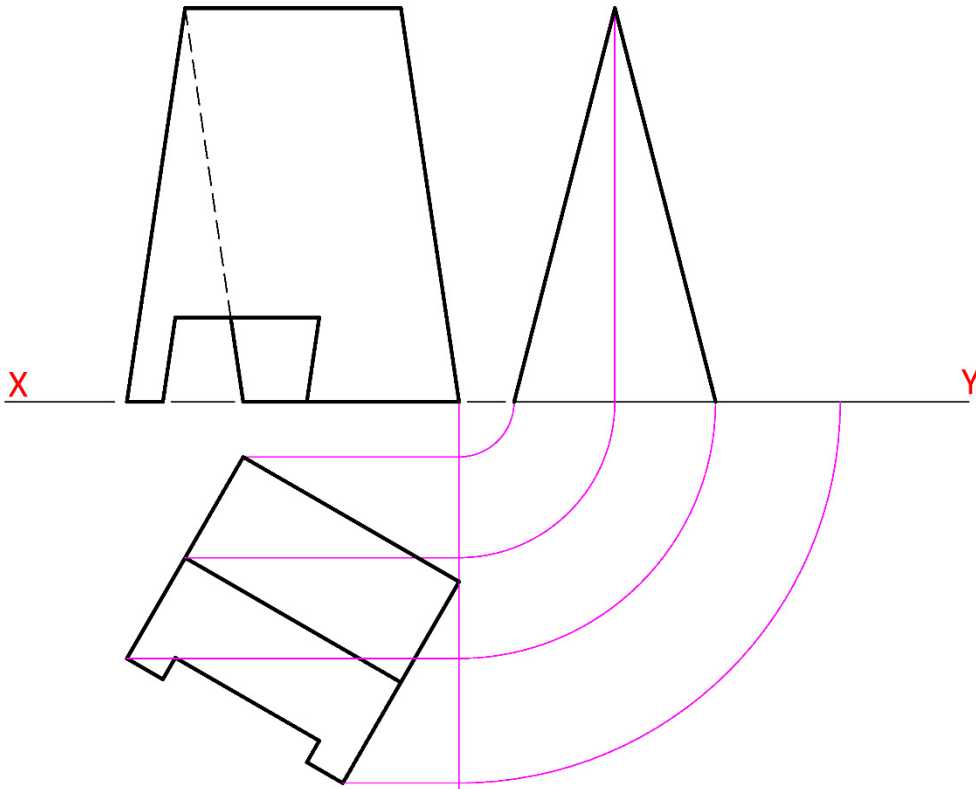
**A-2.** The image below shows a sun lounger. The drawing shows the plan and partially completed perspective view of a similar sun lounger.

Complete the perspective drawing of the sun lounger.



**A-4.** The image below shows a caution sign. The drawing on the right shows the plan, partially completed elevation and partially completed end view of a similar sign.

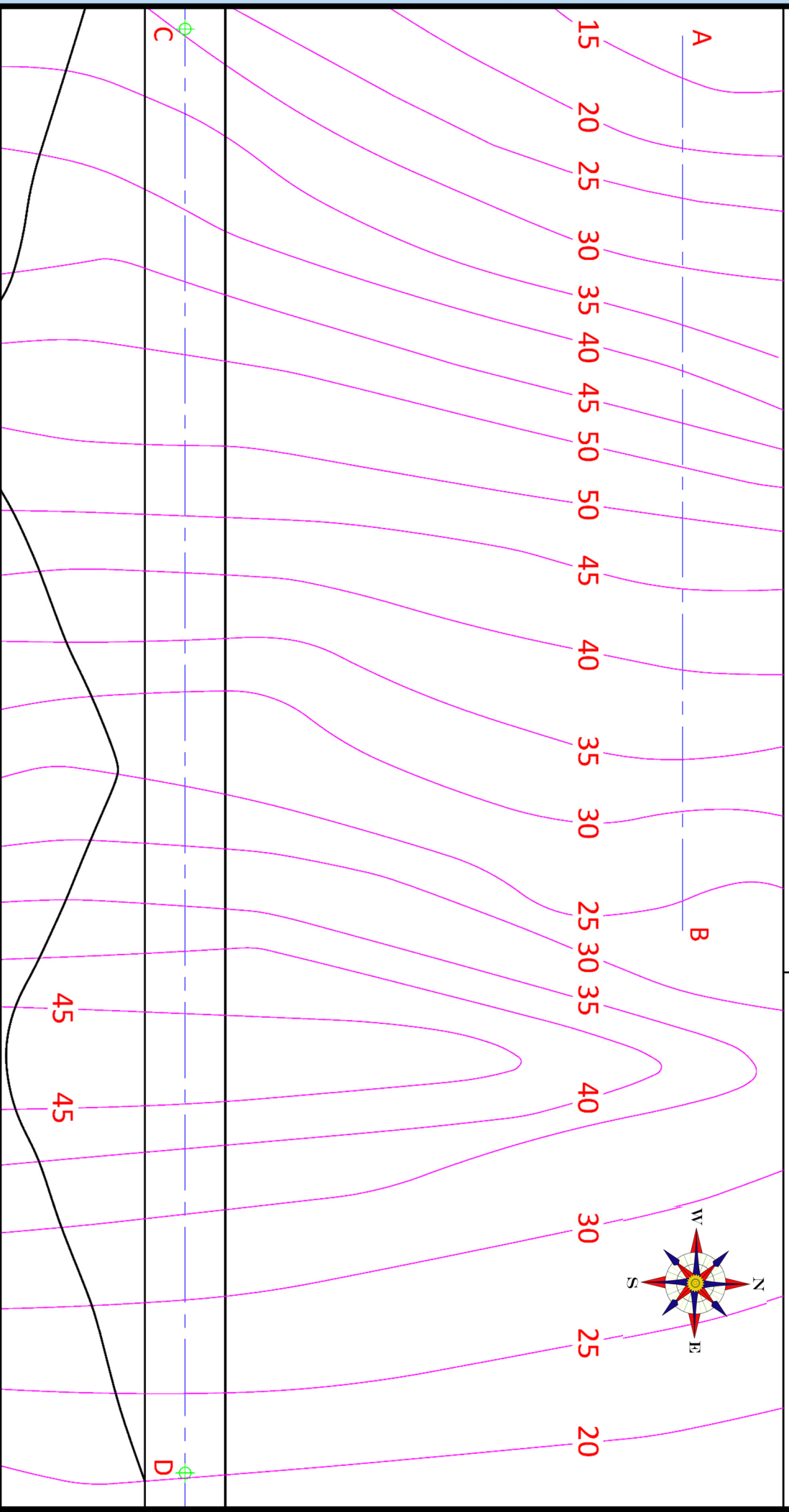
- (a) Complete the elevation.
- (b) Complete the end view.



This Contour Map is part of Section C  
and should only be used for the  
answering of the Geologic Geometry  
Option (Question C-1).

(Scale 1:1000)

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# Coimisiún na Scrúduithe Stáit

## State Examinations Commission

**Leaving Certificate Examination, 2023**

# **Design & Communication Graphics**

**Ordinary Level**

**Section B and C (180 marks)**

**Thursday, 22 June**

**Morning, 9:30 - 12:30**

**This examination is divided into three sections:**

|           |                                     |
|-----------|-------------------------------------|
| SECTION A | (Core - Short Questions)            |
| SECTION B | (Core - Long Questions)             |
| SECTION C | (Applied Graphics - Long Questions) |

- SECTION A**
- Four questions are presented.
  - Answer **any three** on the accompanying A3 examination paper.
  - All questions in Section A carry **20 marks** each.

- SECTION B**
- Three questions are presented.
  - Answer **any two** questions on drawing paper.
  - All questions in Section B carry **60 marks** each.

- SECTION C**
- Five questions are presented.
  - Answer **one** question (i.e. the option you have studied) on drawing paper.
  - All questions in Section C carry **60 marks** each.

**General Instructions:**

- *Construction lines must be shown on all solutions.*
- *The graphics presented are not necessarily drawn to scale and must not be used for scaling purposes.*
- *Write the question number distinctly on the answer paper in Sections B and C.*
- *Work on one side of the drawing paper only.*
- *All dimensions are given in metres or millimetres.*
- *Write your Examination number in the box provided in Section A and on all other sheets used.*

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## SECTION B - Core

Answer **any two** questions from this section on drawing paper.

**B-1.** The image on the right shows an outdoor play area in the shape of a boat.

Fig. B-1 below shows an isometric view of a similar boat.

- (a) Draw an elevation of the boat looking in the direction of the arrow.
- (b) Project a plan from the elevation.
- (c) Draw the auxiliary elevation of the *boat*, projected from the plan, which will include the true shape of surface A.



Scale 1:1

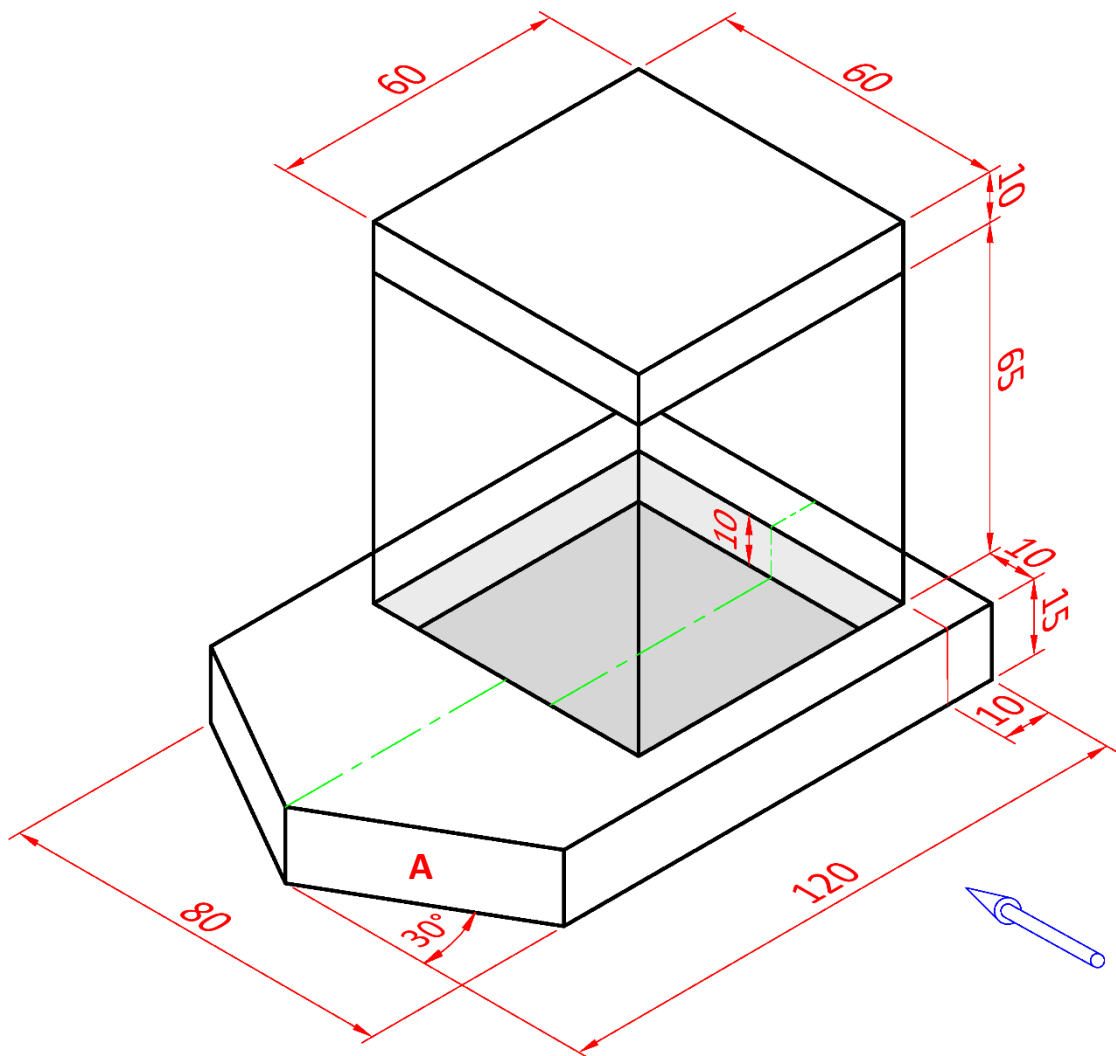


Fig. B-1

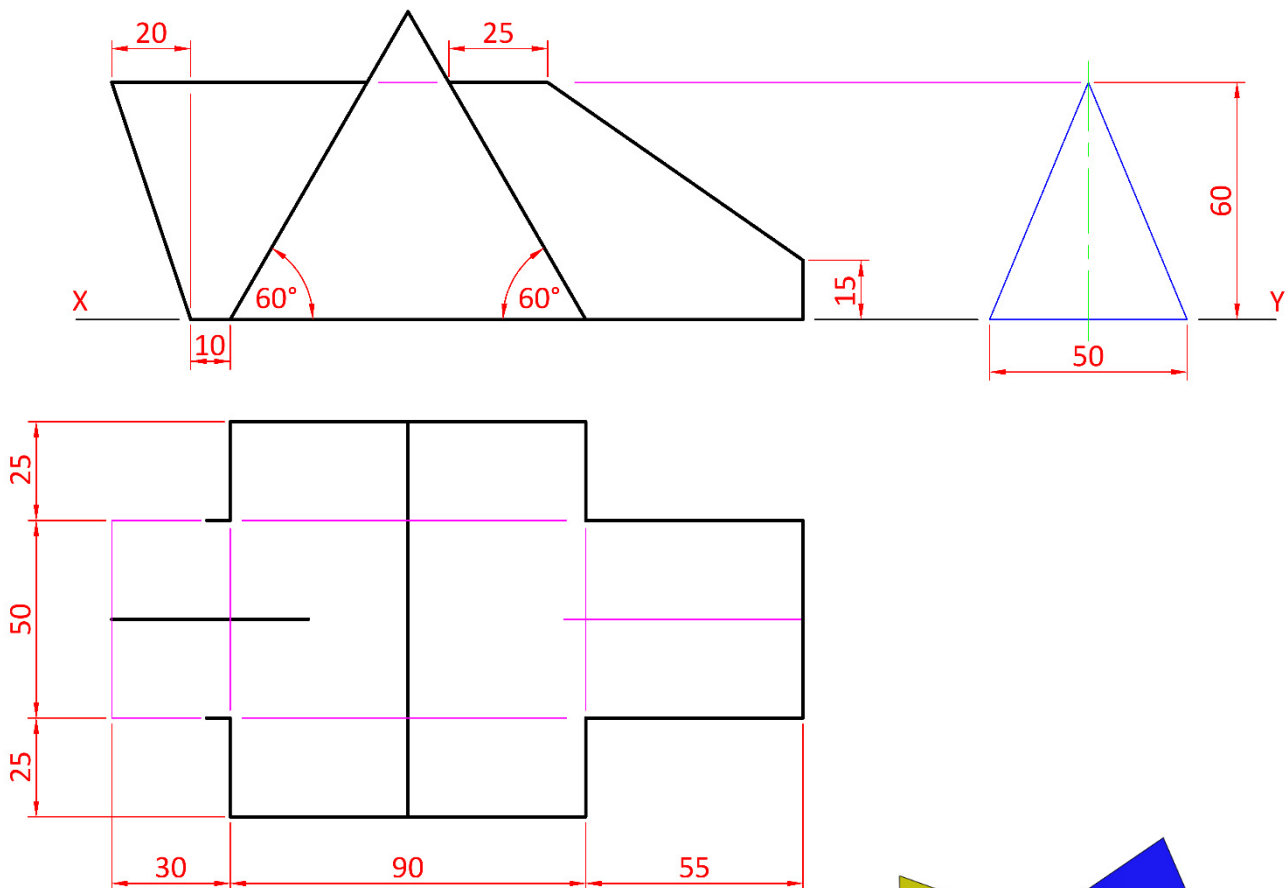
**B-2.** The image on the right shows a modern A-frame house. The house consists of an equilateral triangular prism which is intersected by a second triangular prism.

Fig. B-2 below shows the elevation and incomplete plan of a similar house. The outline profile of the second intersecting prism is also shown on the right below. A 3D graphic is also given.

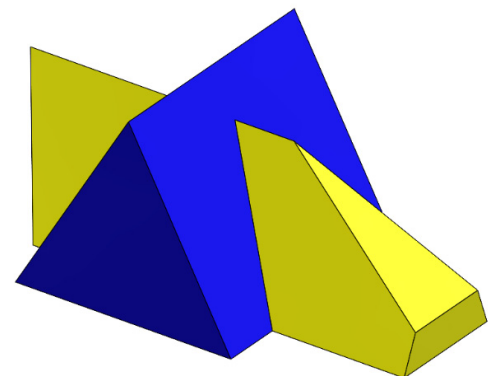


- Draw the given elevation and incomplete plan of the house.
- Complete the plan, showing all lines of interpenetration.
- Draw an end view of the house.

**Scale 1:1**



**Fig. B-2**



**B-3.** The image on the right shows a wooden arbor bench.  
Fig. B-3 below shows an incomplete isometric projection of a similar arbor bench.  
A 3D graphic is also given.

The elevation and plan of the arbor bench are shown in their required positions.

- Draw the given equilateral triangle **abc** and the axonometric axes **X**, **Y**, and **Z**.
- Draw the elevation and plan positioned as shown.
- Draw the axonometric projection of the outline of the arbor bench.
- Complete the axonometric projection of the inner seating area including the semi-circular top.

Scale 1:1

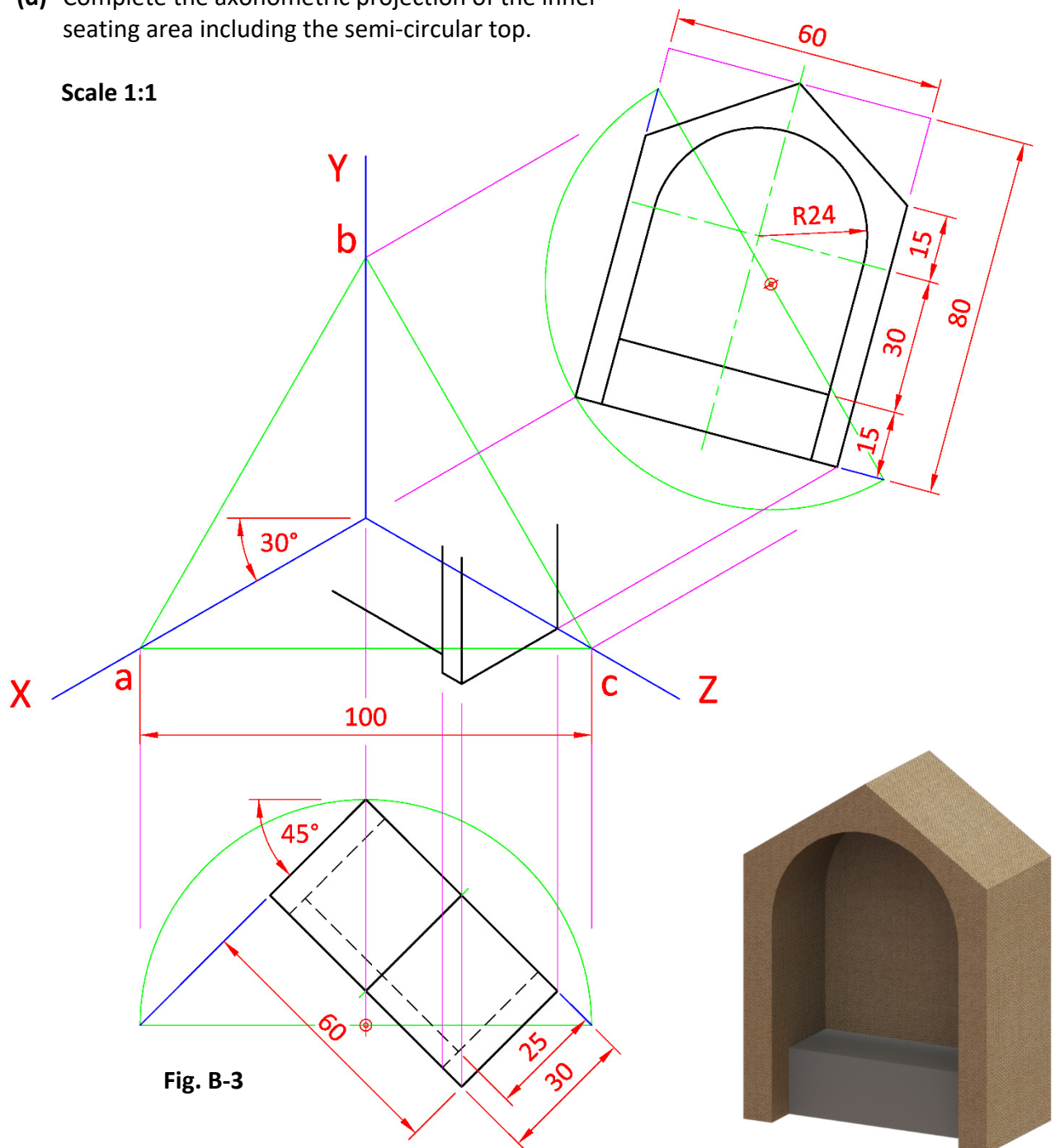


Fig. B-3

## SECTION C - Applied Graphics

Answer **one** question (i.e. the option you have studied)  
from this section on drawing paper.

### Geologic Geometry

- C-1.** The image on the right shows a section of roadway which required cuttings to accommodate it.

The accompanying map, located on the back page of Section A, shows ground contours at five metre vertical intervals.



- (a) On the map supplied, draw a vertical section (profile) on the line **AB**.

- (b) **CD** is the centreline of a proposed roadway which is level at an altitude of 20 m.

Using side slopes of 1 in 1 for the cuttings, complete the earthworks necessary to accommodate the roadway.

**Note:** *The earthworks on the southern side of the roadway have already been completed.*

**Scale 1:1000**



# Structural Forms

- C-2.** The image on the right shows a seating area on a beach which has a canopy based on a hyperbolic paraboloid.

Fig. C-2 below shows the projections of a similar hyperbolic paraboloid surface.

- (a) Draw the plan and elevation of the given hyperbolic paraboloid surface.
- (b) Project an end view of the surface.



Scale 1:1

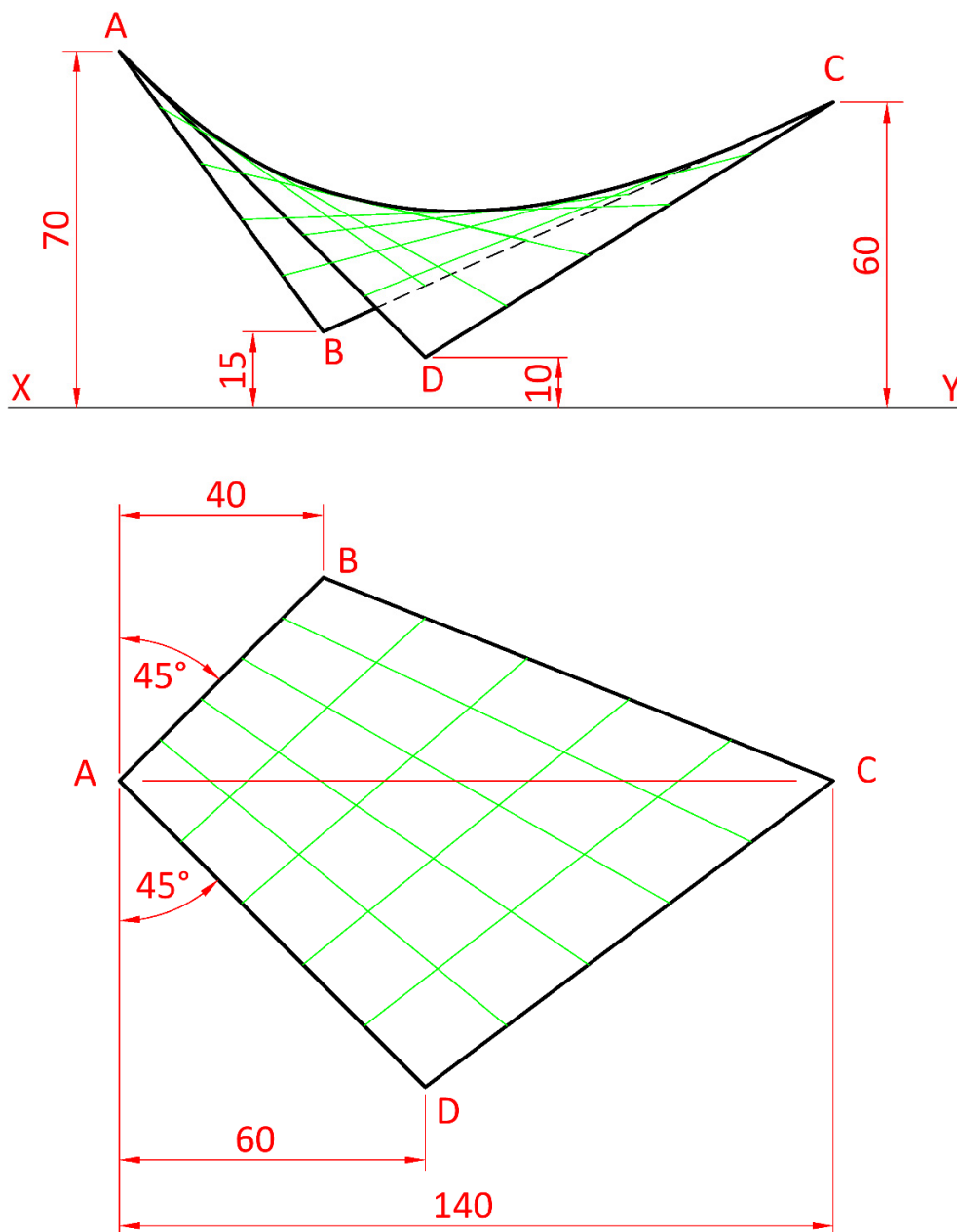


Fig. C-2

# Surface Geometry

**C-3.** The image on the right shows a storage box for BIC biro.

The projections of a similar storage box are shown in Fig. C-3 below. A 3D graphic is also given.

- (a) Draw the given elevation and end view of the storage box.
- (b) Project a plan.
- (c) Draw a one-piece surface development of the storage box.

Scale 1:1

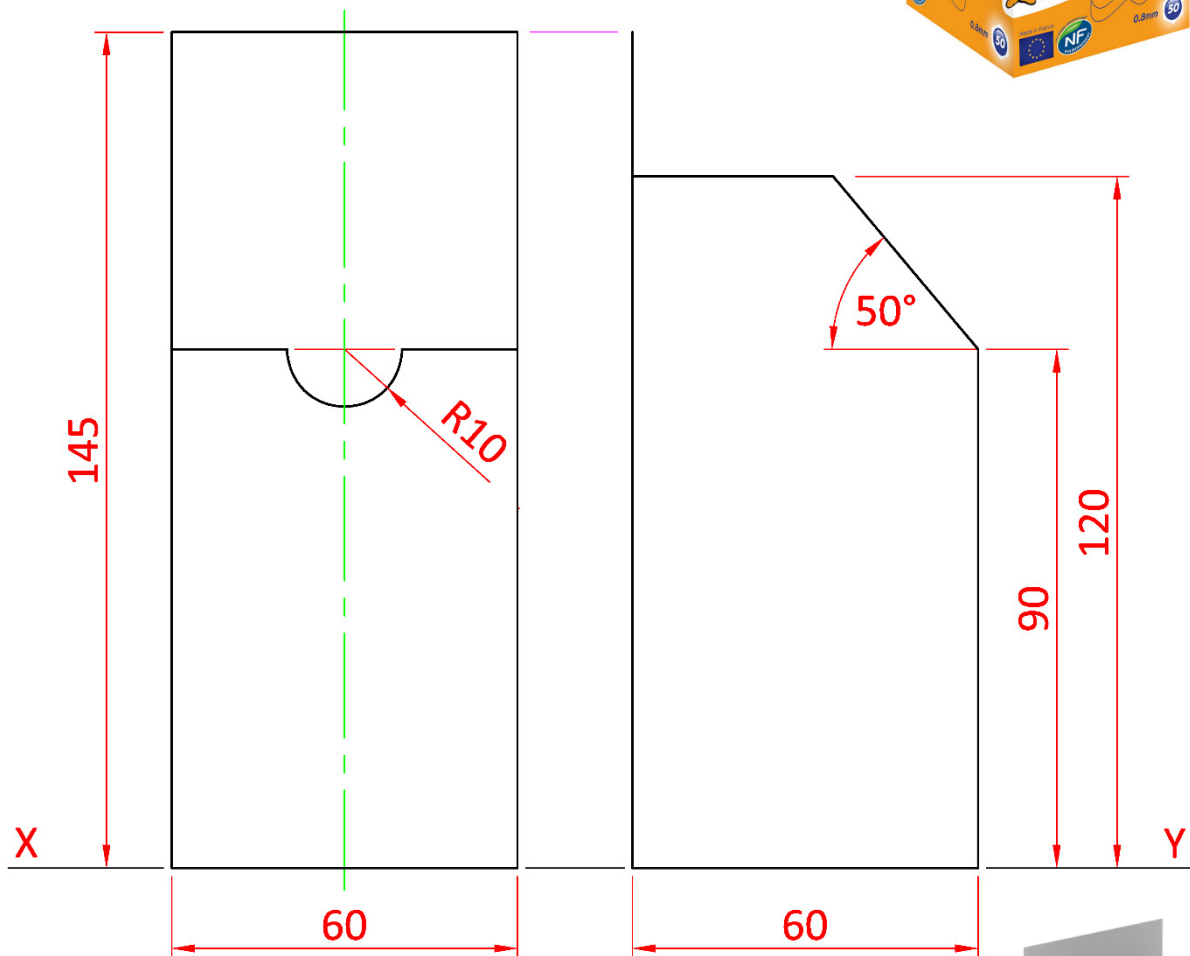


Fig. C-3



# Dynamic Mechanisms

- C-4. (a)** The image below shows an airport control tower. The tower staircase is based on a helix.

Fig. C-4 opposite shows the projections of the tower and partially completed helix.

- Draw the given elevation and plan of the tower.
- Complete the projections of the helix which moves in a clockwise direction from point **A** on the base to point **B** in one revolution.

Scale 1:1

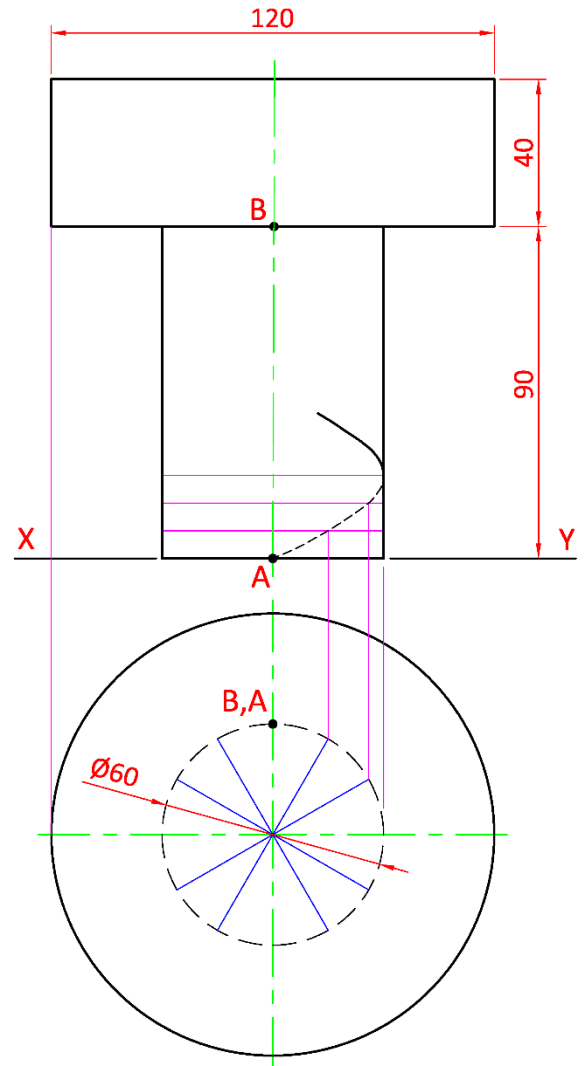


Fig. C-4

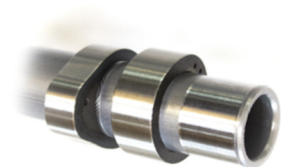
- (b)** A cam from the fuel system of a DAF truck is shown.

The cam imparts the following motion to the follower:

- $0^\circ$  to  $90^\circ$  Rise 60 mm with uniform velocity
- $90^\circ$  to  $180^\circ$  Dwell
- $180^\circ$  to  $360^\circ$  Fall 60 mm with simple harmonic motion.

Draw the displacement diagram, using a distance of 15 mm to represent each  $30^\circ$  interval.

**Note:** It is not necessary to draw the cam profile.



# Assemblies

**C-5.** The image on the right shows a lava lamp which is often a colourful feature in a young person's room.

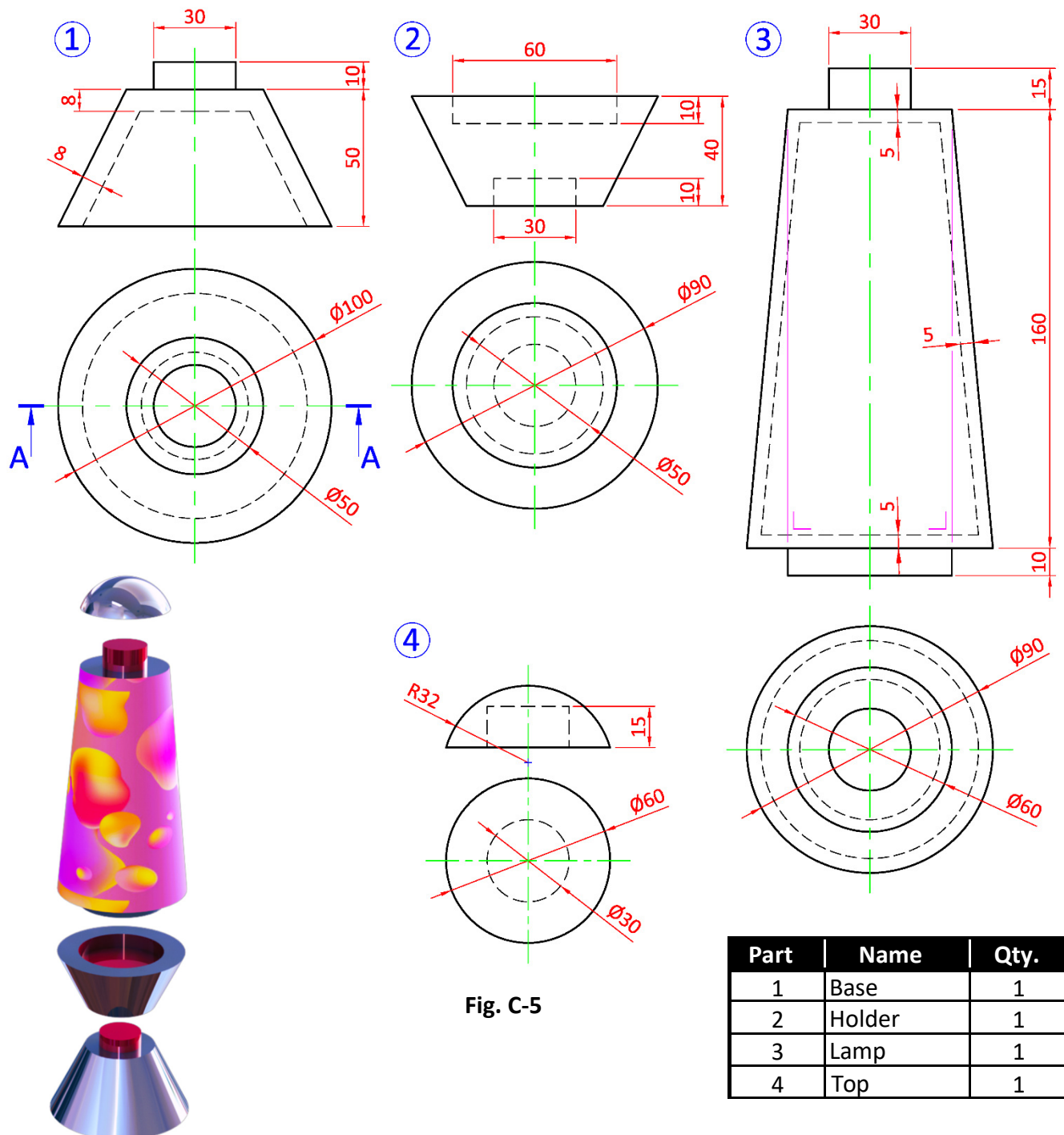
Details of a similar lava lamp are shown in Fig. C-5 below.

A parts list and a 3D graphic of the lava lamp are also shown.

Draw the **sectional elevation A-A** of the assembled lava lamp.

(Any omitted dimensions may be estimated.)

Scale 1:1





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