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This Graphical Communication resource pack is divided into three parts.

Part 1 offers:

a) concrete examples of worksheets that can be used for classwork, homework, or tests;

b) 1:1 scaled solutions to these worksheets;

c) step-by-step solutions to the same worksheets, that can be used for peer and self-assessment;

d) teachers' marking schemes that can also be used for peer and self-assessment; and

e) students' self-evaluation sheets.

Note: The marking schemes are in line with the step-by-step solutions. In case of peer or self-assessment, students can follow these steps to help them mark theirs or each other's work.

Regarding the comments section within each marking scheme, teachers can use this for feedback. There is also a similar comments section within the students' self-evaluation sheets. Students on their part can use this to indicate any problems encountered, or how they have responded to previous feedback in their work.

Part 2 offers concrete ideas for tasks, linked with various assessment methods.

Part 3 offers a Taxonomy which is designed for Graphical Communication. This taxonomy can assist teachers plan lessons according to learning goals and choose the best methods with which to assess that which has been learnt.

A rubric to help assess oral presentations is also being offered within part 3. The simple design of this rubric allows it to be used by both teachers and students alike. However, teachers must make sure that students understand well the assessment criteria and the scoring scales before embarking on any peer assessment.

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Part 1

Graphical Communication resource pack

Worksheets, Answer sheets, Self-evaluation sheets, Marking schemes, and Step-by-step solutions.

This first part of the resource pack presents fifteen different topics chosen from the five subject foci for Graphical Communication. For each topic, five different resources are being presented. These are the following:

1). a worksheet;

2). a full-scale answer sheet;

3). a self-evaluation sheet;

4). a marking scheme;

5). a step-by-step solution.

These worksheets may be used as classwork, homework, revision exercise, or test. The full-scale answer sheet will help students understand how the design problem needs to look when properly solved.

The self-evaluation sheet is for students to indicate how they feel with regard to the work at hand. Every sheet has been divided into four different learning outcomes, with four different levels of attainment paired with emoticons (cartoon expressions). There is also a space where students can comment, either on the work at hand or else in reply to previous teachers' comments.

The marking scheme is primarily for teachers' use but can be used by students as well. Each one has been divided into several sections according to each design problem. Step-by-step solutions have also been provided for students. These match with every step or section of the teachers' marking scheme. This will help students understand how every design problem needs to be tackled and how marks are distributed across each question. This aspect will aid students in peer and self-assessment but will also serve them as notes for their studies.

Teachers can take these sheets as templates and design their own with other topics they intend to cover.

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Worksheets

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1st Angle Orthographic Projection - Coffee Table

Use the information from the Isometric drawing in Fig. 1 to complete the Orthographic projection below, by:

- adding the **Front** elevation and **Plan**;
- adding the symbol of first angle orthographic projection in the space provided;
- rendering the sketch of the coffee table using colour (Material - Wood).

Note: Material thickness is 10mm throughout. (24 marks)

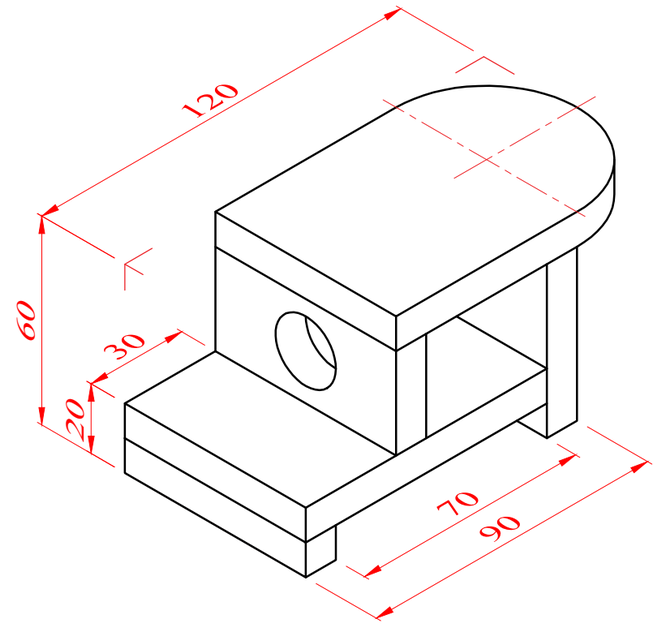
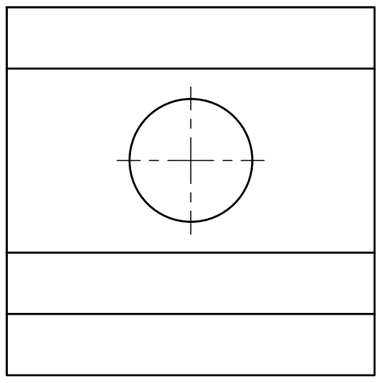
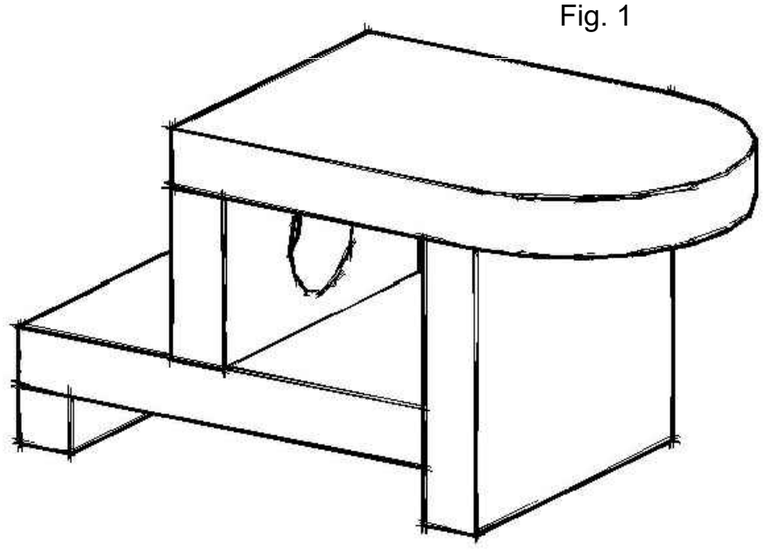


Fig. 1



FRONT ELEVATION



LEFT END ELEVATION

SKETCH

PLAN

SYMBOL for 1st ANGLE

DATE:	TITLE: WORKSHEET	NAME:	CLASS:

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Pictograms and Graphs - Supermarket Items

A set of **General information** signs are needed for a supermarket. Three of these signs have already been drawn; those for the drinks, fish, and meat sections.

a) You are required to provide three more signs; those for the **vegetables**, **bread**, and **pasta** sections. Use the space provided for preparatory sketches.

b) Draw a **Bar Graph** representing the amount of items sold in a week from the same supermarket. Use the information from the table provided below. Colour the bars in your graph.

(18 marks)

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500

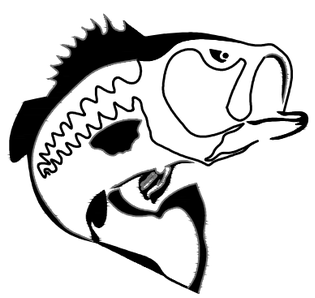
Space for preparatory sketches

DRINKS

VEGETABLES

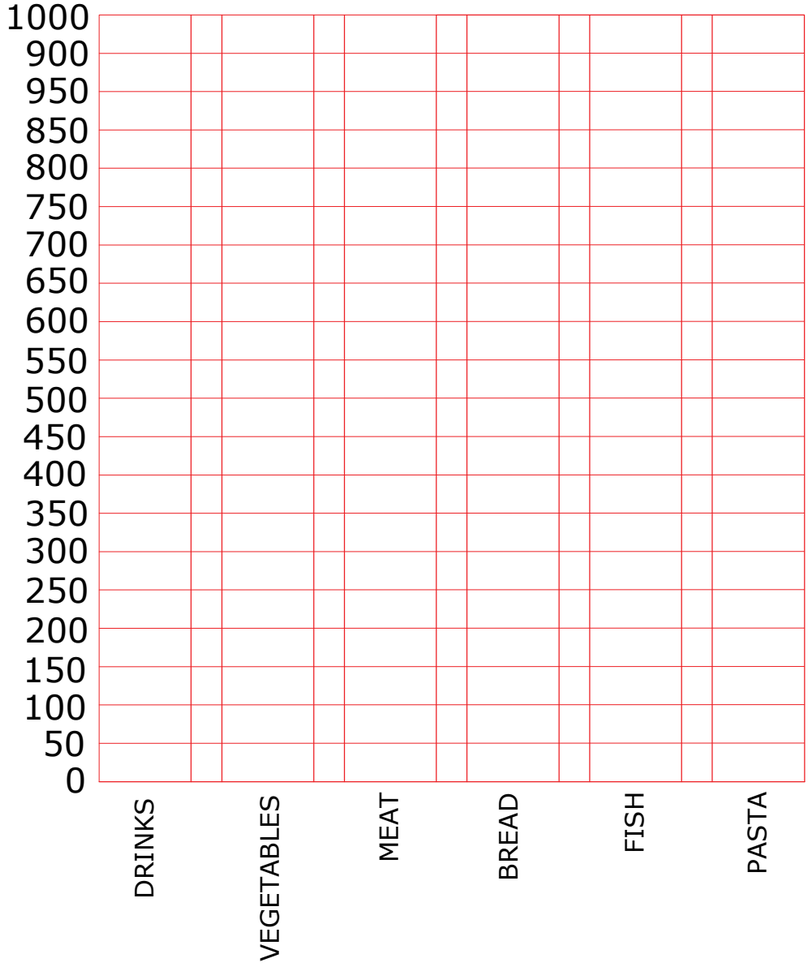
MEAT

BREAD



FISH

PASTA



DATE:	TITLE: WORK SHEET	NAME:	CLASS:

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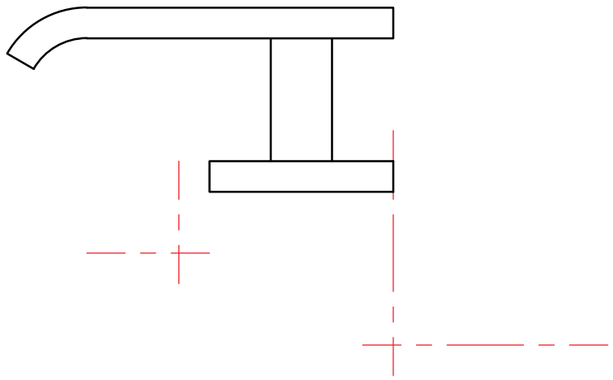
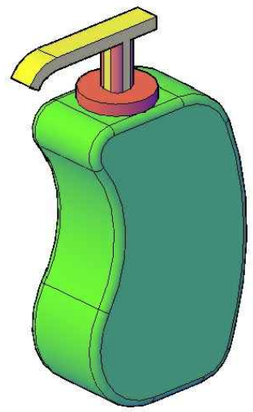
Circles in contact - Soap dispenser

Fig. 1 shows the profile of a soap dispenser. This profile is produced using the principles of **circles in contact**. Use the given measurements to complete the drawing that has been started below.

(18marks)





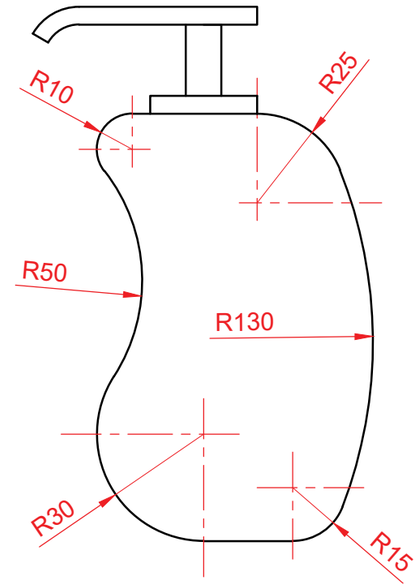
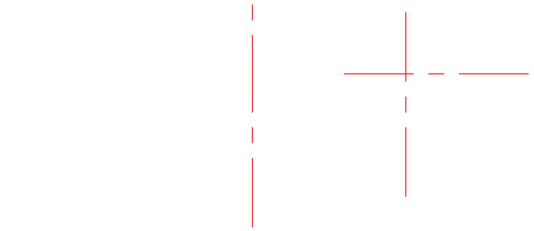


Fig. 1



DATE:	TITLE: WORKSHEET	NAME:	CLASS:

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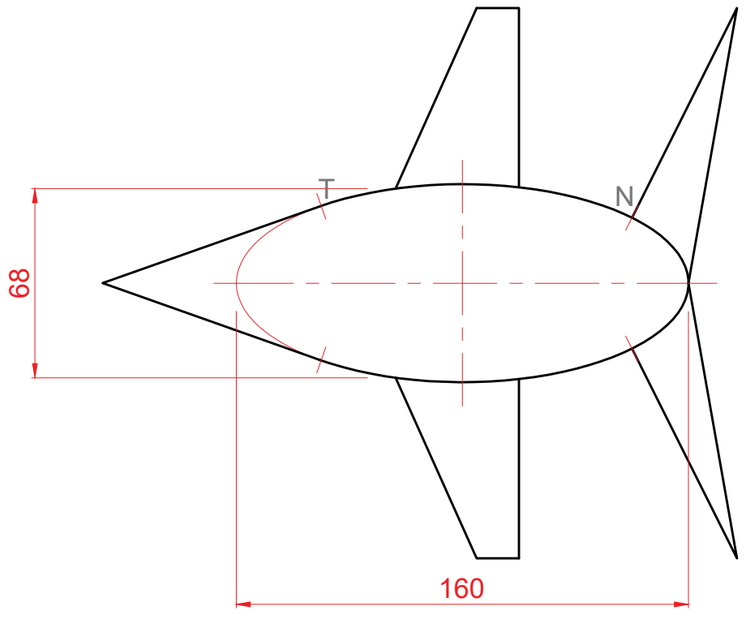
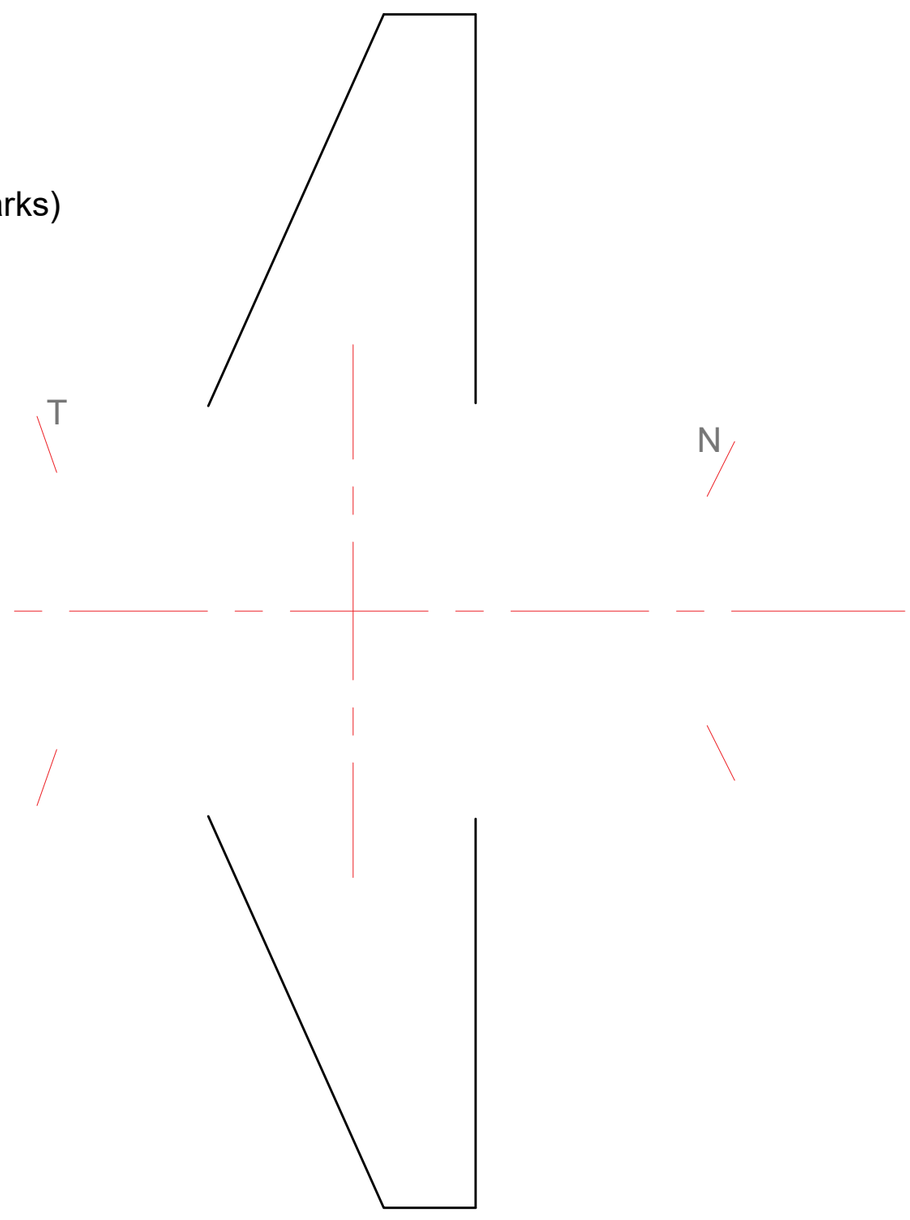
Ellipse - Plane

A surveillance plane used by the military has its main body in the shape of an **Ellipse**, with Major Axis **160mm** and Minor Axis **68mm**.

a) Draw the Ellipse on the given centre lines;
b) Construct a Tangent at point T;
c) Construct a Normal at point N;
d) Reflect the Tangent and Normal horizontally;
e) Complete the tail of the drone according to the information given below.

(18 marks)





DATE:	TITLE: WORKSHEET	NAME:	CLASS:

Truncated Cone - Pharaoh's hat

Fig. 1 shows the profile of an Egyptian pharaoh (king) wearing a hat. This hat is in the shape of an inverted truncated cone. The drawings below show the completed Front elevation and an incomplete Plan of this hat.

a) Complete the **Plan**.
b) Draw the full **Development** of the hat, starting on the given generator A0 and working clockwise.

(20 marks)

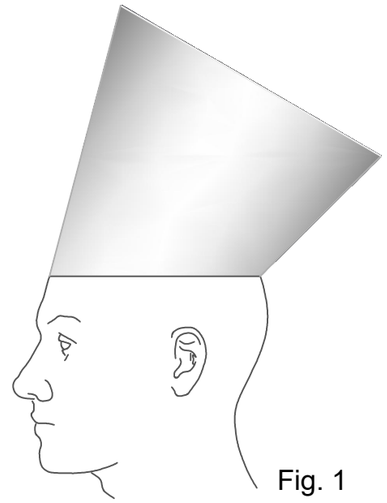
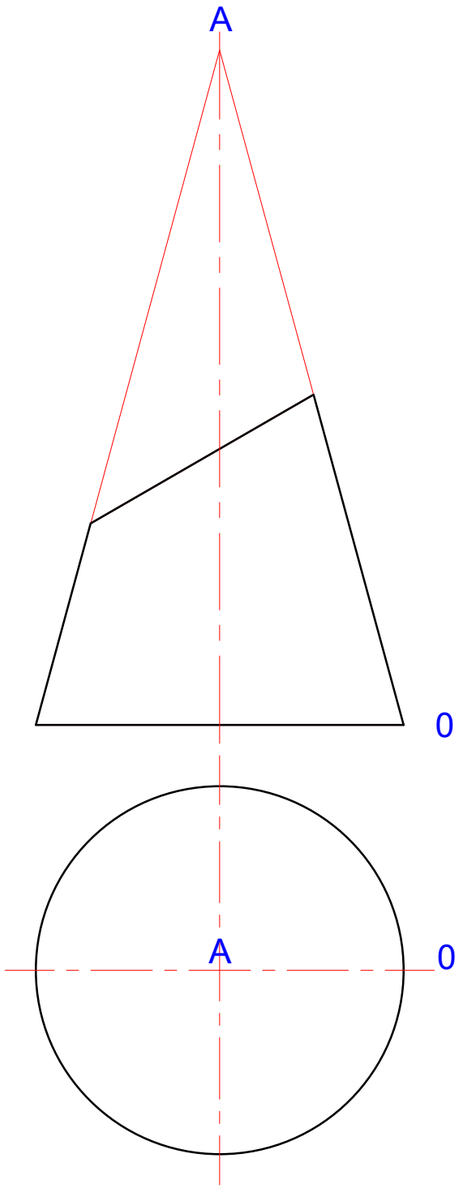
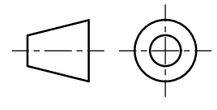


Fig. 1





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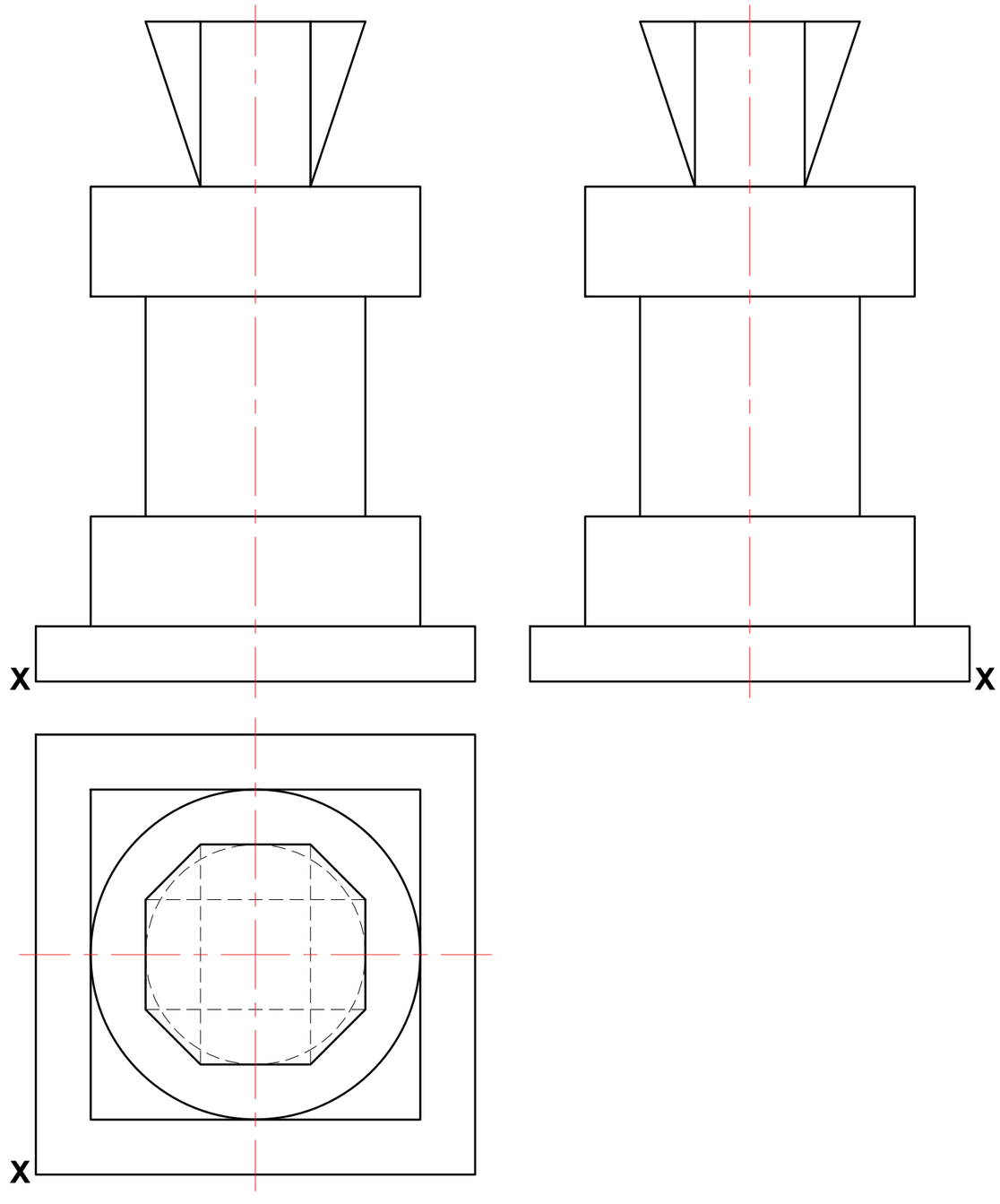
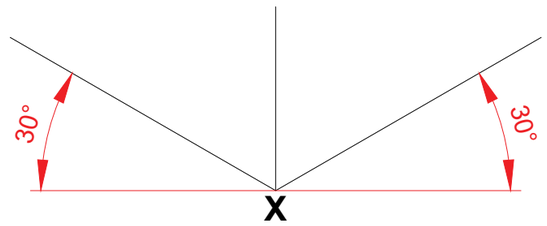
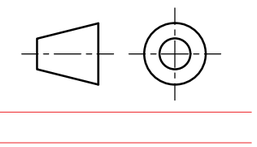
Isometric Projection - Trophy

Three views of a trophy that is awarded to the best chess player of the year is shown below. On the start lines given, produce an Isometric drawing of this trophy. Take the measurements directly from the orthographic views. Place corner X at the lowest point in your drawing. Also state the type of orthographic projection being used.

(24 marks)





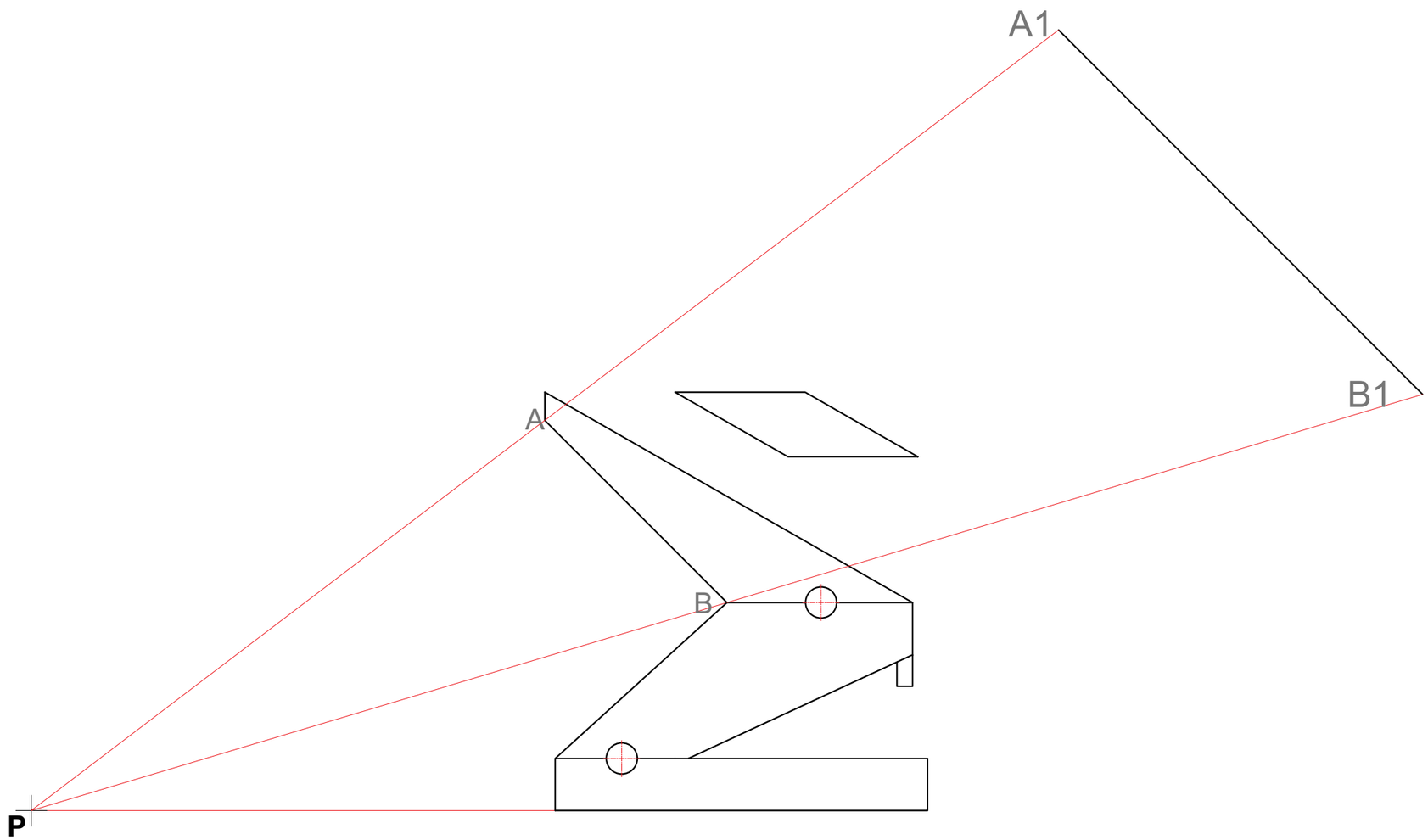


DATE:	TITLE: WORKSHEET	NAME:	CLASS:

Polar Enlargement - Paper Puncher

Enlarge the paper puncher logo given below using point **P** as the Pole. The scale to which the drawing needs to be enlarged is set by line **A-B** that is given enlarged to **A1-B1**

(20 marks)

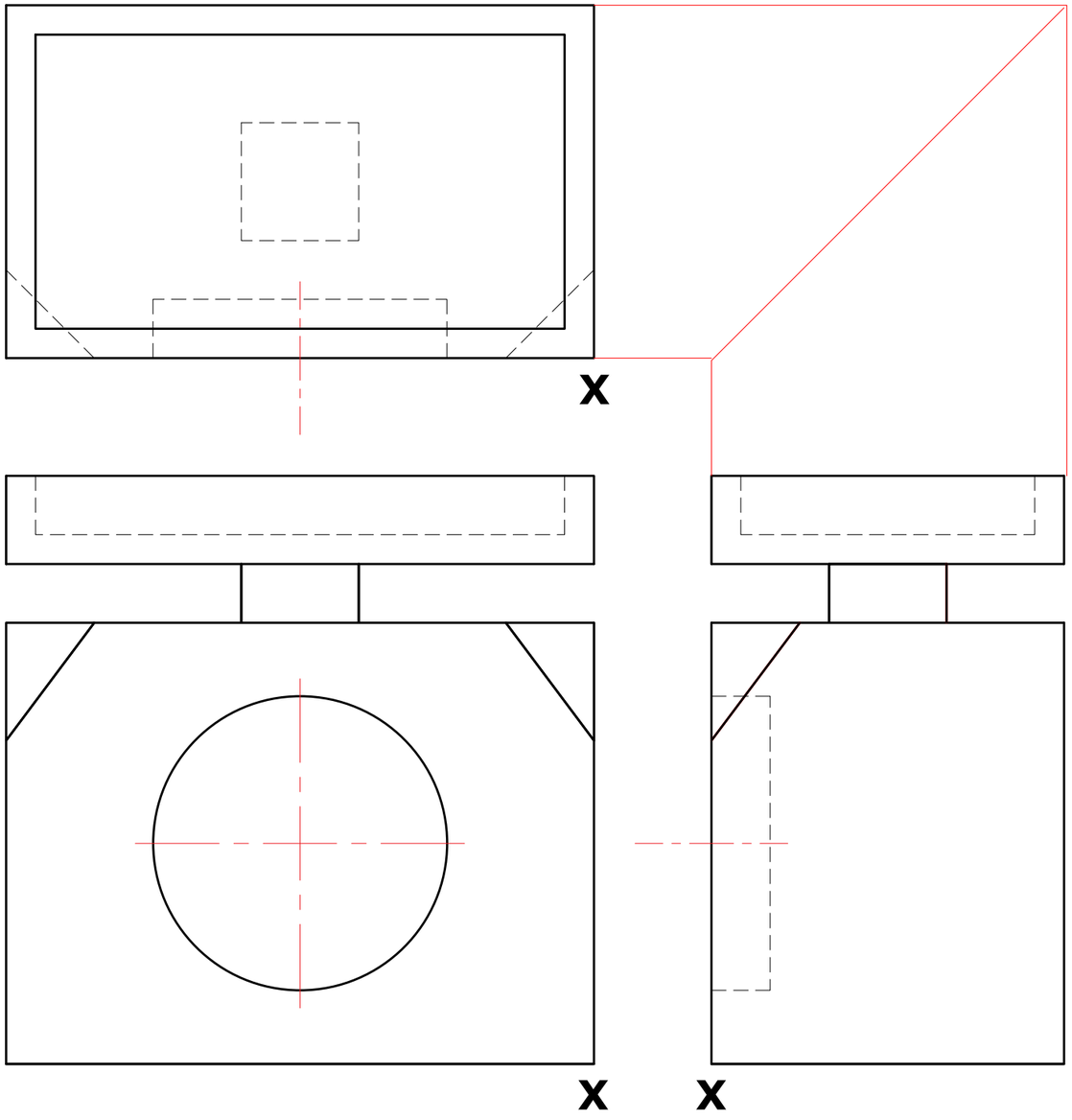


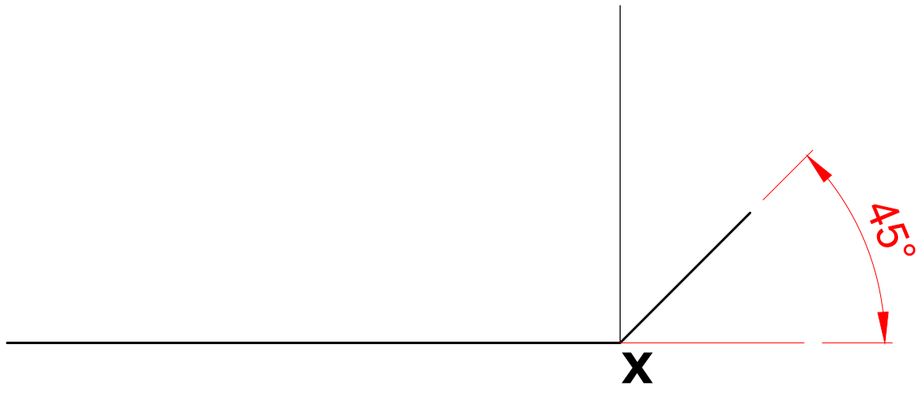
DATE:	TITLE: WORKSHEET	NAME:	CLASS:

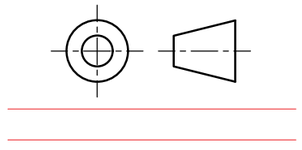
Cabinet Oblique - Kitchen Scales

The Orthographic projection below shows three views of a kitchen scales. Take the measurements directly from these views to draw a **cabinet oblique** drawing of the same scales, placing corner **X** where indicated. Identify the type of orthographic projection being used.

(18 marks)







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Sectioning - Support station

Fig. 1 shows a pictorial drawing of a cast iron support station. The **right End elevation**, **Plan**, and an outline of the **sectional Front elevation** are given below.

a. Complete the sectional Front elevation on cutting plane **X-X**.

b. Label your drawing accordingly.

c. Render the sketch (cast iron).

(16 marks)

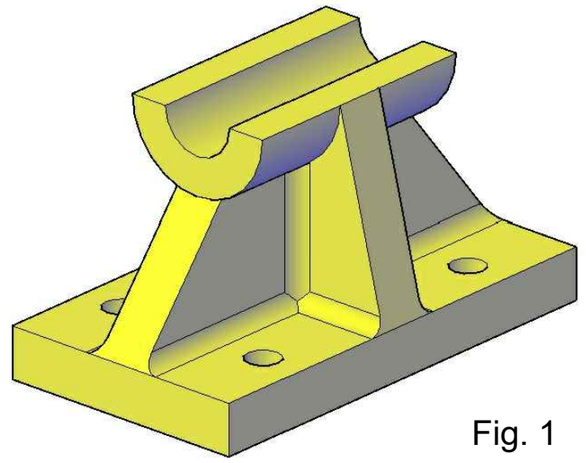
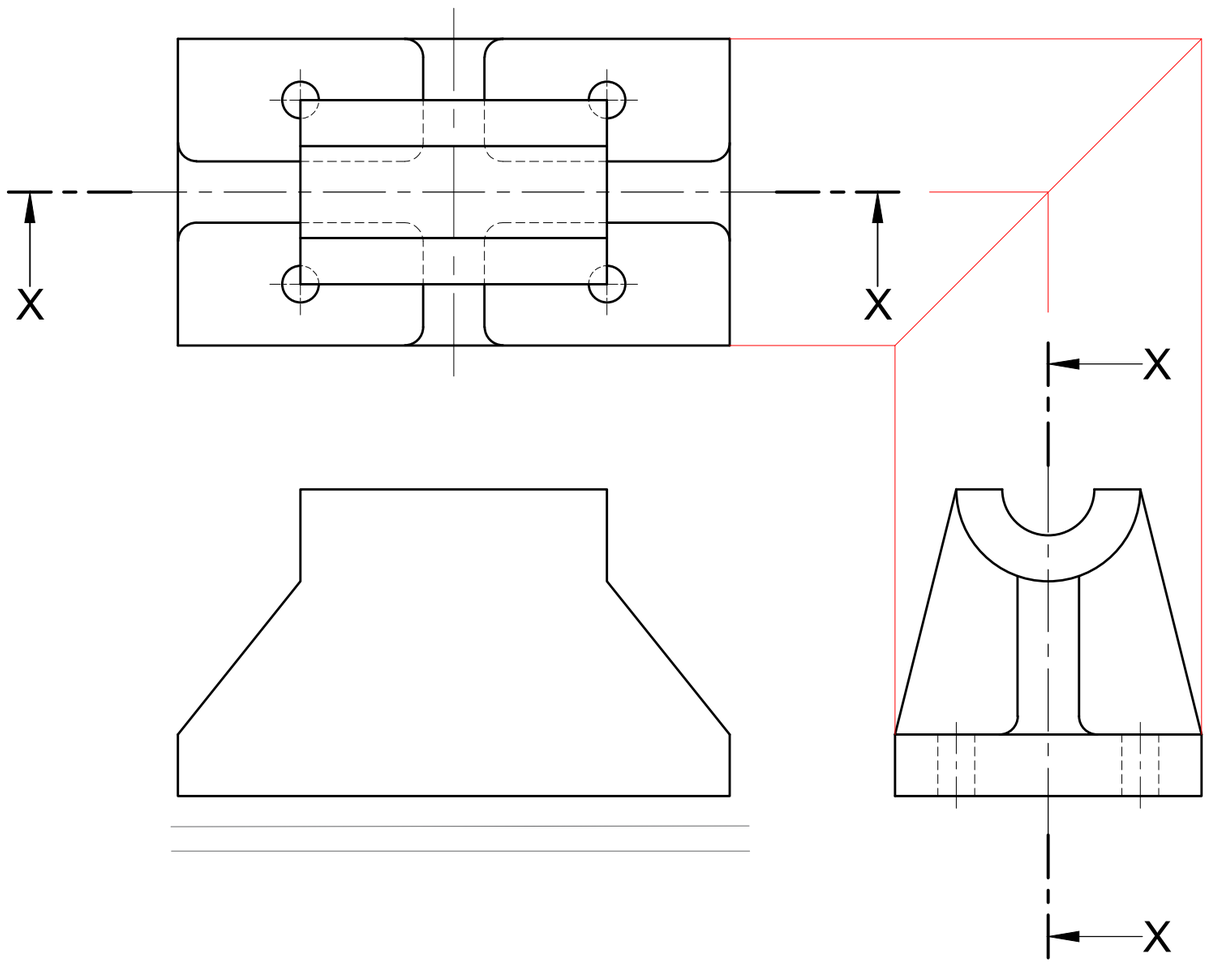
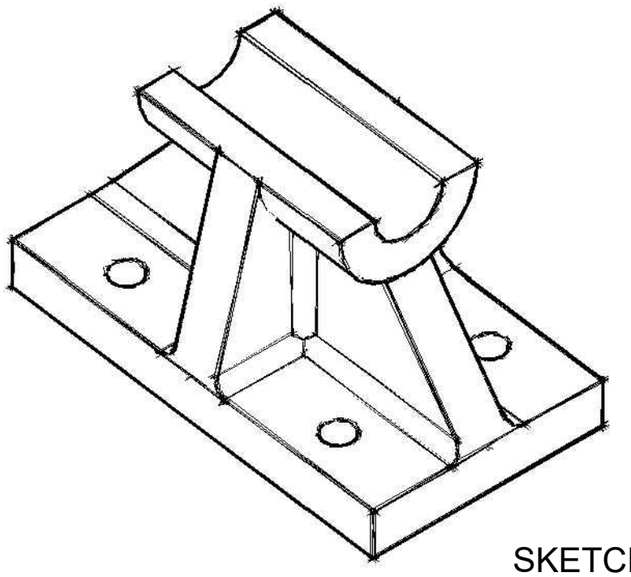


Fig. 1





SKETCH

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Two point Perspective - Stage and Podium

Turn the Isometric drawing of the stage and podium shown in Fig. 1 into a **2-point perspective** drawing. Use the starting corner **FC** and the Vanishing points **(Vp1)** and **(Vp2)** provided.

(18 marks)

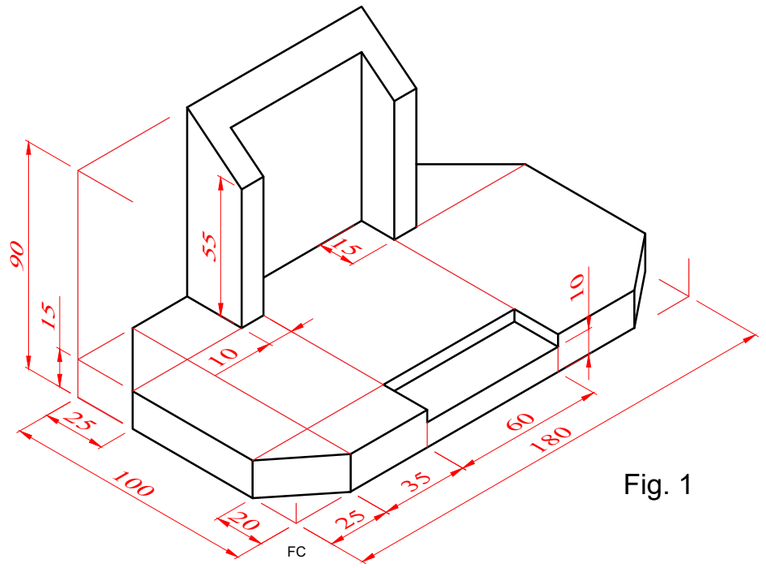
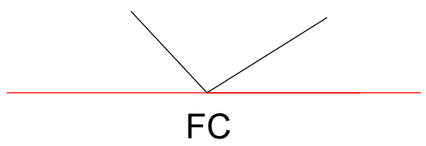


Fig. 1

Vp1

Vp2



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Computer Graphics - Castle

The following computer programme has been written to create the image of a castle for a new mobile application. Use the following information to produce this image on the provided 1000 X 1000 grid.

(16 marks)

DATA: A = 100; B = 200; C = 300; D = 400;
E = 500; F = 600; G = 700; H = 800;
I = 900; J = 1000.

ACI 7: Move A,H; Draw A,I; Draw B,I; Draw B,H; Draw C,H; Draw C,I; Draw D,I; Draw D,H; Draw E,H; Draw E,I, Draw F,I; Draw F,H; Draw E,G; Draw E,F; Draw F,F; Draw F,G; Draw G,G; Draw G,F; Draw H,F; Draw H,G; Draw I,G; Draw I,A; Draw B,A; Draw B,G; Draw A,H:

ACI 1: Move C,B; Draw C,E; Draw D,E; Draw D,B; Draw C,B:

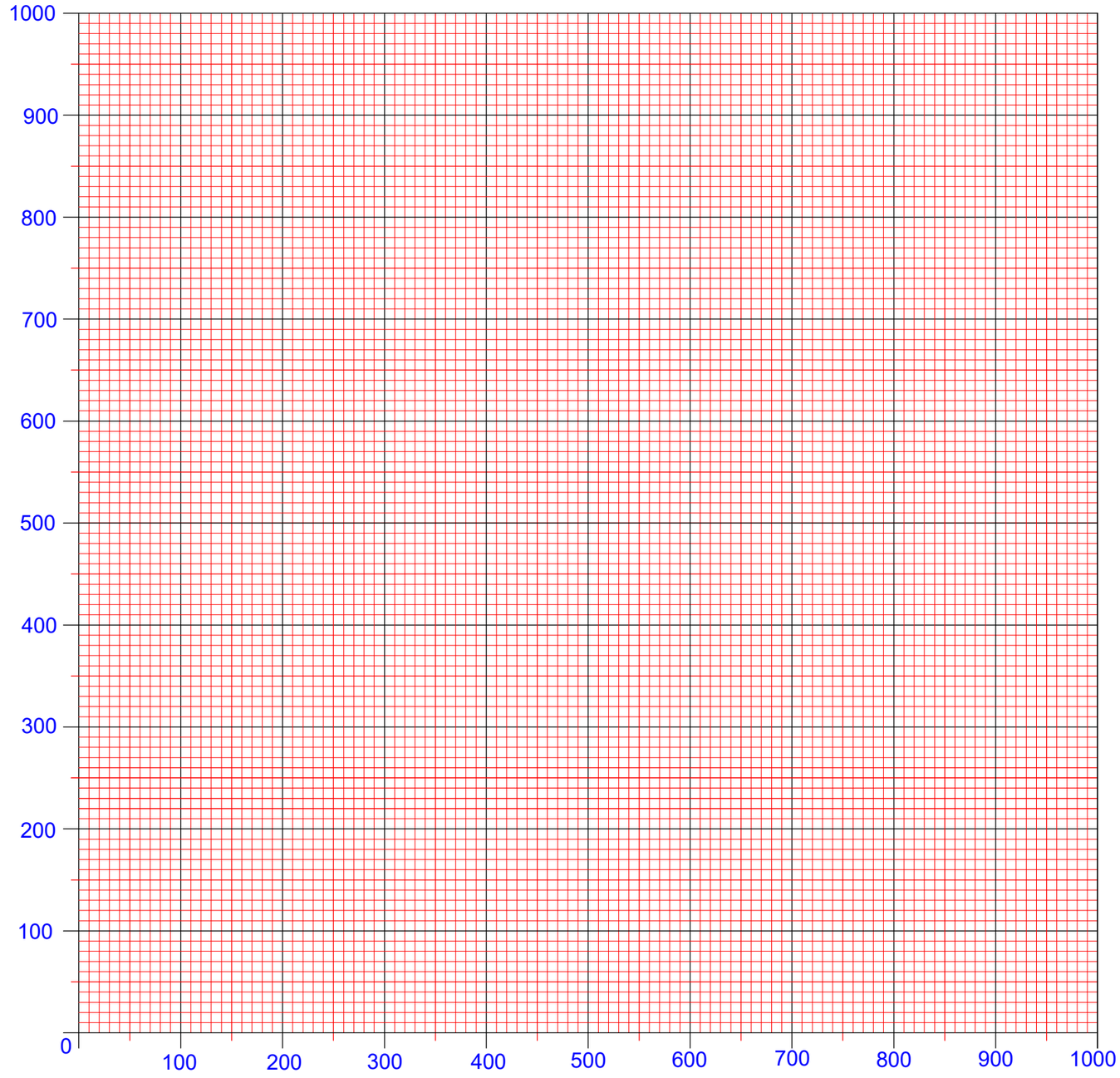
ACI 1: Move C,F; Draw C,G; Draw D,G; Draw D,F; Draw C,F:

ACI 5: Move E,A; Draw E,C; Draw F,D; Draw G,D; Draw H,C; Draw H,A:

ACI 3: Move F,A; Draw F,C; Draw G,C; Draw G,A:

The computer responds to the following colour commands:

ACI 7: Black
ACI 1: Red
ACI 5: Blue
ACI 3: Green



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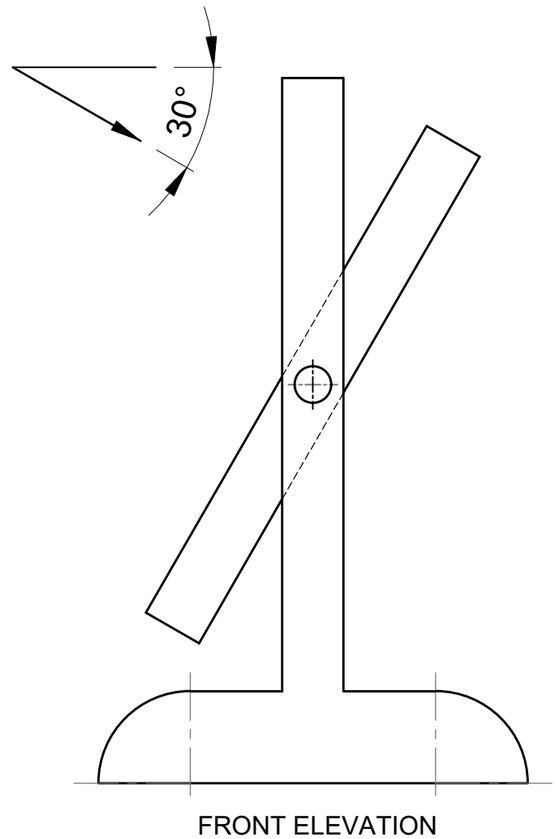
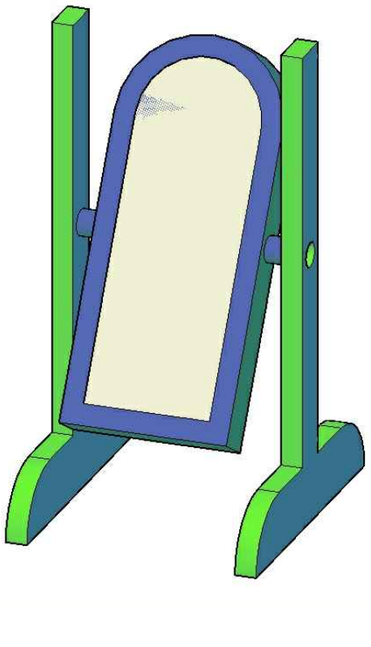
Auxiliary views - Free-standing mirror

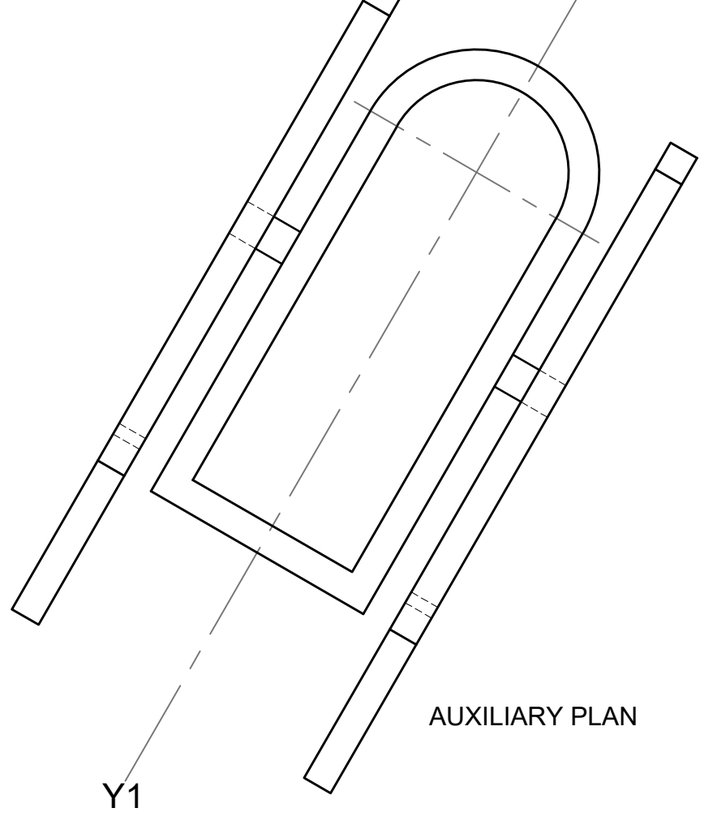
A **Front elevation** and an **Auxiliary plan** of a free-standing mirror are given. Use the information from the two views to project an orthographic plan on X-Y.

(24 marks)

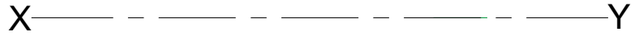


FRONT ELEVATION

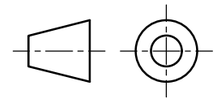




AUXILIARY PLAN



PLAN



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Intersection of solids - Reservoir

Fig. 1 shows the pictorial drawing of a reservoir. The central part of this reservoir is composed of two cylinders intersecting each other perpendicularly. In the Orthographic projection below, the complete **End** elevation, the **Plan,** and an **incomplete Front** elevation are given.

a) Complete the **Front** elevation by constructing the intersection line that results between the two cylinders.

b) Construct a full **development** of the vertical cylinder on the base line ABCDA.

(18 marks)

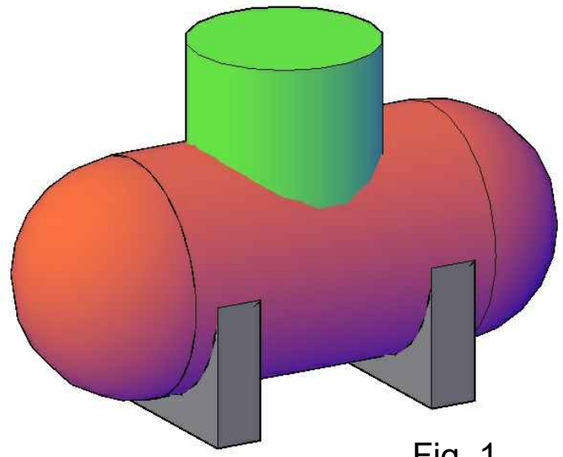
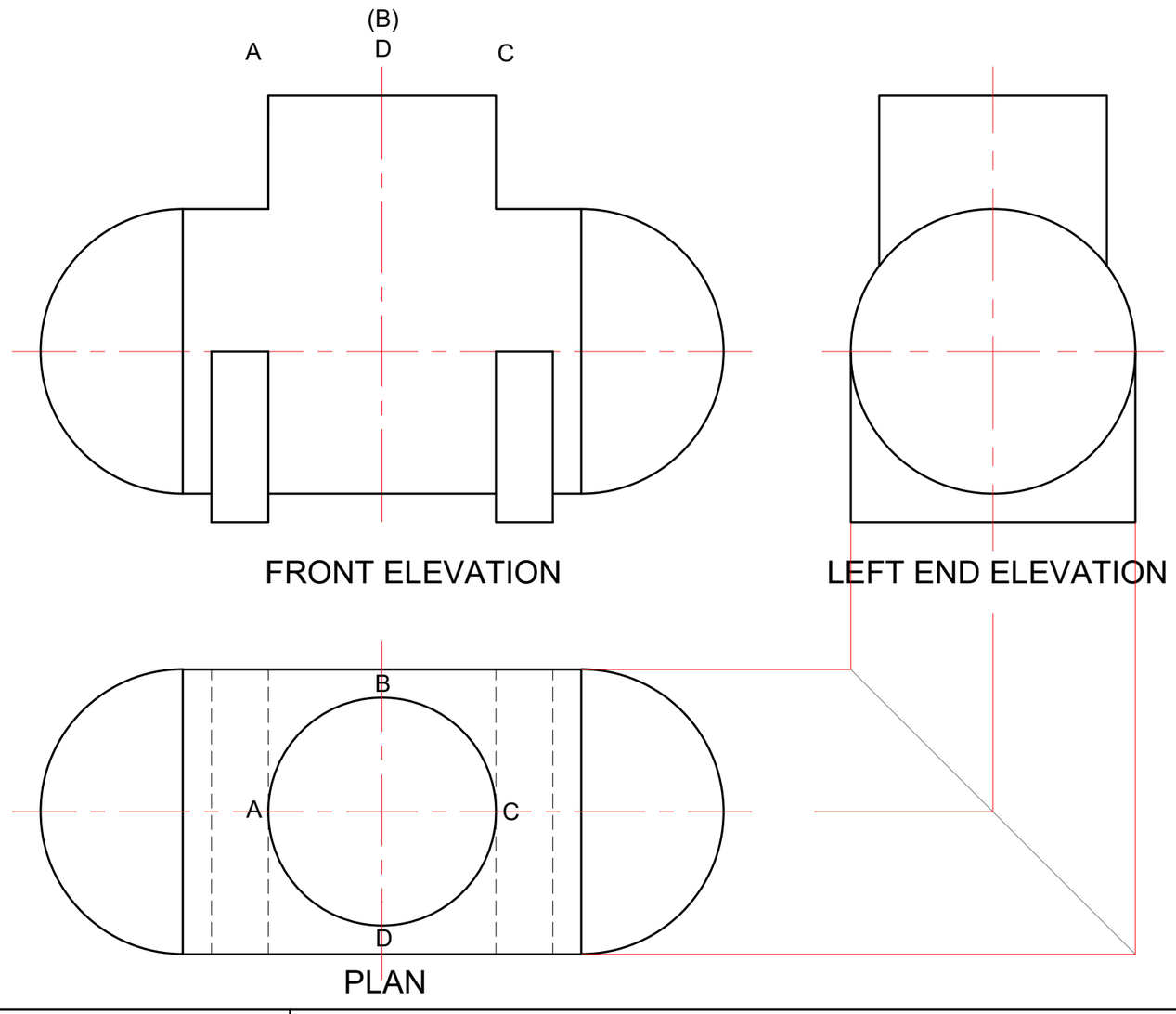
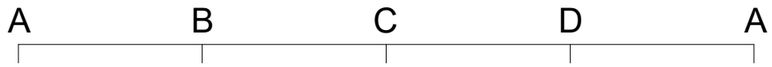
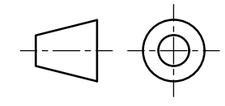


Fig. 1





DEVELOPMENT



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Assembly drawing - Toy Helicopter

Fig. 1 shows an exploded pictorial view of a toy helicopter.

In the space below, draw a well-proportioned **assembled** 3D freehand drawing of this toy. Colour and shade your drawing using vibrant colours.

(18 marks)

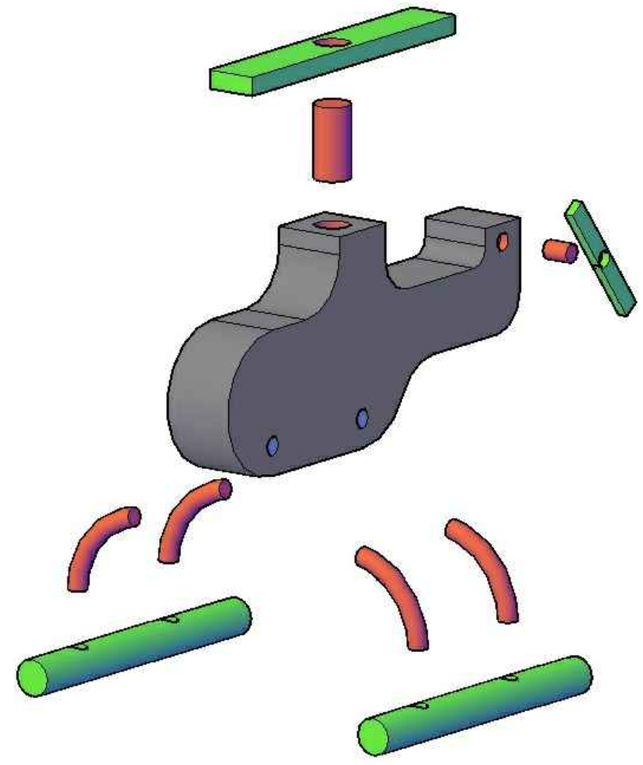

Fig. 1

DATE:	TITLE: WORKSHEET	NAME:	CLASS:

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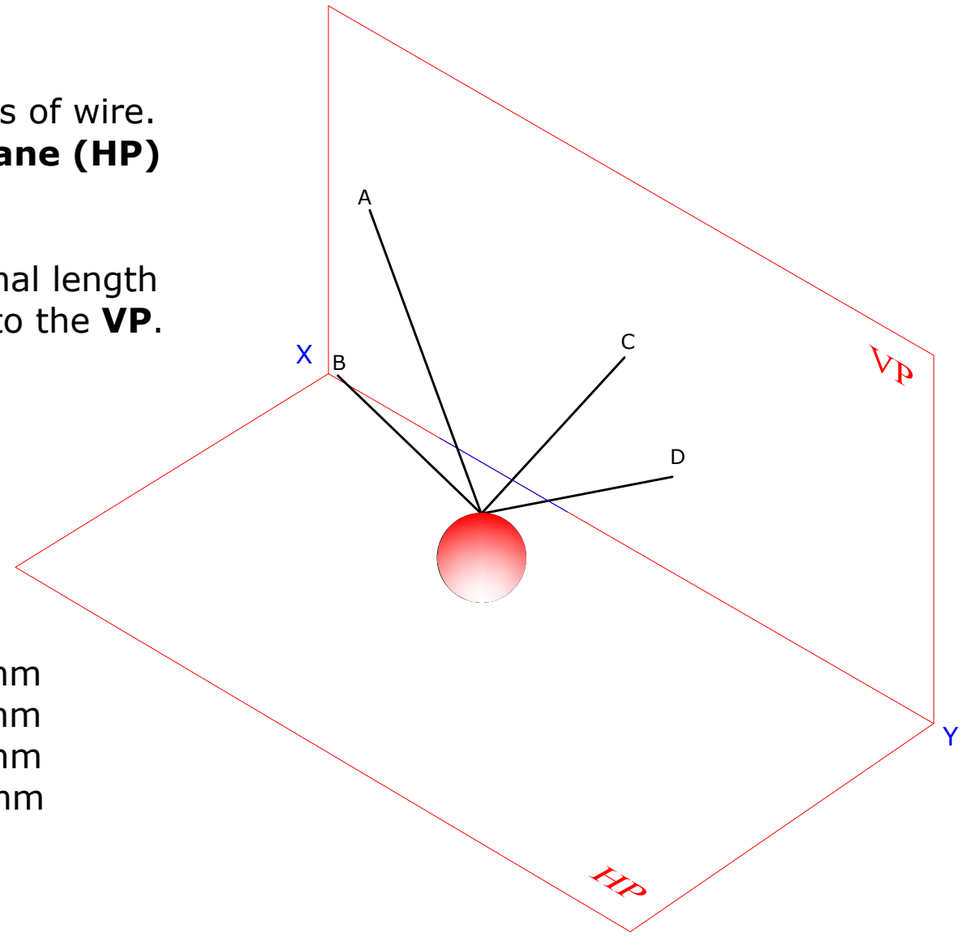
Lines in Space - Decoration Ball

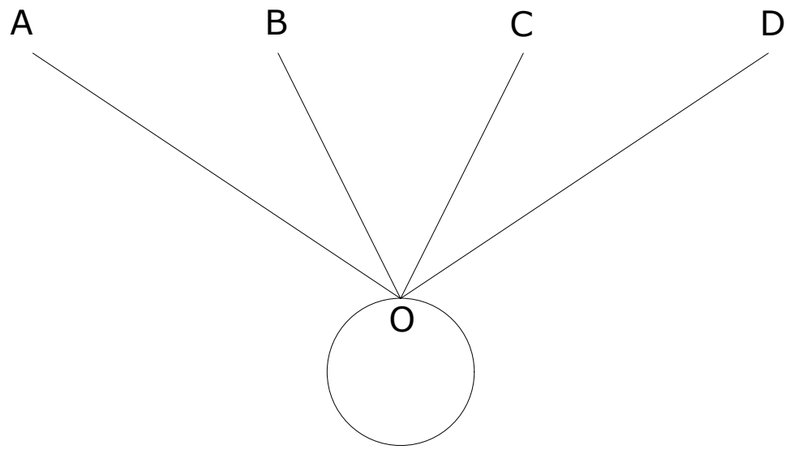
Fig. 1 shows a Christmas decoration ball suspended from a ceiling by 4 pieces of wire. These pieces have been cut from a single piece of string. The **Horizontal Plane (HP)** and the **Vertical Plane (VP)** of the whole setup are given below.

a) Find the **true length** of each piece of wire in order to determine the original length of the initial piece of string. Do this by getting each piece of wire parallel to the **VP**.

b) Find the acute **true angles** that wires **AO**, **BO**, and **CO** make with the horizontal plane **HP**. Identify and print the true length of **OD**.

(18 marks)

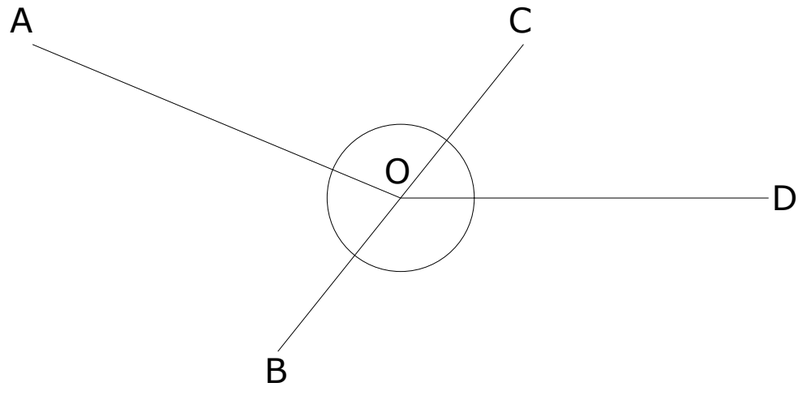




OA =___mm
OB =___mm
OC =___mm
OD =___mm

VP

HP



a) True length of original string: _____ mm

b) True angle with the horizontal of:

AO:_____ °

BO:_____ °

CO:_____ °

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Worksheets' answers

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1st Angle Orthographic Projection - Coffee Table

Use the information from the Isometric drawing in Fig. 1 to complete the Orthographic projection below, by:

- adding the **Front** elevation and **Plan**;
- adding the symbol of first angle orthographic projection in the space provided;
- rendering the sketch of the coffee table using colour (Material - Wood).

Note: Material thickness is 10mm throughout. (24 marks)

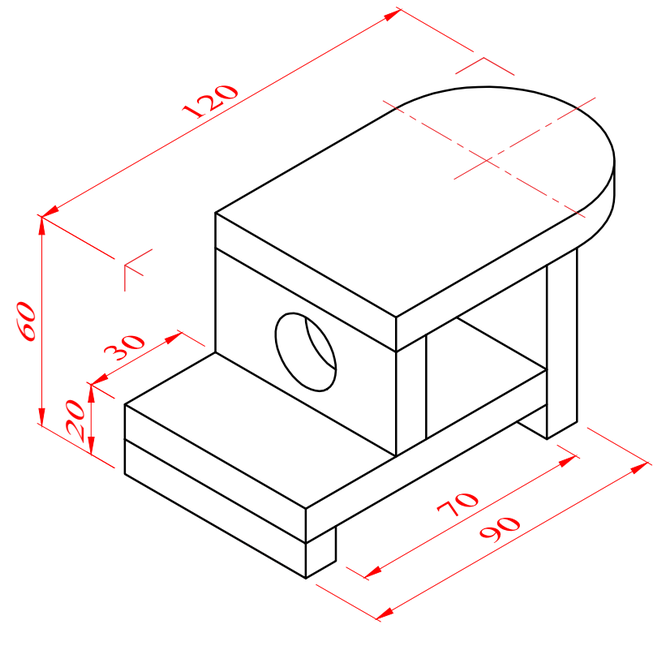
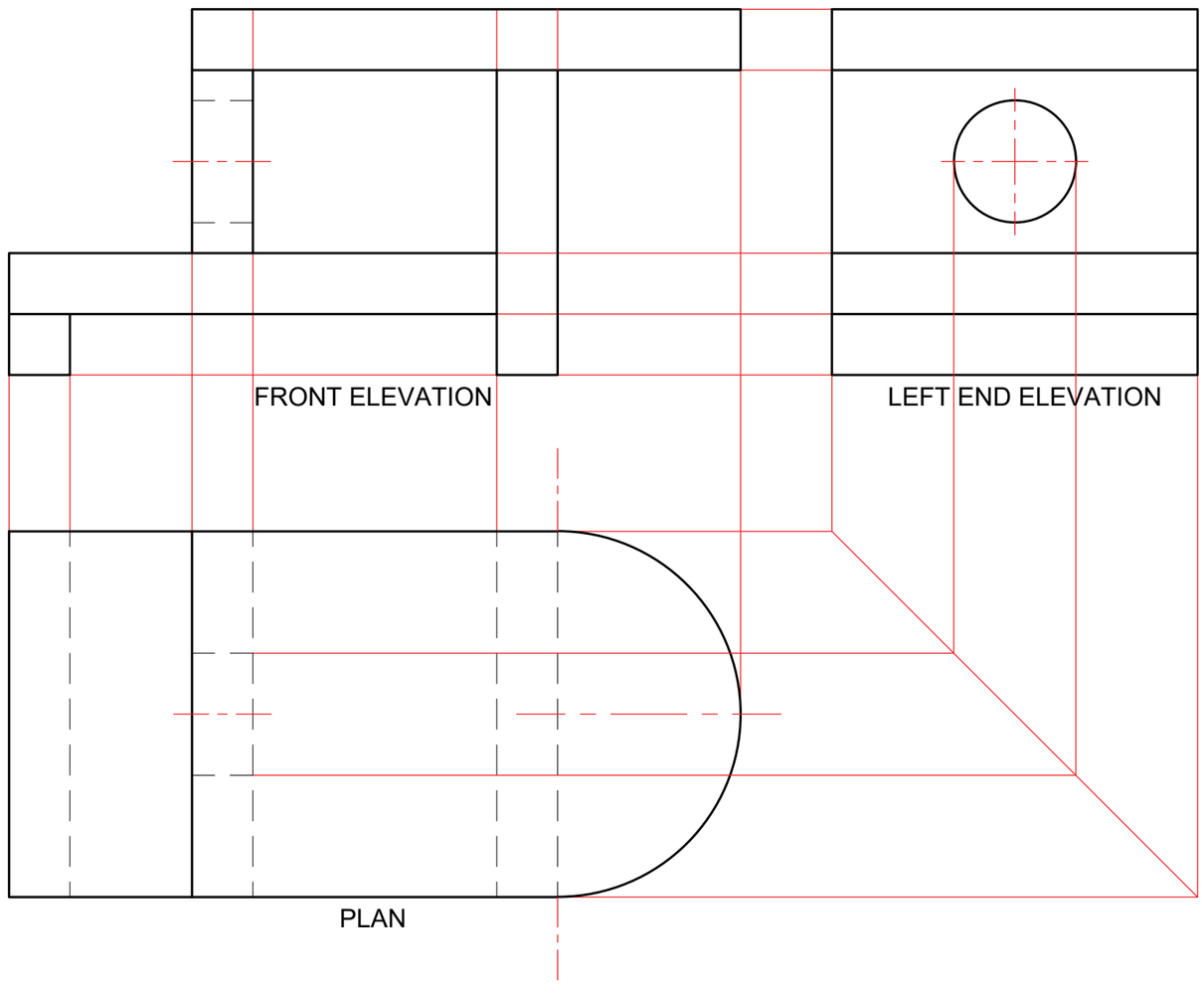
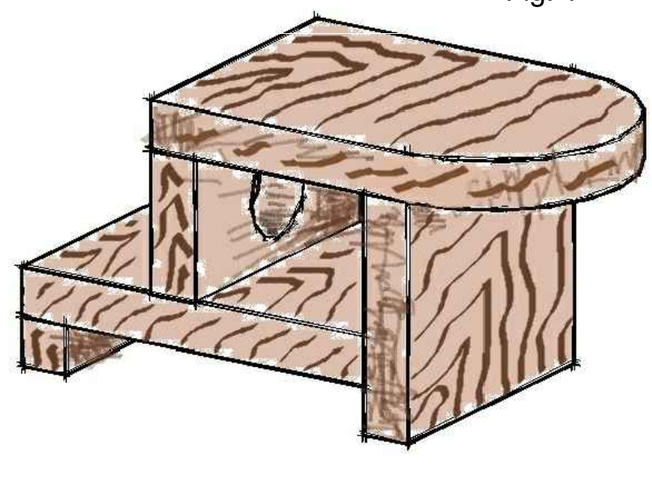
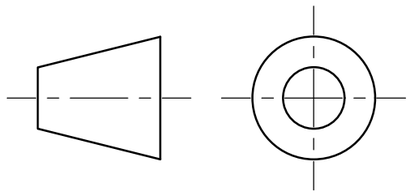


Fig. 1





SKETCH



SYMBOL for 1st ANGLE

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Pictograms and Graphs - Supermarket Items

A set of **General information** signs are needed to be used in a supermarket. Three of these signs have already been drawn; those for the drinks, fish, and meat sections.

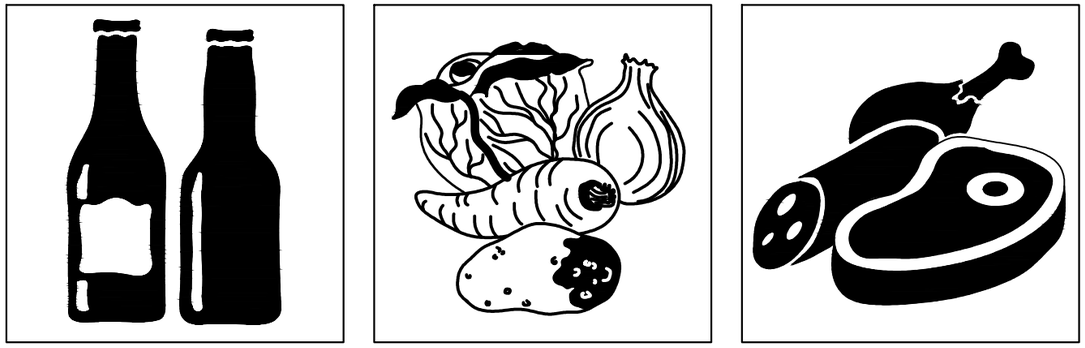
a) You are required to provide three more signs; those for the **vegetables**, **bread**, and **pasta** sections. Use the space provided for preparatory sketches.

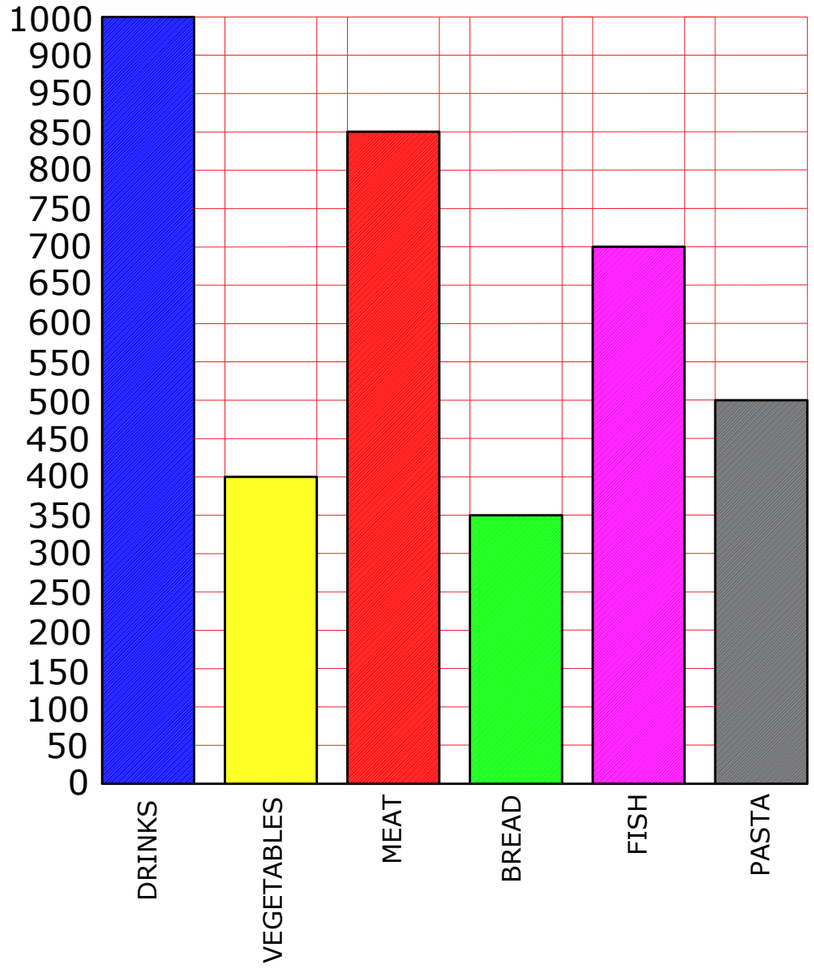
b) Draw a Bar Graph representing the amount of items sold in a week from the same supermarket. Use the information from the table provided below. Colour the bars in your graph.

(18 marks)

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500

Space for preparatory sketches





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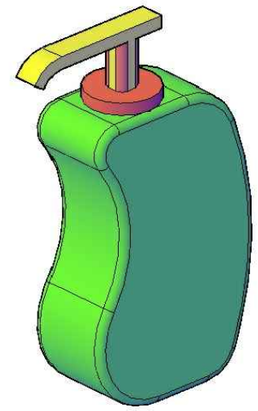
Circles in contact - Soap dispenser

Fig. 1 shows the profile of a soap dispenser. This profile is produced using the principles of **circles in contact**. Use the given measurements to complete the drawing that has been started below.

(18marks)



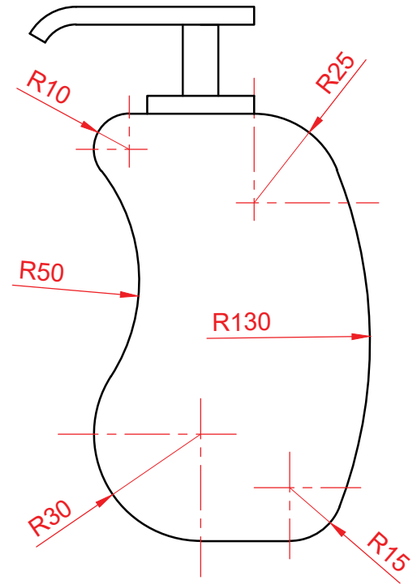
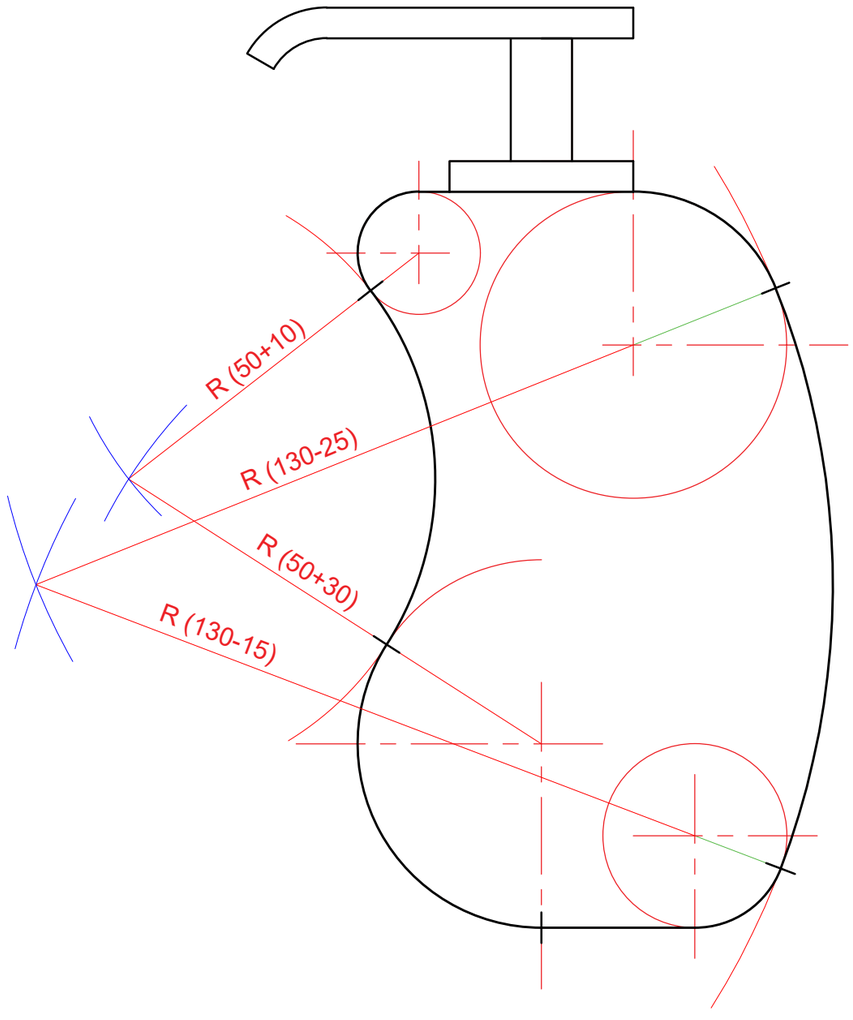


Fig. 1



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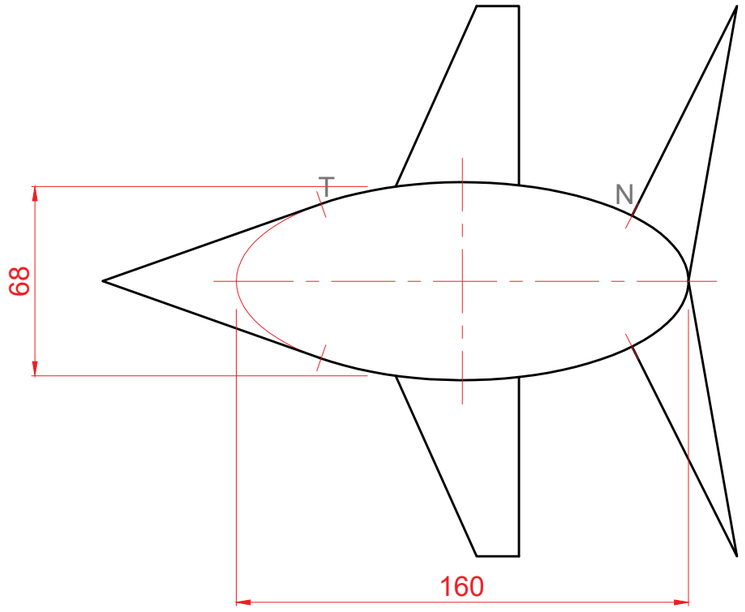
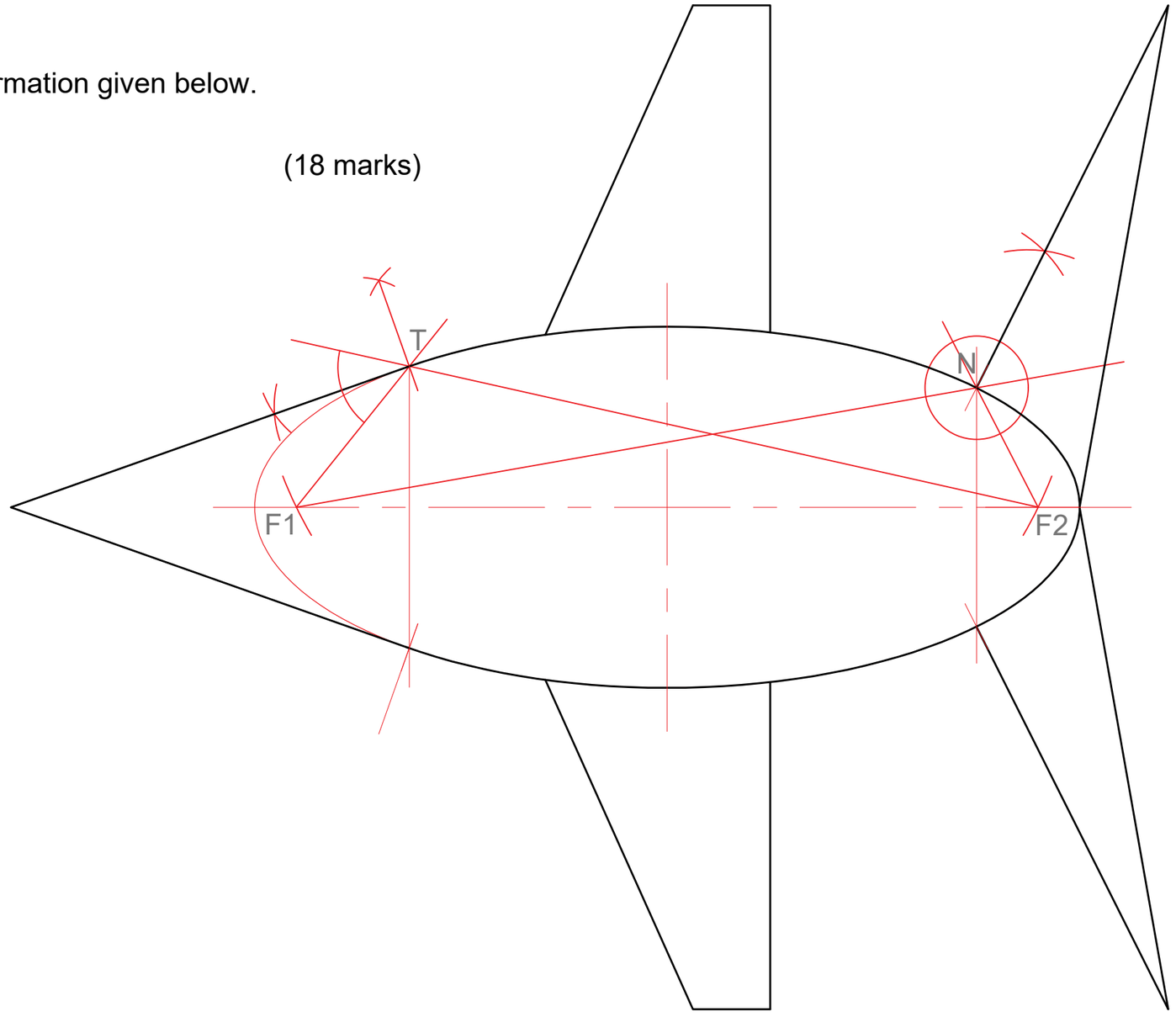
Ellipse - Plane

A surveillance plane used by the military has its main body in the shape of an **Ellipse**, with Major Axis **160mm** and Minor Axis **68mm**.

a) Draw the Ellipse on the given centre lines;
b) Construct a Tangent at point T;
c) Construct a Normal at point N;
d) Reflect the Tangent and Normal horizontally;
e) Complete the tail of the drone according to the information given below.

(18 marks)





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Truncated Cone - Pharaoh's hat

Fig. 1 shows the profile of an Egyptian pharaoh (king) wearing a hat. This hat is in the shape of an inverted truncated cone. The drawings below show the completed Front elevation and an incomplete Plan of this hat.

a) Complete the **Plan**.
b) Draw the full **Development** of the hat, starting on the given generator A0 and working clockwise.

(20 marks)

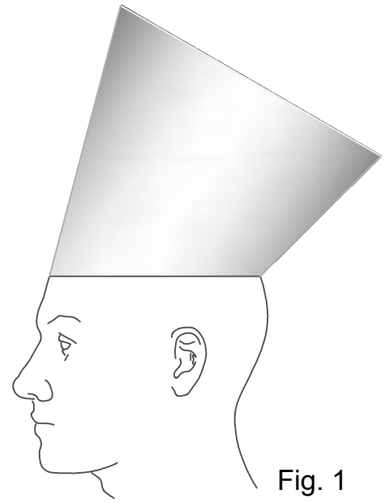
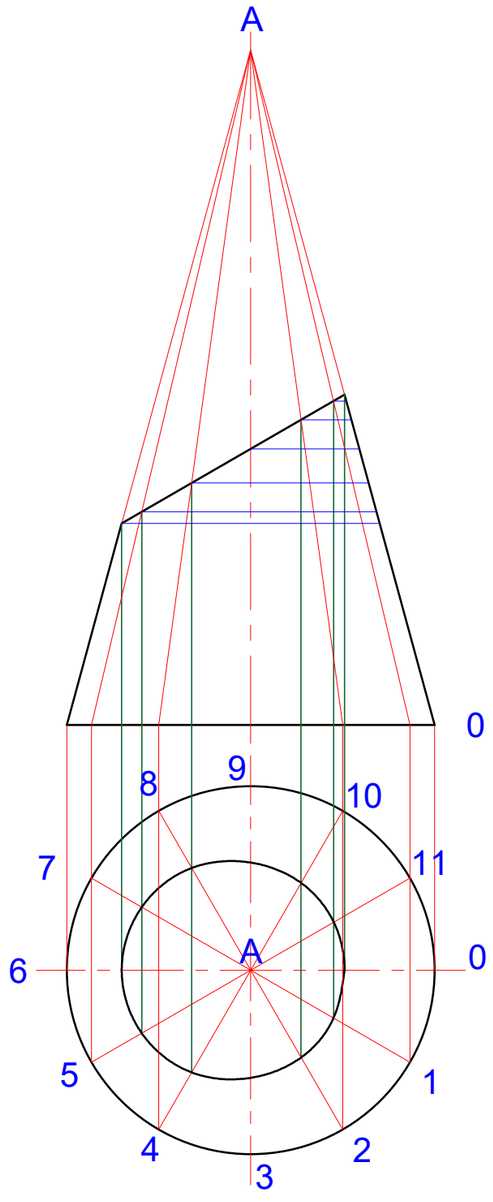
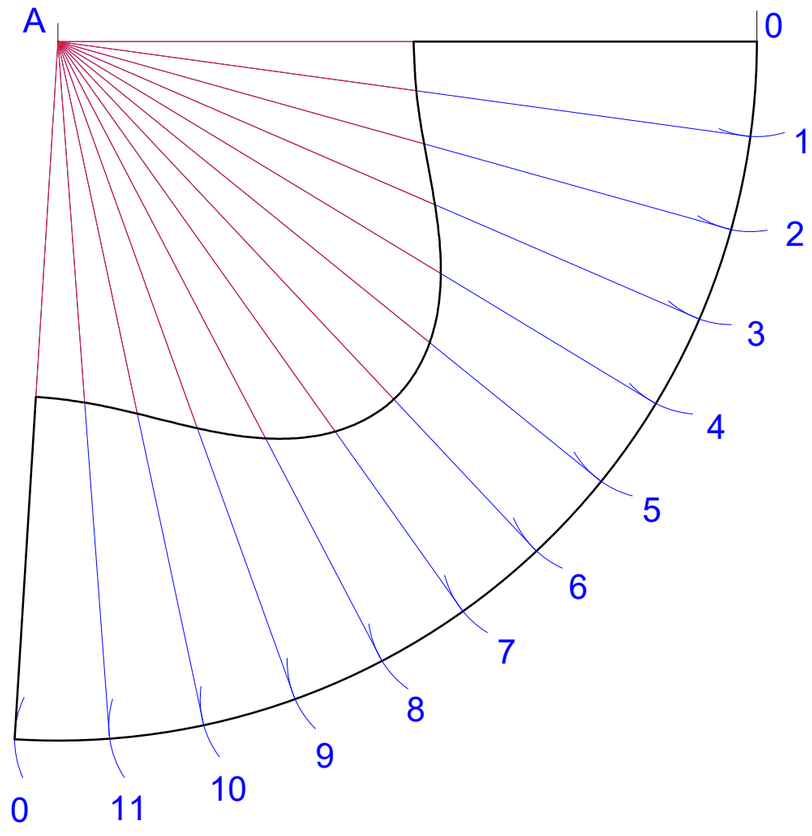


Fig. 1





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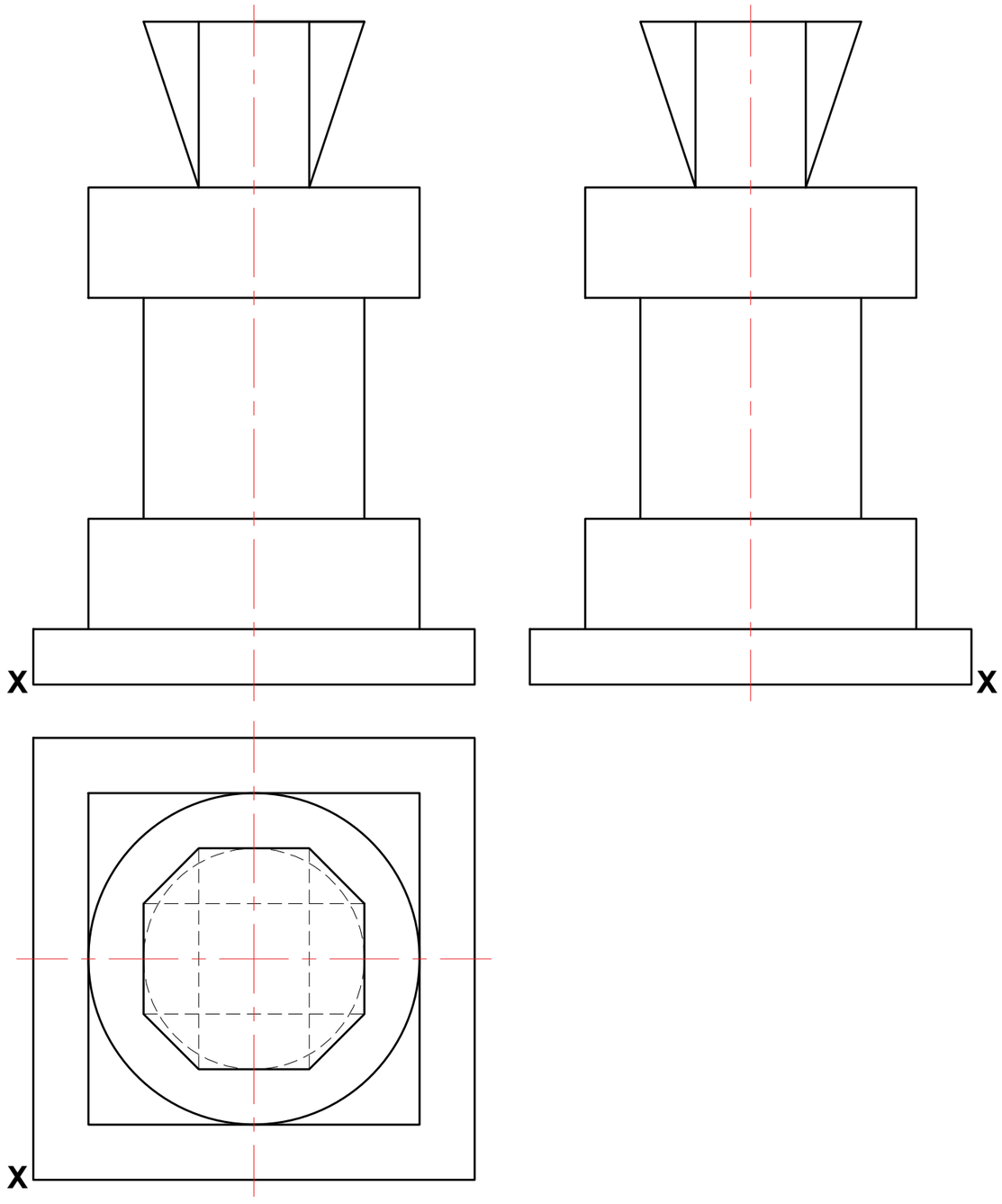
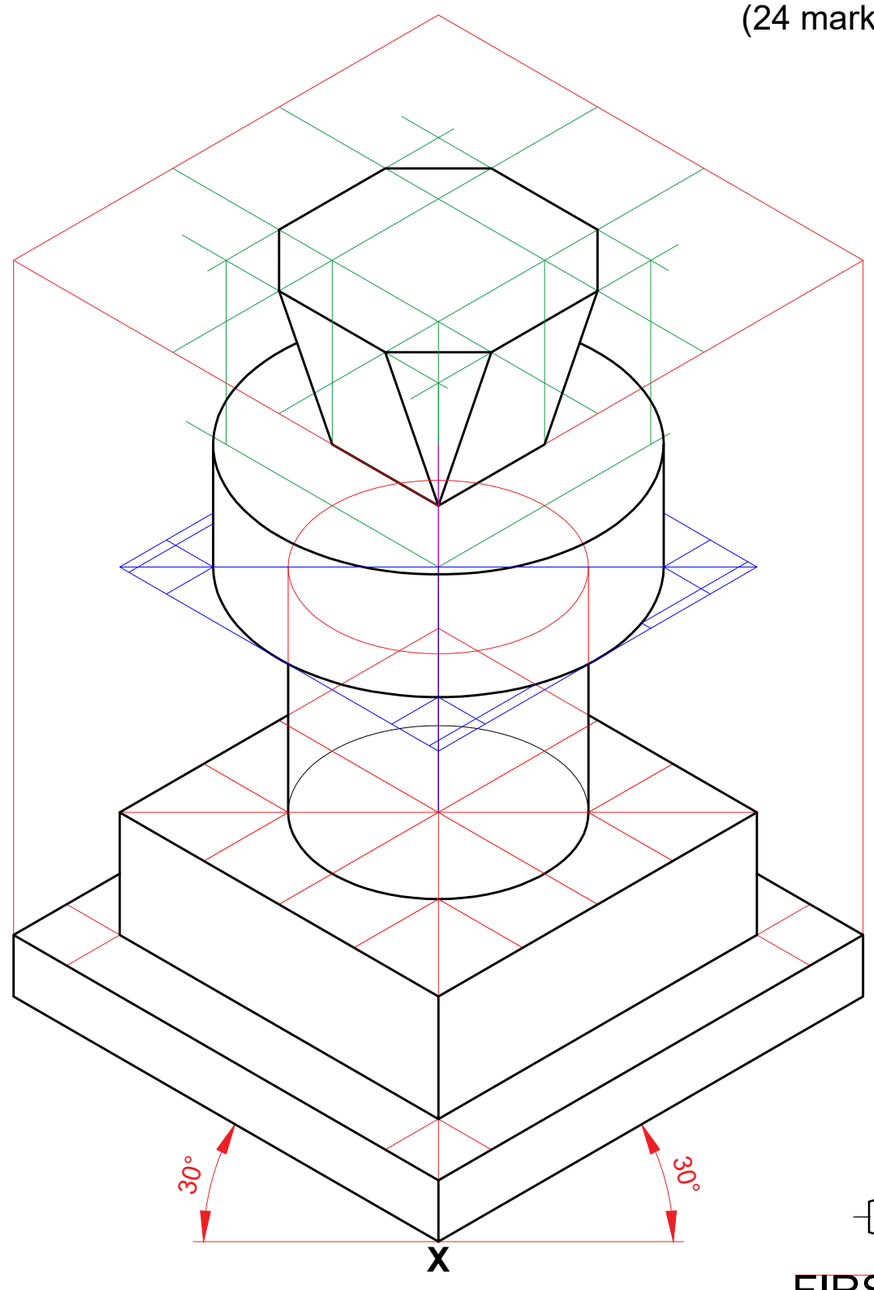
Isometric Projection - Trophy

Three views of a trophy that is awarded to the best chess player of the year is shown below. On the start lines given, produce an Isometric drawing of this trophy. Take the measurements directly from the orthographic views. Place corner X at the lowest point in your drawing. Also state the type of orthographic projection being used.

(24 marks)





FIRST ANGLE

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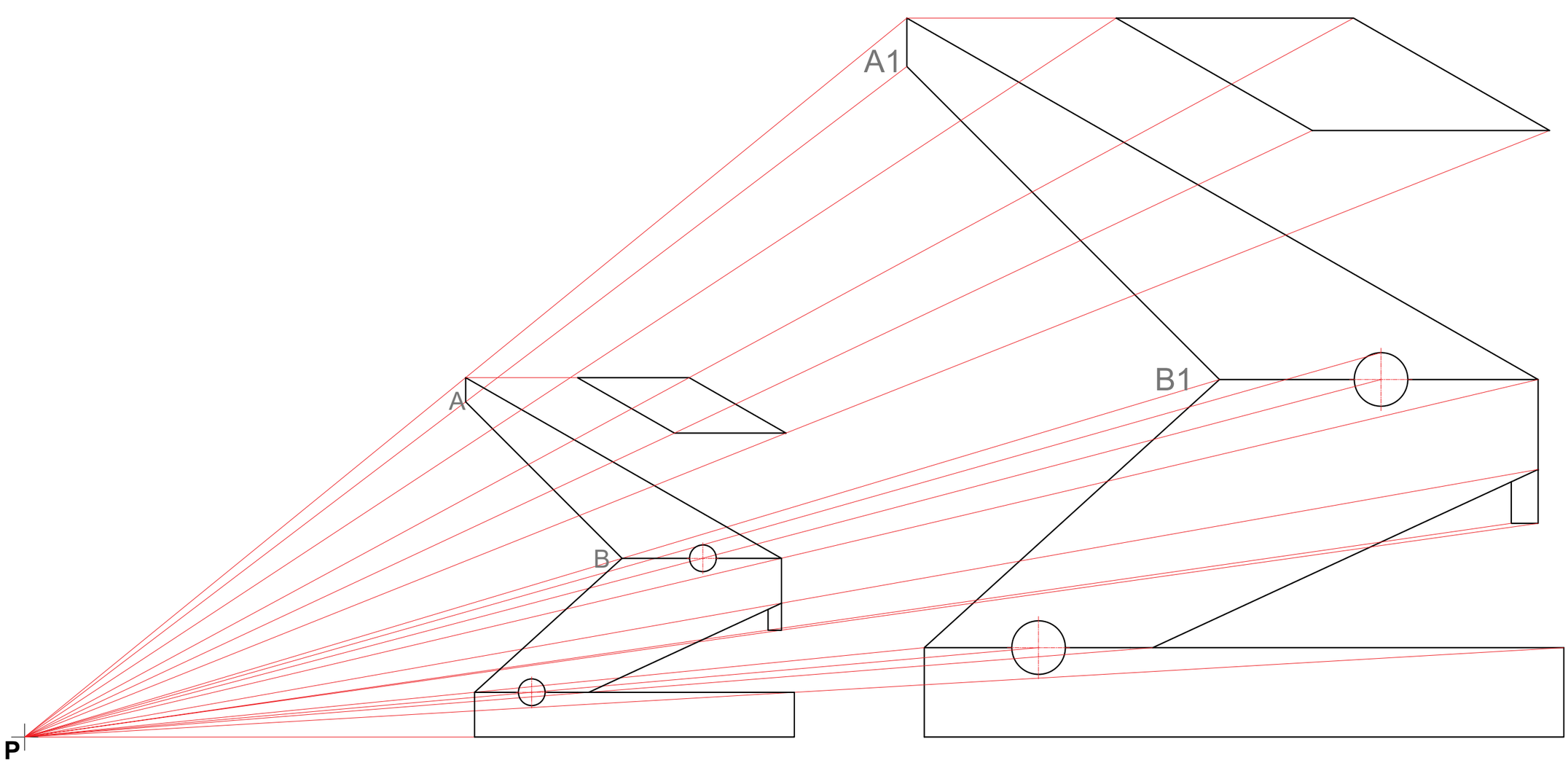
Polar Enlargement - Paper Puncher

Enlarge the paper puncher logo given below using point **P** as the Pole. The scale to which the drawing needs to be enlarged is set by line **A-B** that is given enlarged to **A1-B1**

(20 marks)



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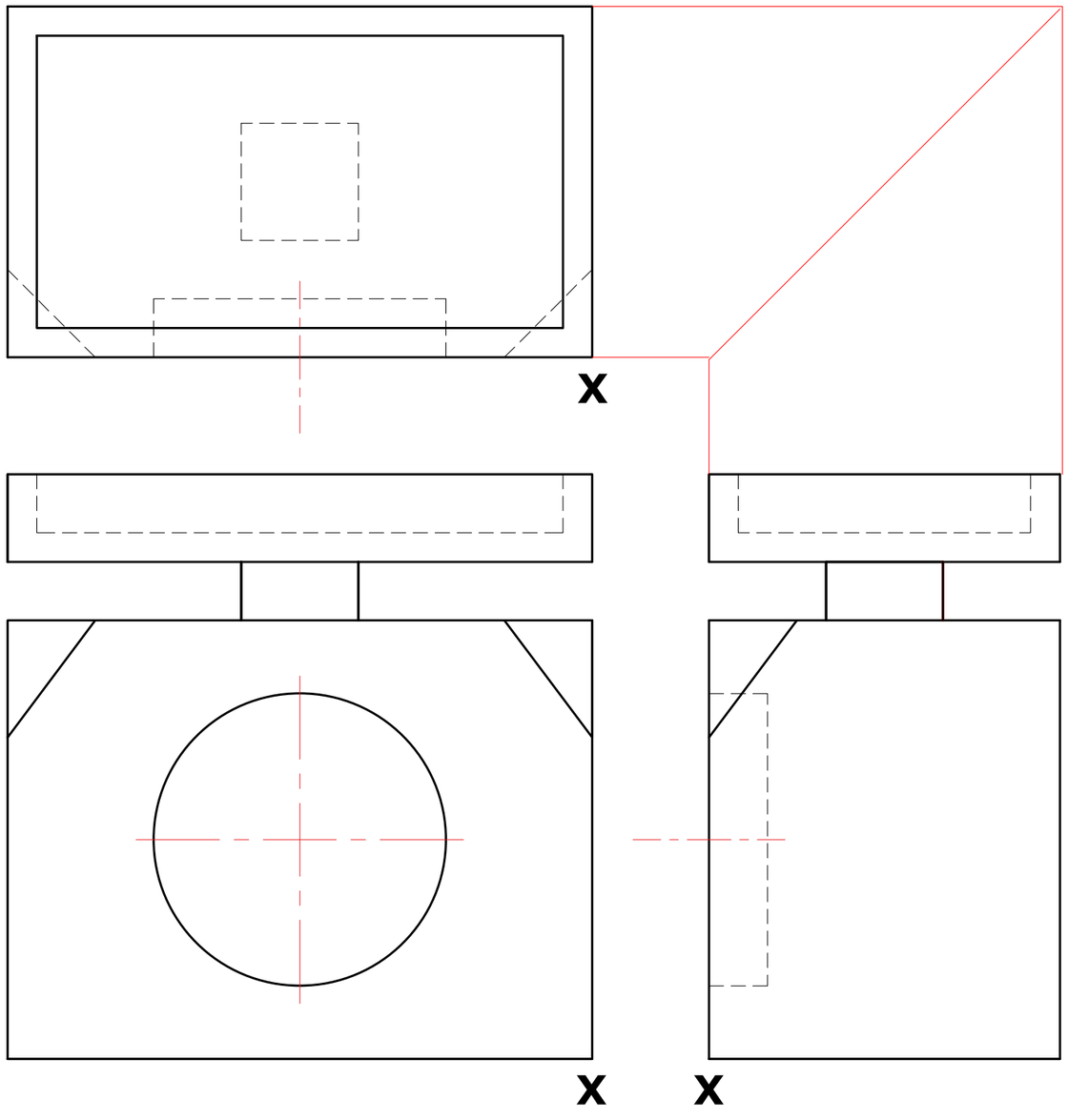
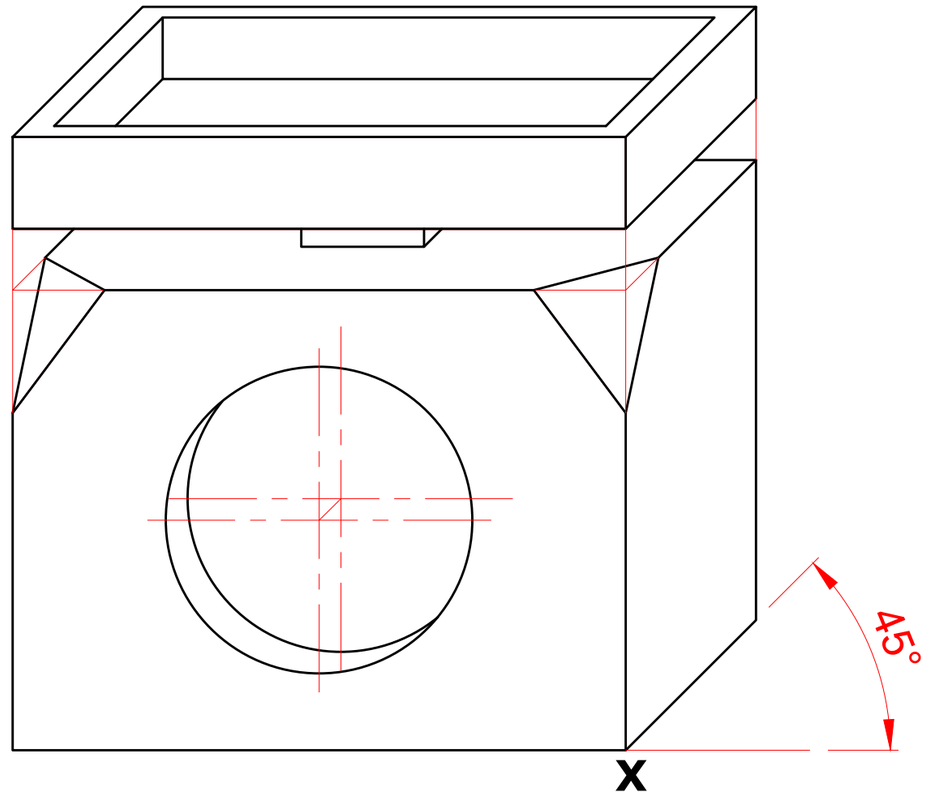
Cabinet Oblique - Kitchen Scales

The Orthographic projection below shows three views of a kitchen scales. Take the measurements directly from these views to draw a **cabinet oblique** drawing of the same scales, placing corner **X** where indicated. Identify the type of orthographic projection being used.

(18 marks)





THIRD ANGLE

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Sectioning - Support station

Fig. 1 shows a pictorial drawing of a cast iron support station. The **right End elevation**, **Plan**, and an outline of the **sectional Front elevation** are given below.

a. Complete the sectional Front elevation on cutting plane **X-X**.

b. Label your drawing accordingly.

c. Render the sketch (cast iron).

(16 marks)

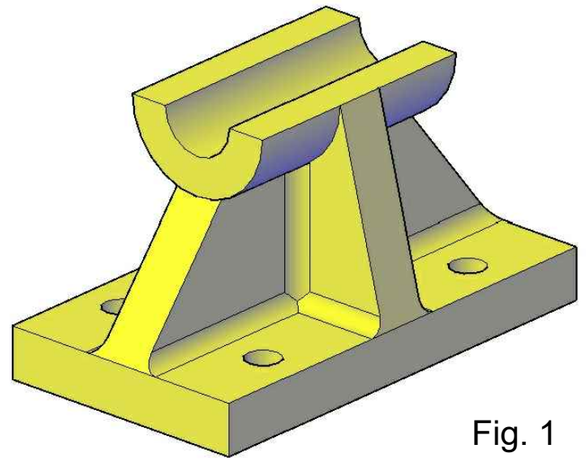
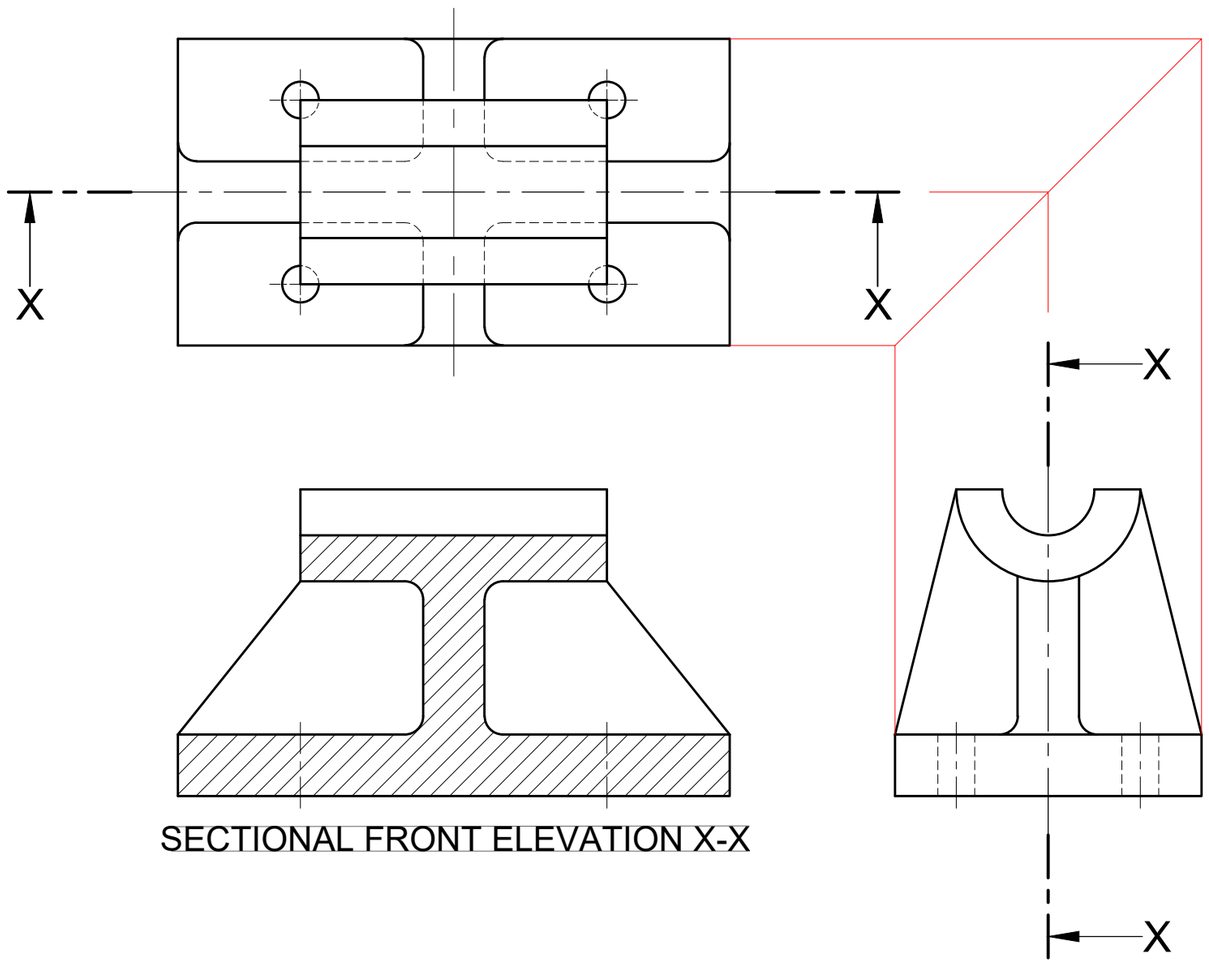
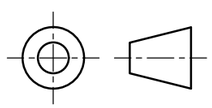
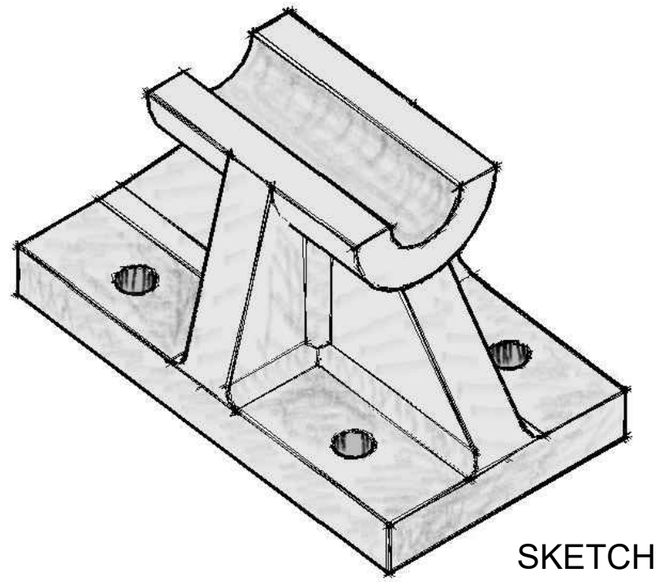


Fig. 1



SECTIONAL FRONT ELEVATION X-X





SKETCH

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Two point Perspective - Stage and Podium

Turn the Isometric drawing of the stage and podium shown in Fig. 1 into a **2-point perspective** drawing. Use the starting corner **FC** and the Vanishing points **(Vp1)** and **(Vp2)** provided.

(18 marks)

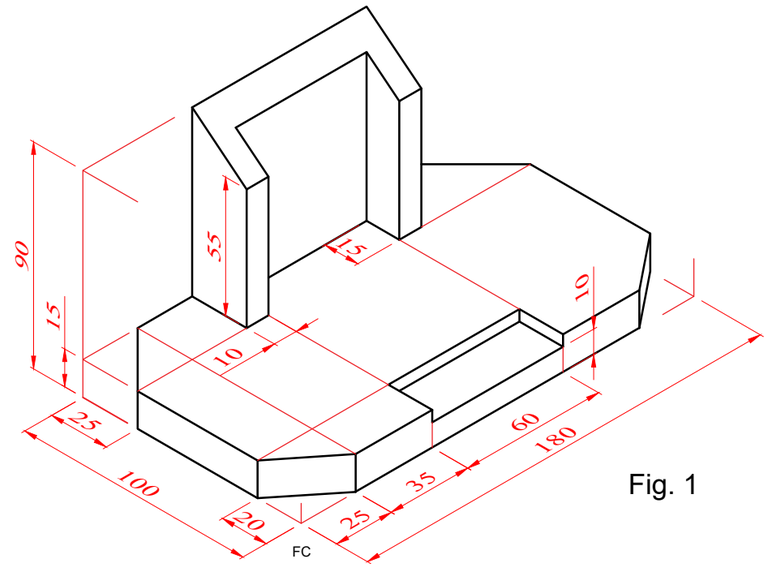
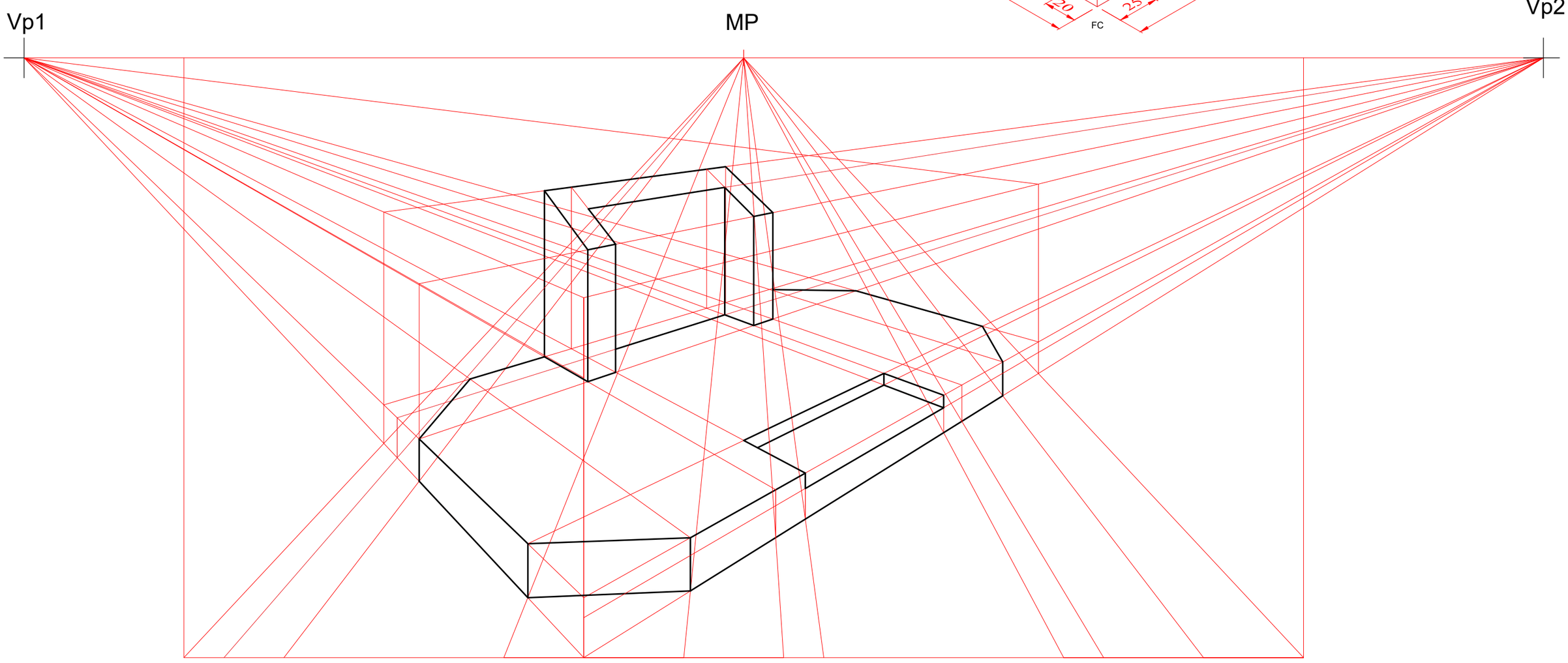


Fig. 1



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Computer Graphics - Castle

The following computer programme has been written to create the image of a castle for a new mobile phone application. Use the following information to produce this image on the provided 1000 X 1000 grid.

(16 marks)

DATA: A = 100; B = 200; C = 300; D = 400;
E = 500; F = 600; G = 700; H = 800;
I = 900; J = 1000.

ACI 7: Move A,H; Draw A,I; Draw B,I; Draw B,H; Draw C,H; Draw C,I; Draw D,I; Draw D,H; Draw E,H; Draw E,I, Draw F,I; Draw F,H; Draw E,G; Draw E,F; Draw F,F; Draw F,G; Draw G,G; Draw G,F; Draw H,F; Draw H,G; Draw I,G; Draw I,A; Draw B,A; Draw B,G; Draw A,H:

ACI 1: Move C,B; Draw C,E; Draw D,E; Draw D,B; Draw C,B:

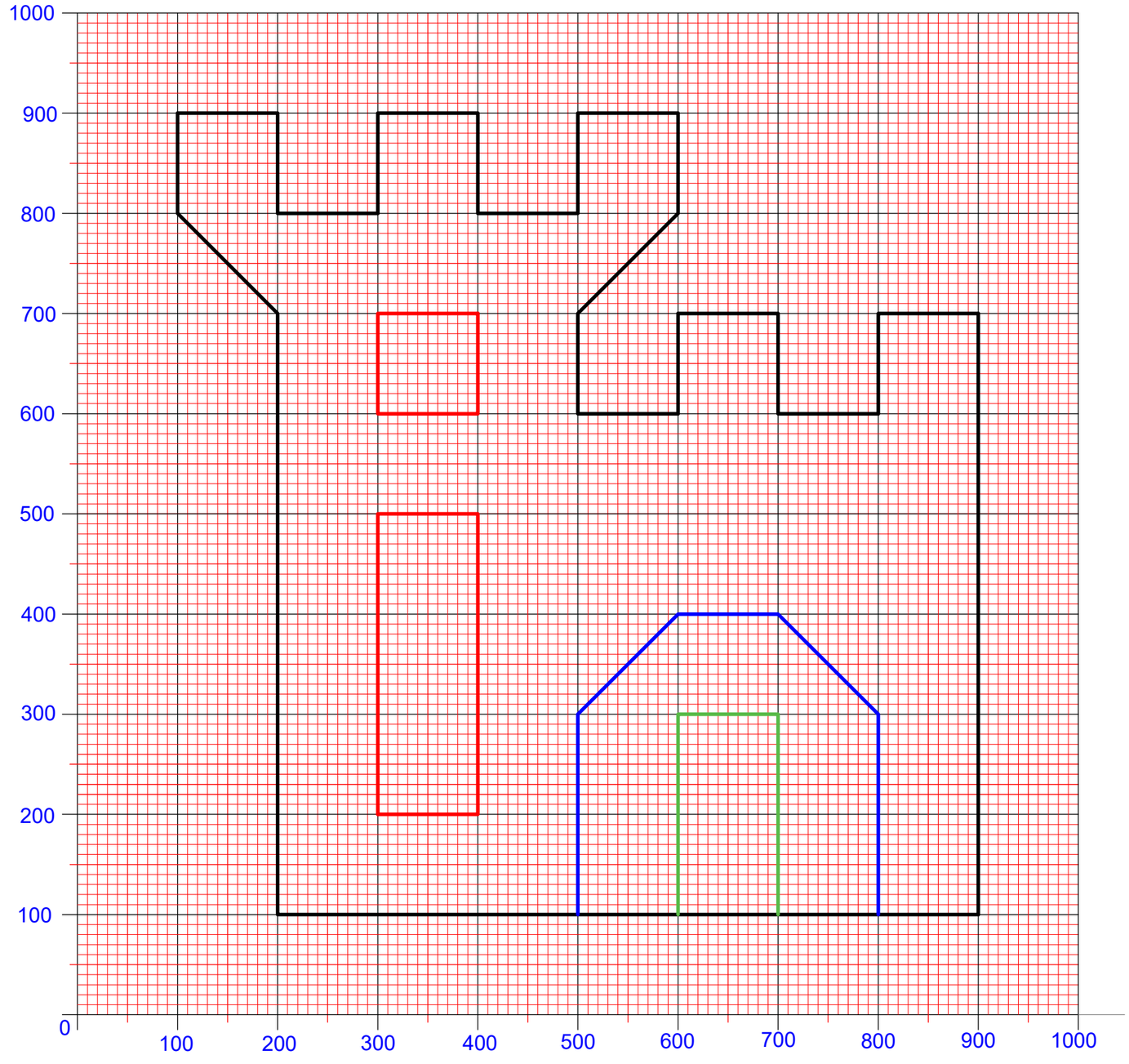
ACI 1: Move C,F; Draw C,G; Draw D,G; Draw D,F; Draw C,F:

ACI 5: Move E,A; Draw E,C; Draw F,D; Draw G,D; Draw H,C; Draw H,A:

ACI 3: Move F,A; Draw F,C; Draw G,C; Draw G,A:

The computer responds to the following colour commands:

ACI 7: Black
ACI 1: Red
ACI 5: Blue
ACI 3: Green



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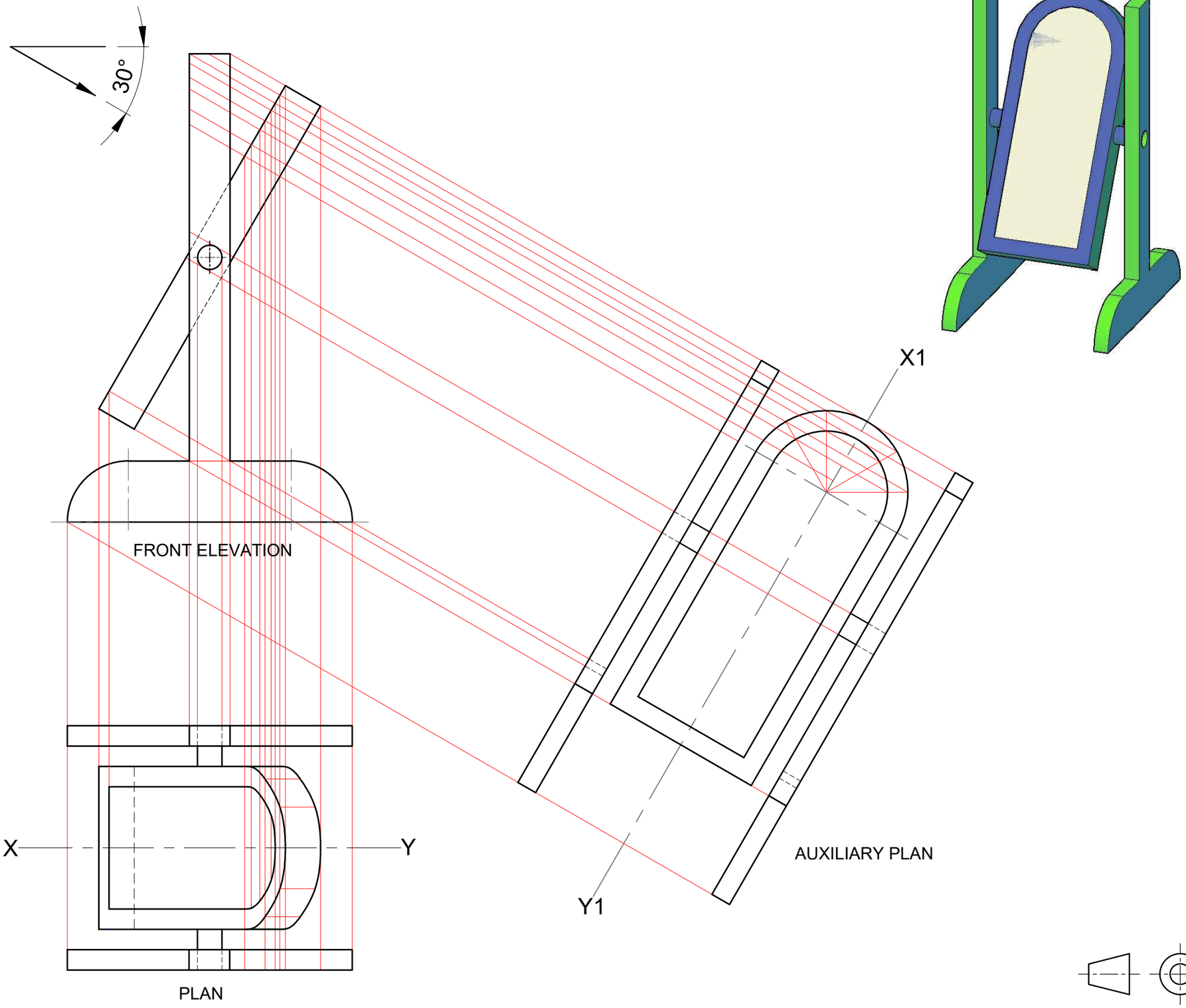
Auxiliary views - Free-standing mirror

A **Front elevation** and an **Auxiliary plan** of a free-standing mirror are given. Use the information from the two views to project an orthographic plan on X-Y.

(24 marks)



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Intersection of solids - Reservoir

Fig. 1 shows the pictorial drawing of a reservoir. The central part of this reservoir is composed of two cylinders intersecting each other perpendicularly. In the Orthographic projection below, the complete **End** elevation, the **Plan,** and an **incomplete Front** elevation are given.

a) Complete the **Front** elevation by constructing the intersection line that results between the two cylinders.

b) Construct a full **development** of the vertical cylinder on the base line ABCDA.

(18 marks)

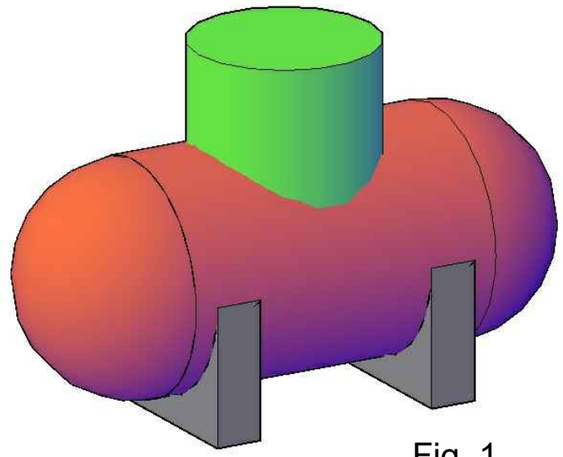
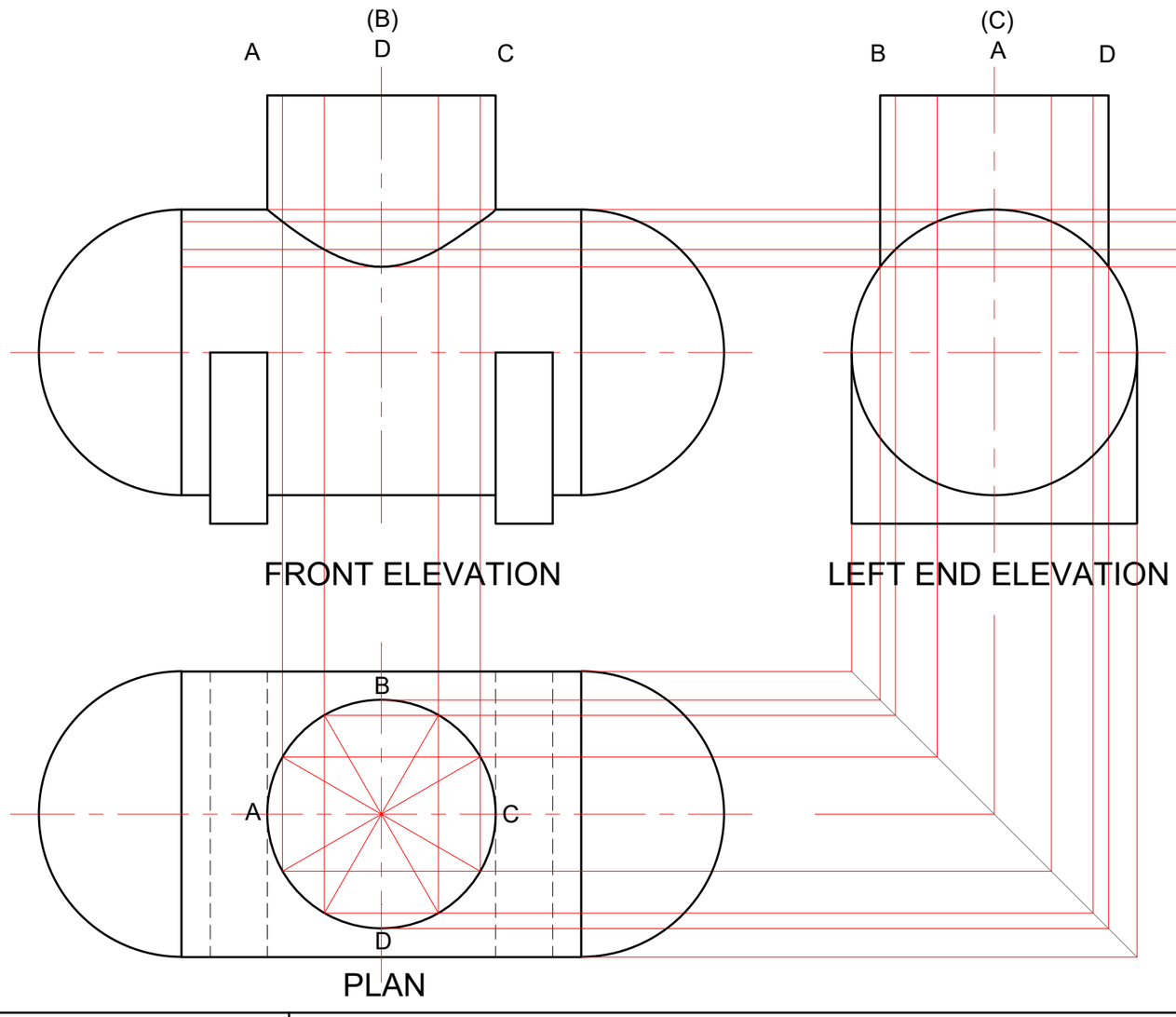
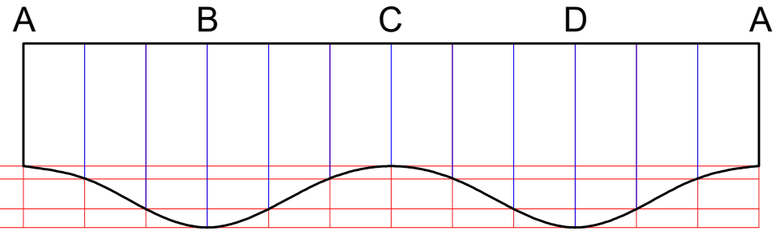


Fig. 1





DEVELOPMENT

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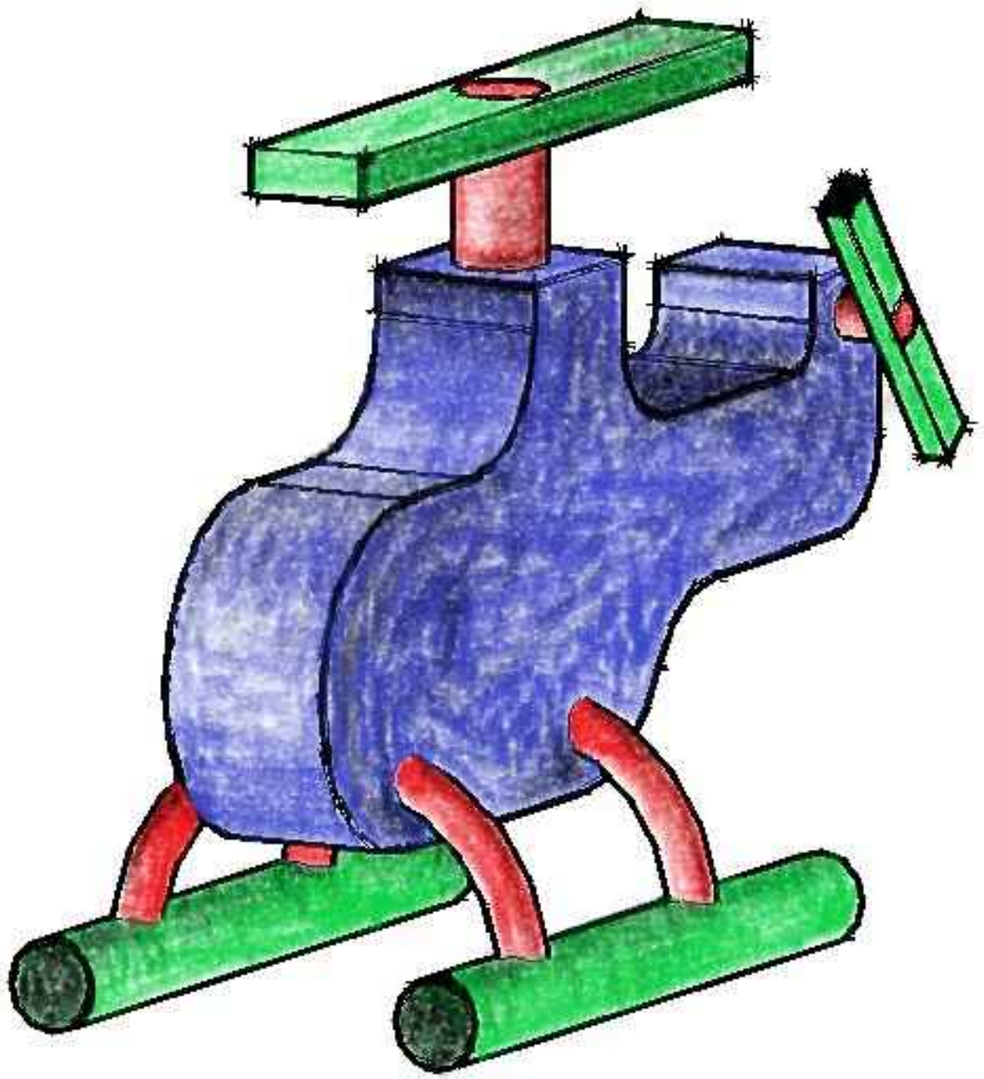
Assembly drawing - Toy Helicopter

Fig. 9 shows an exploded pictorial view of a toy helicopter.

In the space below, draw a well-proportioned **assembled** 3D freehand drawing of this toy. Colour and shade your drawing using vibrant colours.

(18 marks)



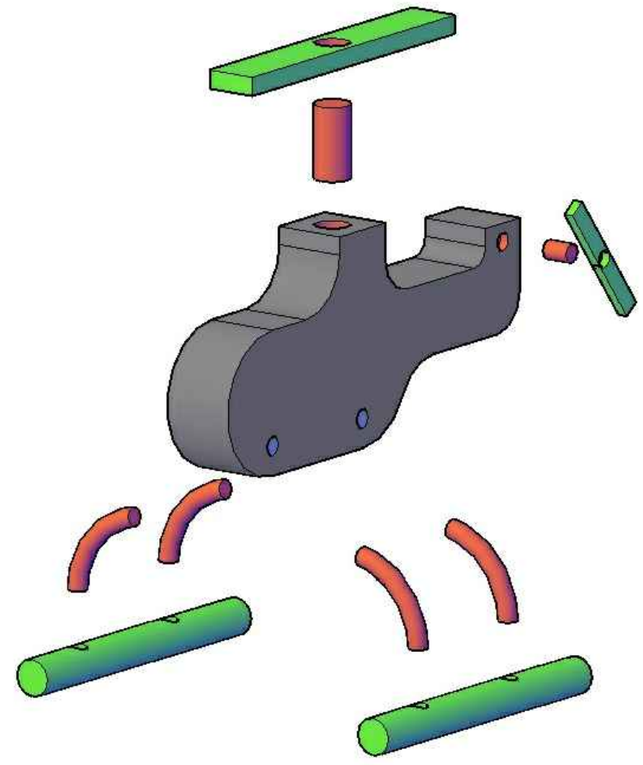


Fig. 9

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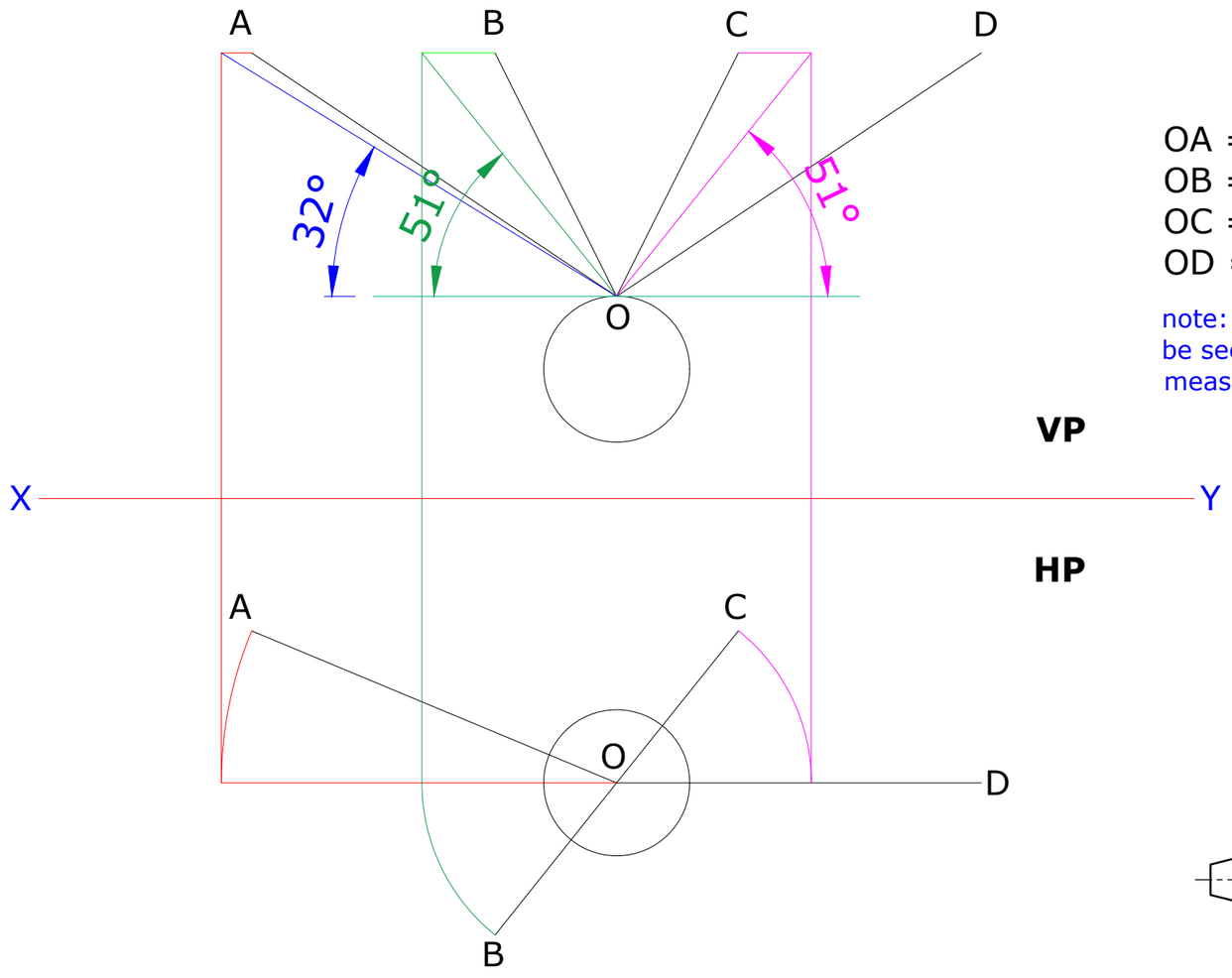
Lines in Space - Decoration Ball

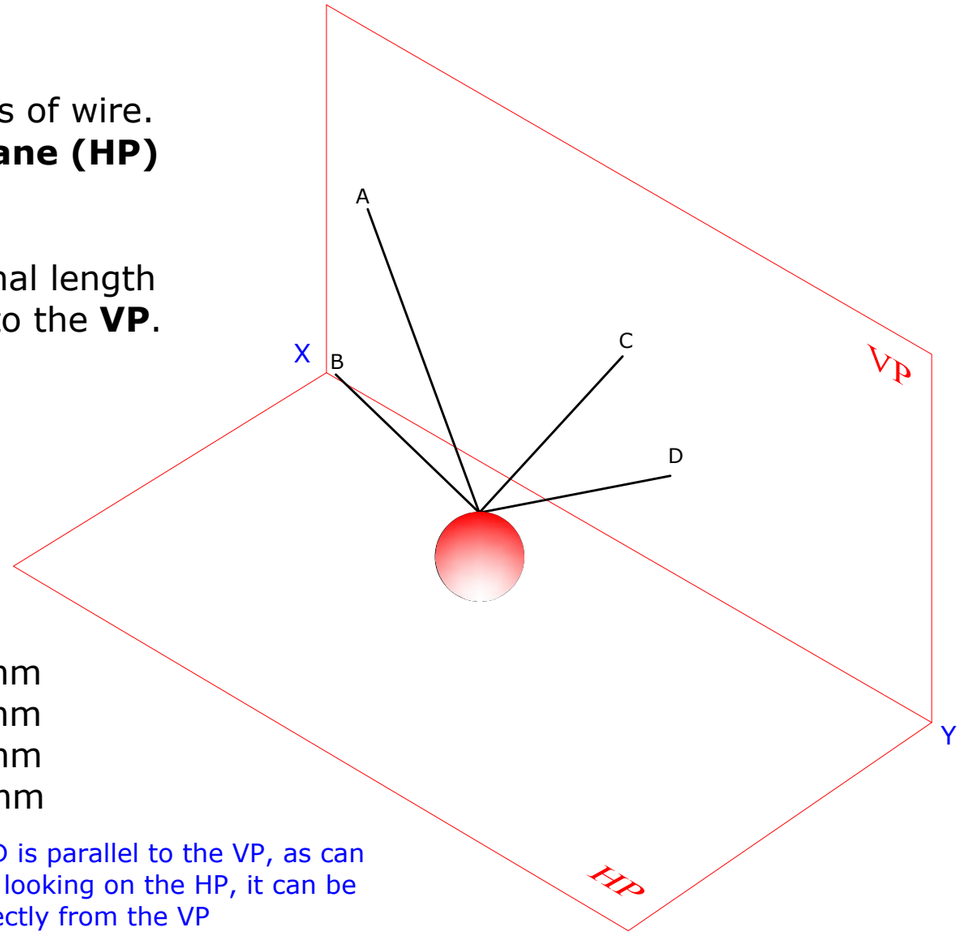
Fig. 1 shows a Christmas decoration ball suspended from a ceiling by 4 pieces of wire. These pieces have been cut from a single piece of string. The **Horizontal Plane (HP)** and the **Vertical Plane (VP)** of the whole setup are given below.

a) Find the **true length** of each piece of wire in order to determine the original length of the initial piece of string. Do this by getting each piece of wire parallel to the **VP**.

b) Find the acute **true angles** that wires **AO**, **BO**, and **CO** make with the horizontal plane **HP**. Identify and print the true length of **OD**.

(18 marks)





OA = 76 mm
OB = 51 mm
OC = 51 mm
OD = 72 mm

note: since OD is parallel to the VP, as can be seen when looking on the HP, it can be measured directly from the VP

a) True length of original string: 250 mm

b) True angle with the horizontal of:

AO: 32 °

BO: 51 °

CO: 51 °

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Self-evaluation sheets

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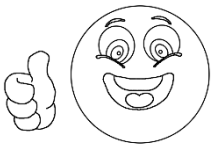
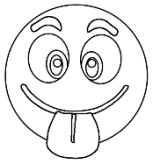
Student's Rubric				
Coffee Table - Orthographic Projection				
Mark how you feel using a 	 I feel confident about it and can teach it to my peers	 I understand it, but feel that I need a little more practice to master it	 I need a little help to be able to understand it completely	 I cannot understand it yet
I can recognise different faces on a 3D drawing				
I can draw different faces in 2D from a 3D drawing				
I can differentiate between 1st and 3rd angle Orthographic projection and draw the symbol for both				
I can render 3D drawings in different materials using colour				

Comments:

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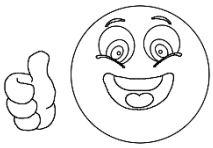
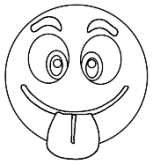
Student's Rubric				
Supermarket Items – Pictograms & Graphs				
Mark how you feel using a 				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can generate a number of preparatory sketches to develop ideas				
I can translate an idea to a finalized drawing using instruments and freehand drawing				
I can identify the correct shapes and colour schemes of Pictograms				
I can translate data from tables onto graphs				

Comments:

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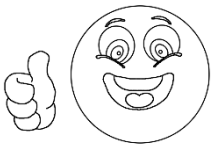
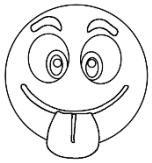
Student's Rubric				
Soap dispenser – Circle in contact				
Mark how you feel using a 				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can draw the R10, R15, and R30 circles using compasses				
I can find the centre of arc R50 by construction				
I can find the centre of arc R130 by construction				
I can show tangential points on arcs by drawing short dashes from appropriate centres				

Comments:

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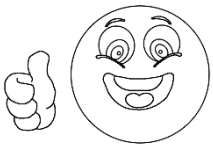
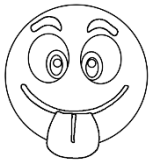
Student's Rubric				
Plane – Ellipse				
Mark how you feel using a 	 I feel confident about it and can teach it to my peers	 I understand it, but feel that I need a little more practice to master it	 I need a little help to be able to understand it completely	 I cannot understand it yet
I can use an accepted method of construction to draw an ellipse from given data				
I can find the focal points of an ellipse				
I can construct a Tangent at a point on an ellipse				
I can construct a Normal at a point on an ellipse				

Comments:

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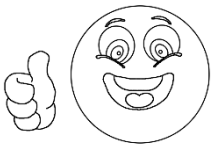
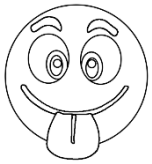
Student's Rubric				
Pharaoh's hat – Conic sections				
Mark how you feel using a ✓				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can divide a circle in a number of parts and project generators toward the apex of a cone in an elevation				
I can drop lines from points on elevation generators to draw a cut on the Plan				
I can identify the true lengths of elevation generators and the circumference of the base of a cone to draw the outline of a conic development				
I can transfer true lengths of cut generators on a conic elevation to a development				

Comments:

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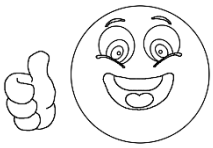
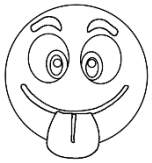
Student's Rubric				
Trophy - Isometric projection				
Mark how you feel using a ✓				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can use horizontal and vertical measurements from an orthographic projection to draw a crate in Isometric				
I can draw the stepped base in Isometric				
I can draw an Isometric circle and transfer points from it to a given depth				
I can draw chamfers in Isometric as in the diamond shaped block at the top				

Comments:

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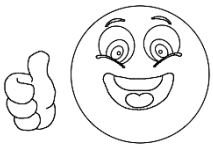
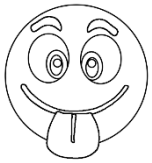
Student's Rubric				
Paper puncher – polar enlargement				
Mark how you feel using a 	 I feel confident about it and can teach it to my peers	 I understand it, but feel that I need a little more practice to master it	 I need a little help to be able to understand it completely	 I cannot understand it yet
I can project lines from a pole toward corners of a drawing and extend these outward				
I can draw parallel lines to those of an original drawing				
I can construct links between unattached points on a drawing				
I can project links and unattached points from an original drawing to an enlarged figure				

Comments:

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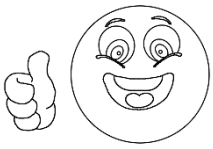
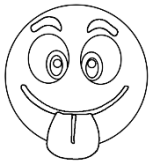
Student's Rubric				
Kitchen scales - Oblique projection				
Mark how you feel using a 	 I feel confident about it and can teach it to my peers	 I understand it, but feel that I need a little more practice to master it	 I need a little help to be able to understand it completely	 I cannot understand it yet
I can use measurements on an orthographic projection to draw a crate in cabinet oblique				
I can draw circles on the true shape of a cabinet oblique and replicate these backwards				
I can draw linear shapes within each other in cabinet oblique as in the case of the upper tray of the scales				
I can translate hidden detail to visible form from orthographic to cabinet oblique				

Comments:

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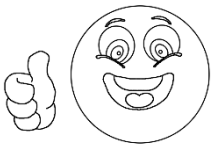
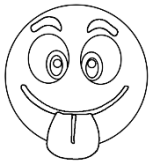
Student's Rubric				
Support station – Sectioning				
Mark how you feel using a ✓				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can draw lines from the end elevation and plan (or any other two views) to generate features on the front elevation (or the third view)				
I can line in the sectional front elevation including webs				
I can hatch, at 45°, the sectioned parts of the block and use lettering to name the sectioned view				
I can render the sketch to make it look like real metal				

Comments:

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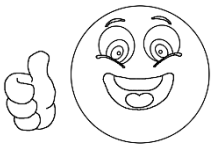
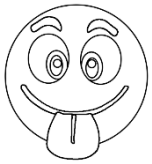
Student's Rubric				
Stage and Podium – 2-pt Perspective				
Mark how you feel using a 				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can draw an estimated 2-pt perspective crate from given measurements				
I can transfer given measurements onto a 2-pt Perspective drawing				
I can mark true lengths on the outer vertical axis and project lines towards the vanishing points				
I can outline my drawing into a concrete object, leaving construction lines visible to show my working				

Comments:

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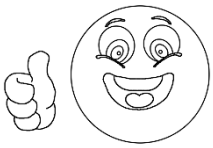
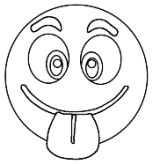
Student's Rubric				
Castle – Computer Graphics				
Mark how you feel using a 				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can interpret given letter data and transfer it in cartesian co-ordinate form to the axes of a grid				
I can understand and execute the commands of move and draw on a grid				
I can understand and execute commands such as mirror and copy if I have to				
I can use ACI information to outline a drawing in colour				

Comments:

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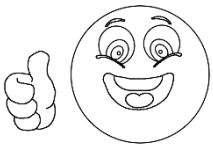
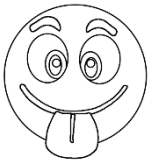
Student's Rubric				
Standing Mirror - Auxiliary views				
Mark how you feel using a 	 I feel confident about it and can teach it to my peers	 I understand it, but feel that I need a little more practice to master it	 I need a little help to be able to understand it completely	 I cannot understand it yet
I can project lines from the auxiliary view to a view of the opposite nature according to the viewing angle, and in turn project these to a view of the same nature as the original				
I can mark the 30°/60° divisions on an arc in auxiliary view and project points from it to the orthographic view of the opposite nature and subsequently to the orthographic view of the same nature				
I can mark the widths from an auxiliary plan to the orthographic plan via the Front elevation using the X1-Y1 line as datum				
I can line in each part of the plan with straight lines and arcs				

Comments:

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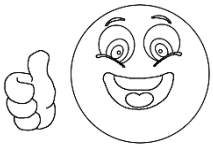
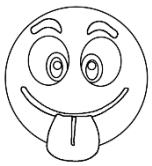
Student's Rubric				
Reservoir - Intersection of Cylinders				
Mark how you feel using a 				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can use information from two different views in orthographic to project the points of intersection of the curve on a third view				
I can line in with a smooth curve the points of intersection between two cylinders				
I can identify measurements from an orthographic projection to draw developments of truncated cylinders				
I can line in the cut of a truncated cylinder by a smooth curve				

Comments:

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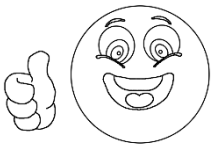
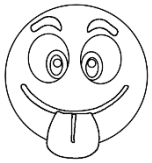
Student's Rubric				
Toy Helicopter – Assembly drawing				
Mark how you feel using a ✓				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can draw the profile of the fuselage and generate its width in freehand				
I can draw the top and back rotor blades and their attachments in freehand				
I can draw the four curved bars attached to the fuselage and the landing skids				
I can neatly colour the toy with various colours and shades				

Comments:

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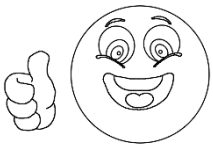
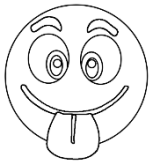
Student's Rubric				
Decoration ball – Lines in space				
Mark how you feel using a 				
	I feel confident about it and can teach it to my peers	I understand it, but feel that I need a little more practice to master it	I need a little help to be able to understand it completely	I cannot understand it yet
I can find the true lengths of AO, BO and CO				
I can recognise the true length of DO				
I can calculate the true length of the original string				
I can recognise and measure the true angles that AO, BO, and CO make with the horizontal plane				

Comments:

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Marking Schemes

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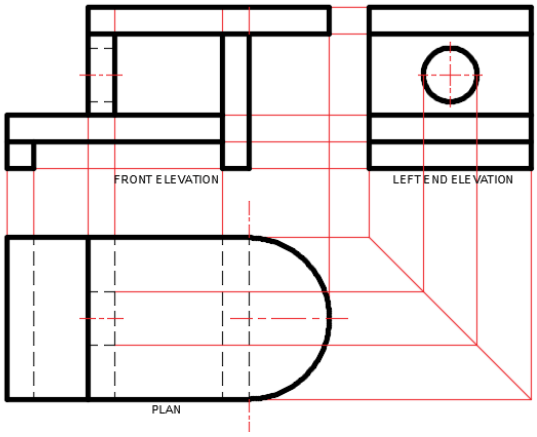
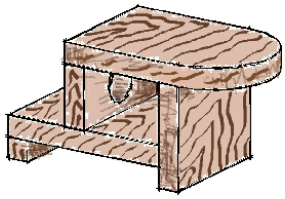
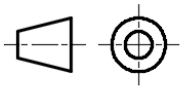
Teacher's Marking Scheme	**Orthographic Projection** – Coffee Table





SKETCH

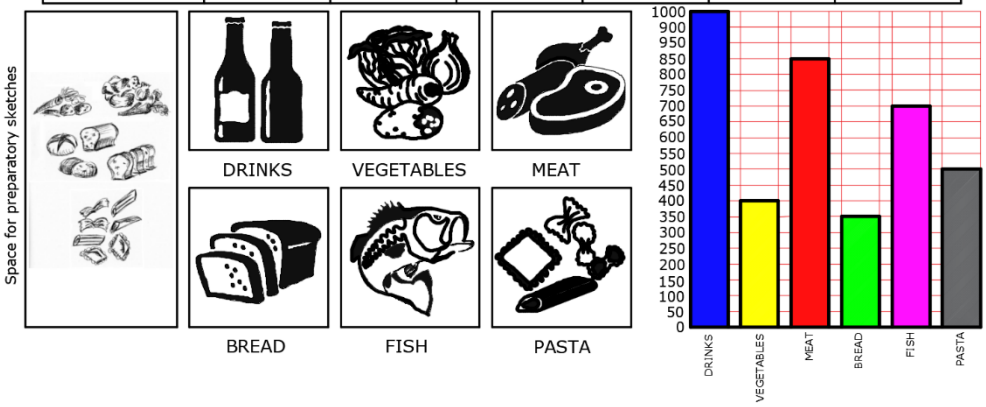


SYMBOL for 1st ANGLE

	Allocated mark	Teacher's mark	Comments
• Projecting faint lines from the End elevation onto the Front elevation and Plan	1		
• Lining in the Orthographic crate	1		
• Marking the Horizontal widths on the Front elevation and projecting faint lines downwards onto the Plan	2		
The Front elevation			
• Outlining the Horizontal Top and bottom shelf	2		
• Outlining the three Vertical sides	3		
• Marking the hidden detail of the circular hole	1		
The Plan			
• Drawing the semi-circular Top on the right	3		
• Completing the outline of the Top and bottom shelf	1		
• Drawing the four vertical hidden lines	2		
• Drawing the hidden detail of the circular hole	1		
• Drawing the symbol for 1st angle projection	2		
• Rendering the sketch	3		
• Overall Neatness and Presentation	2		
Total	**24**		

Teacher's Marking Scheme	**Pictograms and Graphs** – Supermarket Items

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500



	Allocated mark	Teacher's mark	Comments
Drawing the Pictograms			
• Preparing sketches for Vegetables	1		
• Preparing sketches for Bread	1		
• Preparing sketches for Pasta	1		
• Finalising drawing for Vegetables	2		
• Finalising drawing for Bread	2		
• Finalising drawing for Pasta	2		
• Using black to render Pictograms	1		
Drawing the Graph			
• Drawing bars with right height (data from table)	3		
• Colouring the bars on the graph	3		
• Overall Neatness and Presentation	2		
Total	**18**		

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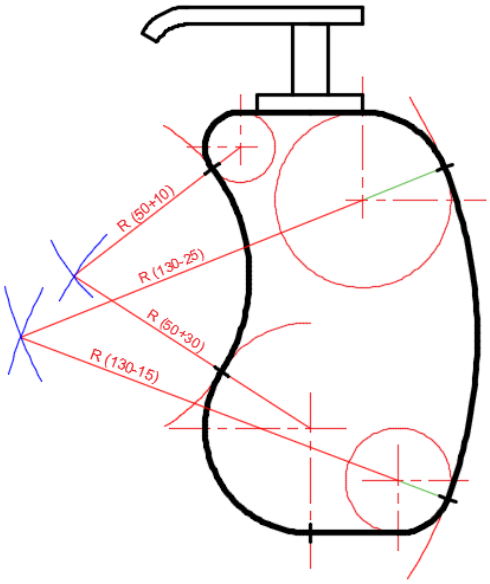
Teacher's Marking Scheme	**Circles in contact** – Soap dispenser



	Allocated mark	Teacher's mark	Comments
• Drawing circle R10	1		
• Drawing circle R25	1		
• Drawing circle R15	1		
• Drawing circle R30	1		
• Constructing the centre of R50	3		
• Drawing of arc R50	1		
• Constructing the centre of R130	3		
• Drawing of arc R130	1		
• Finishing off drawing	1		
• Showing tangential points on the drawing by short dashes	3		
• Neatness and Presentation	2		
Total	**18**		

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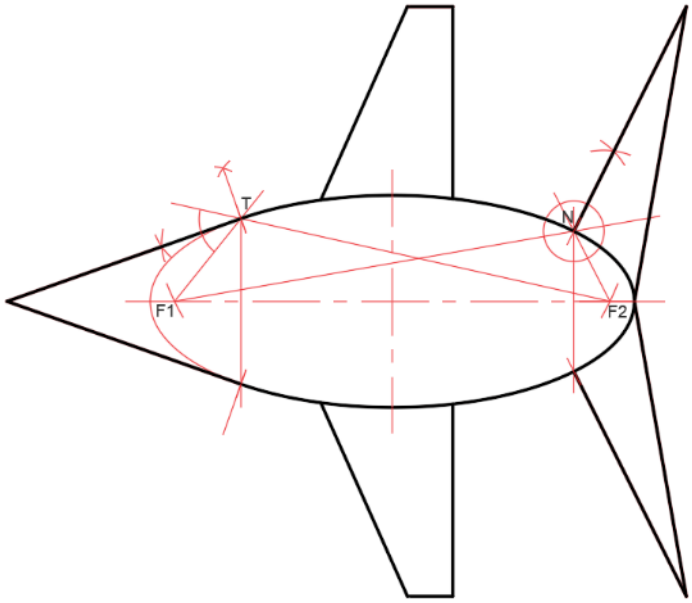
Teacher's Marking Scheme	**Ellipse** – Plane



	Allocated mark	Teacher's mark	Comments
• Constructing the Ellipse using any accepted method	6		
• Finding the Focal Points on the Major axis	2		
• Constructing a Tangent at point T	2		
• Reflecting the Tangent horizontally	1		
• Constructing a Normal at point N (bisection of angle)	2		
• Reflecting the Normal horizontally	1		
• Finishing off the tail of the plane	2		
• Neatness and Presentation	2		
Total	**18**		

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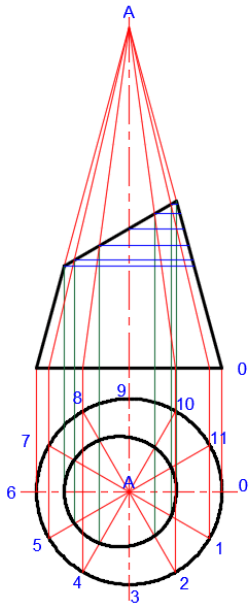
Teacher's Marking Scheme	**Conic sections** – Pharaoh's hat



	Allocated mark	Teacher's mark	Comments
Drawing the cut on the Plan			
• Dividing the circle with 30°/60°	1		
• Generating lines to the base of the Front elevation	1		
• Connecting generators to the vertex of the cone	1		
• Dropping radial lines from the cut, down to the Plan and marking points of cut on the Plan	1		
• Joining points to form the cut on the Plan	3		
Drawing the Development			
• Drawing an arc at point A using the true length of the cone	1		
• Marking twelve divisions on the development	2		
• Connecting lines from point A to the twelve divisions	1		
• Generating horizontal lines from the cut on the Front elevation onto the true length	1		
• Marking the true lengths from the Front elevation onto the development	3		
• Joining the points to form the cut on the development (smooth curve)	2		
• Finishing off the drawing	1		
• Neatness and Presentation	2		
Total	**20**		

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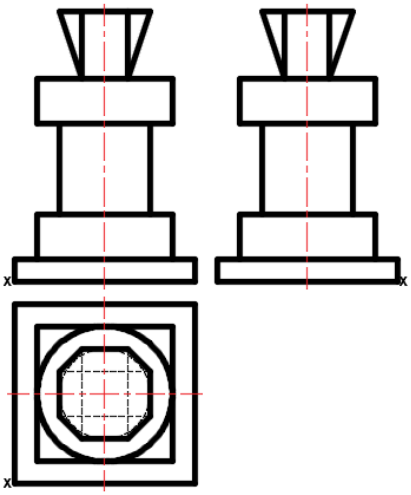
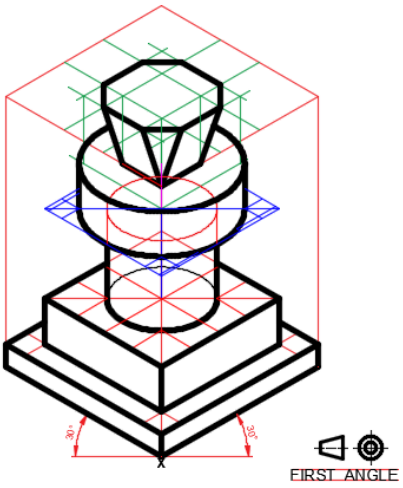
Teacher's Marking Scheme	**Isometric projection** – Trophy





	Allocated mark	Teacher's mark	Comments
• Drawing the Isometric crate	1		
• Drawing the lowest step	2		
• Drawing the second lowest step	2		
• Constructing the Isometric circle of the central column	4		
• Projecting the sides of the column	1		
• Finding the centre and constructing the upper Isometric circle	4		
• Projecting the depth of the Isometric circle	3		
• Constructing the upper irregular octagonal diamond	4		
• Outlining the drawing	1		
• Neatness and Presentation	2		
Total	**24**		

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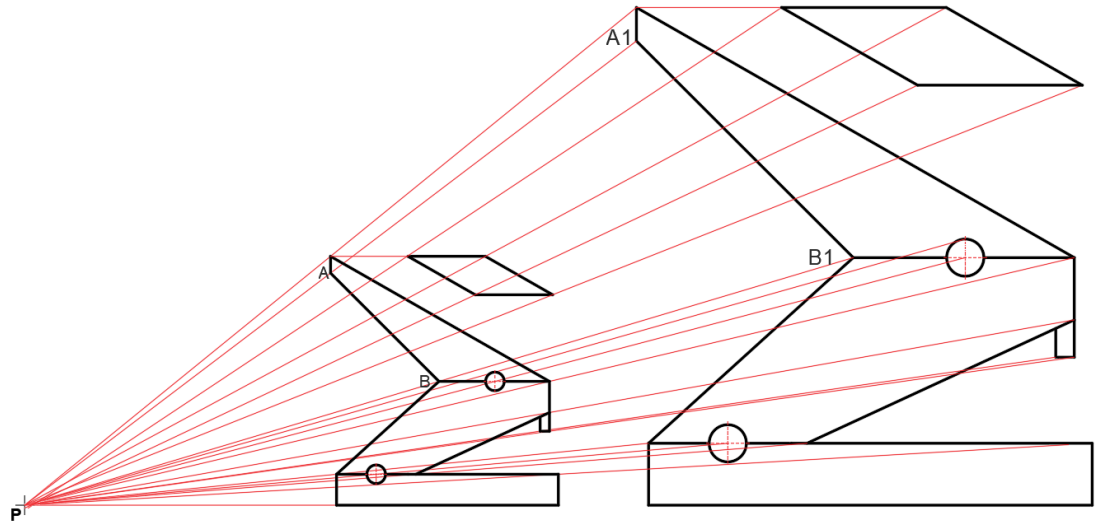
Teacher's Marking Scheme	**Polar Enlargement** – Paper Puncher Logo



	Allocated mark	Teacher's mark	Comments
• Producing radial lines from pole **P** towards the drawing and extending them outward	3		
• Lining in the upper part of the puncher parallel to the original drawing	3		
• Lining in the body of the puncher parallel to the original drawing	3		
• Lining in the base of the puncher parallel to the original drawing	1		
• Enlarging the round holes and tooth according to the right scale	4		
• Creating a link between the paper puncher and the outside paper (Rhombus)	1		
• Transferring the link to the enlarged drawing	3		
• Lining in the external paper (Rhombus)	1		
• Neatness and Presentation	1		
Total	**20**		

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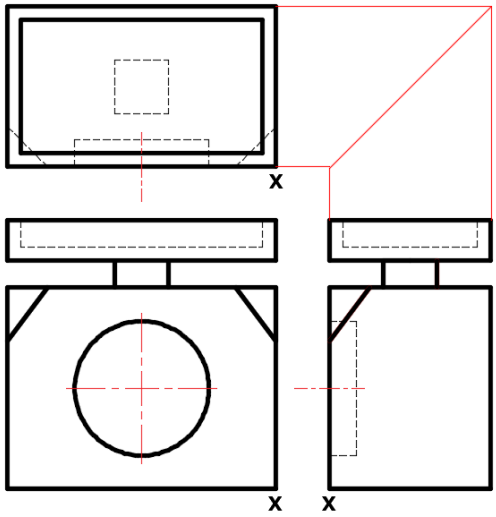
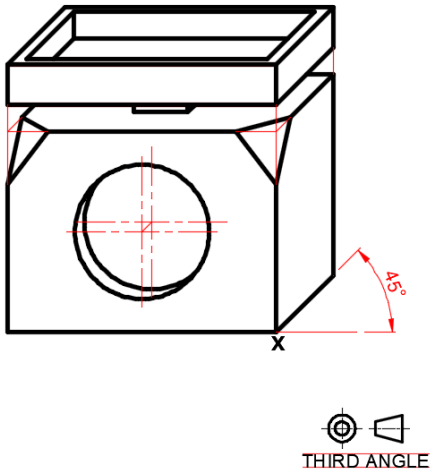
Teacher's Marking Scheme	**Oblique projection** – Kitchen scales





	Allocated mark	Teacher's mark	Comments
• Drawing the Oblique crate	1		
• Marking and drawing the lower part (body) of the scales	1		
• Drawing the circle on the front	1		
• Projecting the circle on the front back 5mm at 45°	2		
• Drawing the right-hand chamfer	2		
• Drawing the left-hand chamfer	2		
• Drawing the outer part of the upper tray	2		
• Drawing the inner part of the upper tray	2		
• Finishing off the drawing (tray stand)	3		
• Neatness and Presentation	2		
Total	**18**		

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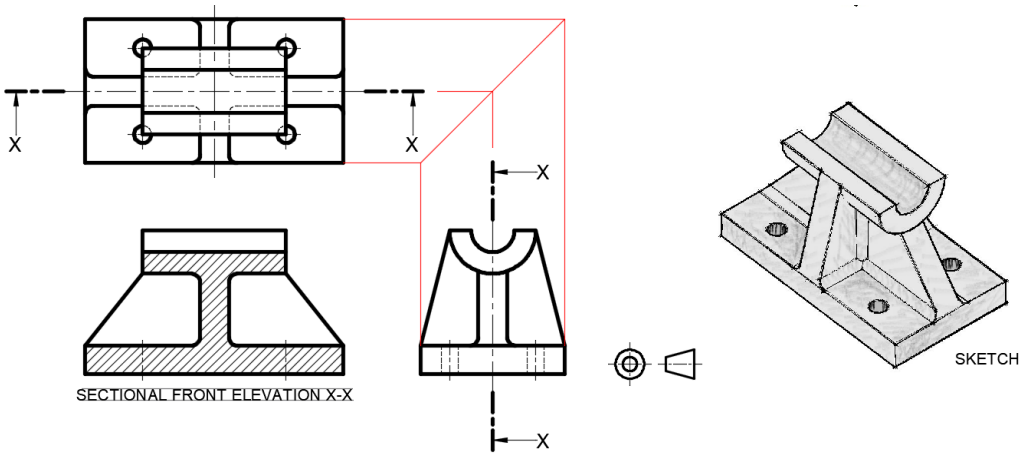
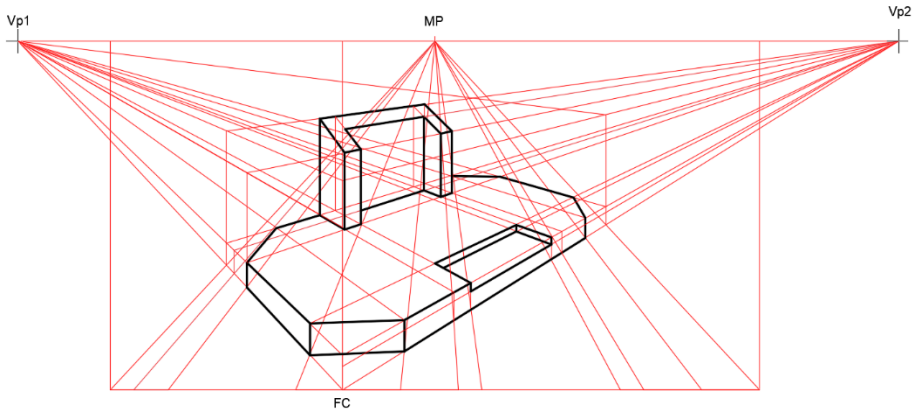
Teacher's Marking Scheme	**Sectioning** – Support station



	Allocated mark	Teacher's mark	Comments
Projecting lines from the End elevation and Plan onto the sectional Front elevation	1		
Lining in the upper sectional semi-cylinder on the sectional Front	2		
Lining in the webs on the sectional Front elevation	3		
Marking the two vertical centre lines (of holes) on the base	2		
Proper hatching with 45˚	4		
Labelling the sectional front elevation using simple block letters	1		
Rendering the sketch (metal)	3		
Total	**16**		

Teacher's Marking Scheme	**2 pt. Perspective** – Stage and Podium



	Allocated mark	Teacher's mark	Comments
Drawing the crate:			
• Joining Vp1 and Vp2 (Horizon)	1		
• Marking the lengths on either side of the front corner (FC)	1		
• Erecting vertical lines to touch the horizon and finding the Mid-point	1		
• Joining the lines from the front corner to Vp1 and Vp2	1		
• Joining lines to Mid-point from marked lengths and erecting the sides of the crate	2		
• Finishing off the crate	1		
Drawing the stage:			
• Marking the height of the base and closing the base plane	1		
• Marking and outlining the front base chamfers	2		
• Marking and outlining the back base chamfers	1		
• Marking the height and width of the front step and shifting lines back to Vp1 and Vp2 to form the step in perspective	2		
Drawing the podium:			
• Marking and erecting the sides of the podium	2		
• Finishing off the podium by adding its front part	1		
Overall drawing:			
• Overall Neatness and Presentation	2		
Total	**18**		

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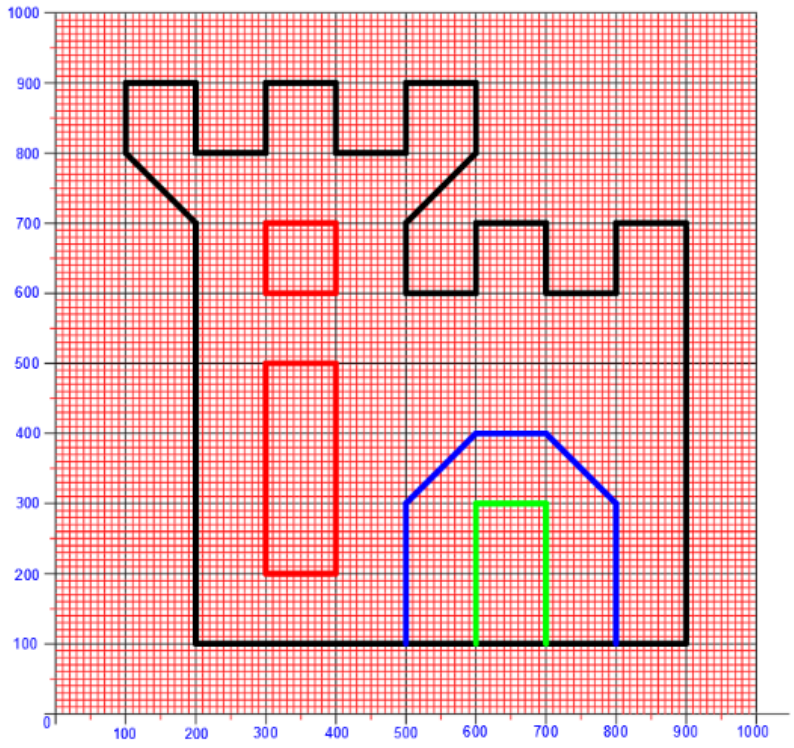
Teacher's Marking Scheme	**Computer Graphics** – Castle



	Allocated mark	Teacher's mark	Comments
• Marking letters on the Grid according to the given Data	2		
• Drawing Part 1 according to the given data set	4		
• Applying colour to Part 1	1		
• Drawing Part 2 according to the given data set	1		
• Applying colour to Part 2	1		
• Drawing Part 3 according to the given data set	1		
• Applying colour to Part 3	1		
• Drawing Part 4 according to the given data set	1		
• Applying colour to Part 4	1		
• Drawing Part 5 according to the given data set	1		
• Applying colour to Part 5	1		
• Neatness and Presentation	1		
Total	**16**		

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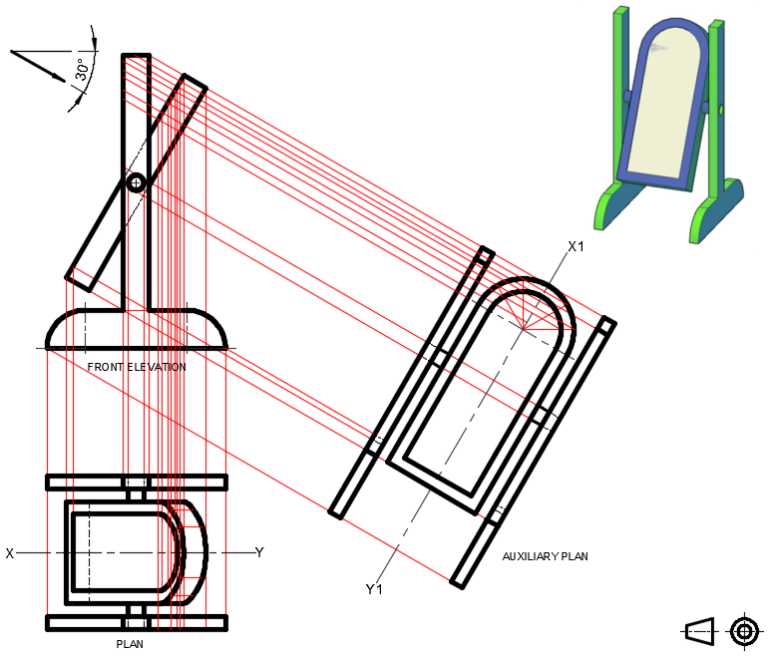
Teacher's Marking Scheme	**Auxiliary views** – Standing Mirror



	Allocated mark	Teacher's mark	Comments
• Dividing the semi-circle on the Auxiliary plan using 30°/60°	1		
• Generating lines from 30°/60° to the Front elevation	1		
• Dropping lines onto the plan	1		
• Marking the widths of the arcs on the orthographic plan from the auxiliary plan	3		
• Drawing the two arcs of the frame on the orthographic plan	2		
• Marking and drawing the depth of the arced frame	2		
• Generating the remaining lines from the auxiliary plan to the Front elevation	2		
• Dropping the remaining generators from the Front elevation onto the orthographic plan	1		
• Marking the remaining widths from the auxiliary plan onto the orthographic plan using the X1-Y1 line as datum	4		
• Lining in the frame of the mirror	1		
• Marking the width and lining in the left stand	1		
• Marking the width and lining in the right stand	1		
• Finishing off the drawing including hidden detail	2		
• Neatness and Presentation	2		
Total	**24**		

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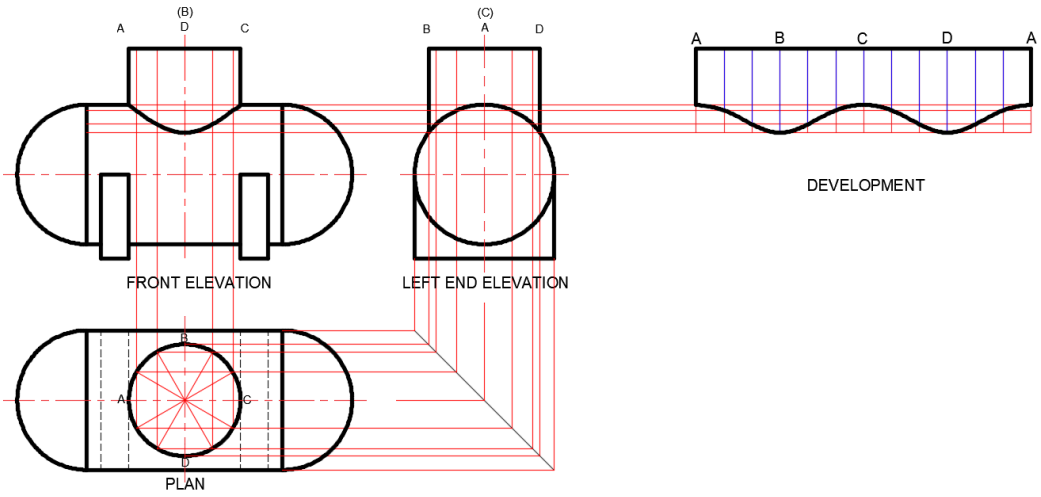
Teacher's Marking Scheme	**Intersection of Cylinders** – Water Tank



	Allocated mark	Teacher's mark	Comments
Drawing the Front			
• Dividing circle in Plan into twelve equal parts	1		
• Projecting lines upwards onto the Front elevation	1		
• Projecting lines onto the End elevation via the 45° line	1		
• Generating lines from the End elevation onto the Front	1		
• Marking the points of the cut on the Front elevation and line in with a smooth curve (intersection)	3		
• Neatness and Presentation	1		
Drawing the Development			
• Marking the same twelve divisions on line ABCDA	2		
• Dropping vertical lines from the divisions	1		
• Generating lengths from the Front elevation onto the development	1		
• Lining in the cut with a smooth curve	3		
• Outlining the rest of the development	2		
• Neatness and Presentation	1		
Total	**18**		

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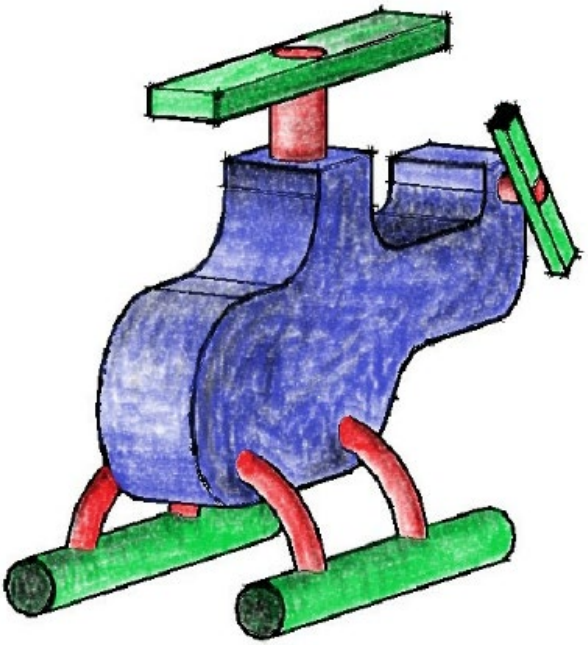
Teacher's Marking Scheme	**Assembly drawing** – Toy Helicopter



	Allocated mark	Teacher's mark	Comments
• Drawing the profile of the helicopter's body (fuselage)	3		
• Generating the width of the body	2		
• Drawing the top vertical cylinder (rotor mast)	1		
• Drawing the top rotor blade	2		
• Drawing the small horizontal cylinder that attaches the tail rotor to the body	1		
• Drawing the tail rotor	2		
• Drawing the four curved bars attaching the fuselage to the landing skids	2		
• Drawing the two cylindrical landing skids	2		
• Colouring the helicopter	3		
• Neatness and Presentation	2		
Total	**20**		

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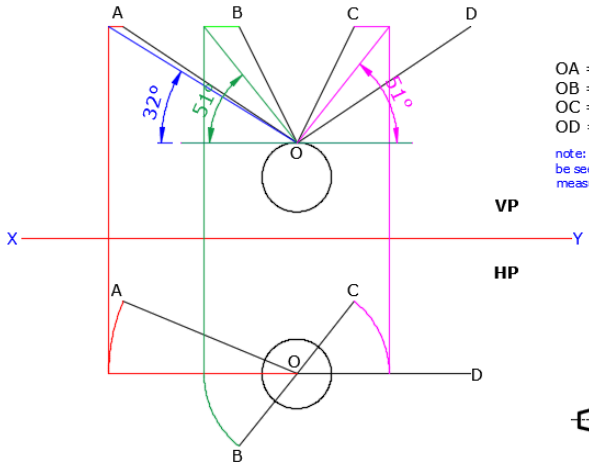
Teacher's Marking Scheme	**Lines in space** – Decoration ball



OA = 76 mm
OB = 51 mm
OC = 51 mm
OD = 72 mm

note: since OD is parallel to the VP, as can be seen when looking on the HP, it can be measured directly from the VP

a) True length of original string: 250 mm

b) True angle with the horizontal of:

AO: 32 °

BO: 51 °

CO: 51 °

	Allocated mark	Teacher's mark	Comments
Finding the true length of OA	3		
Finding the true length of OB	3		
Finding the true length of OC	3		
Measuring the true length of OD	1		
Calculating the true length of the original string	1		
Measuring and printing the true angle of AO with the horizontal plane	2		
Measuring and printing the true angle of BO with the horizontal plane	2		
Measuring and printing the true angle of CO with the horizontal plane	2		
Neatness and Presentation	1		
Total	**18**		

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Step-by-step solutions

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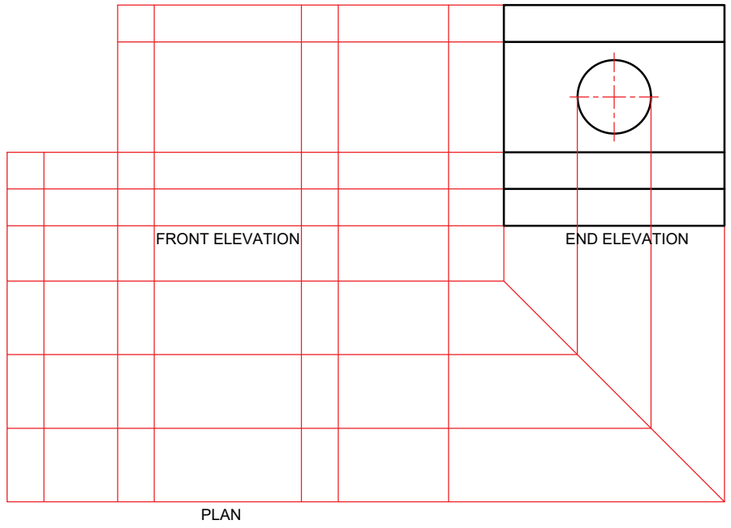
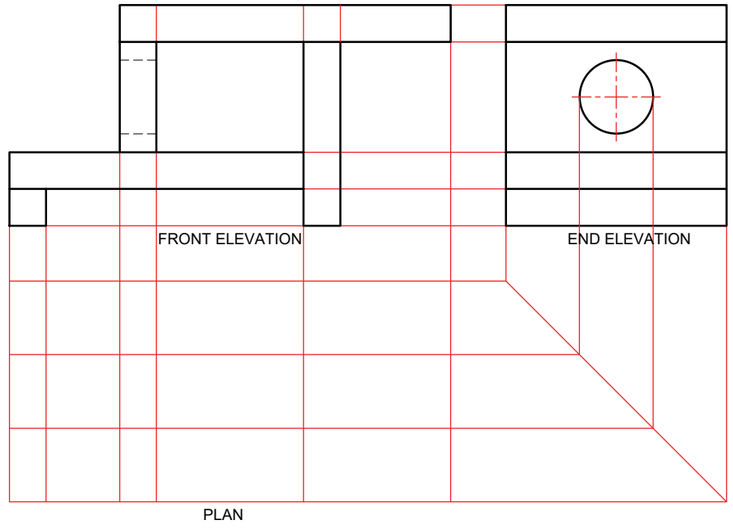
Step A

1. Project faint lines onto the Front elevation and Plan;
2. Line in the Orthographic crate;
3. Mark the Horizontal widths on the Front elevation and project faint lines downwards onto the Plan.



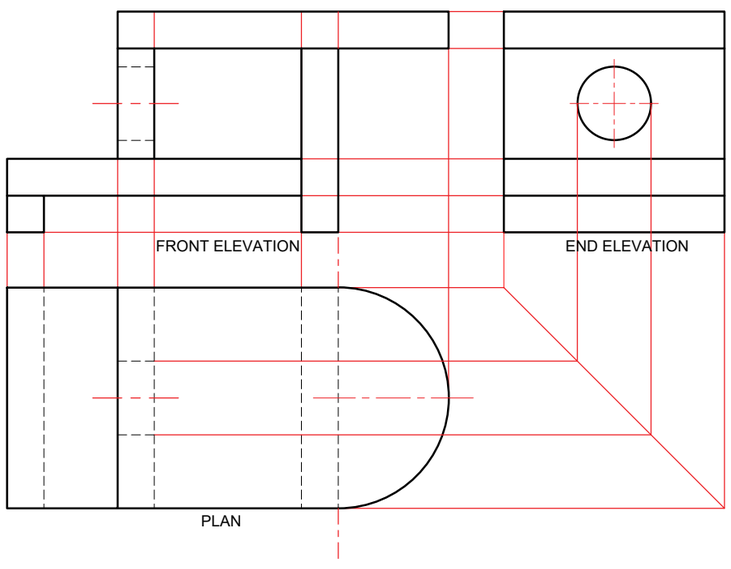
Step B - FRONT ELEVATION

1. Outline the Horizontal Top and bottom shelf;
2. Outline the three Vertical sides;
3. Mark the hidden detail of the circular hole.



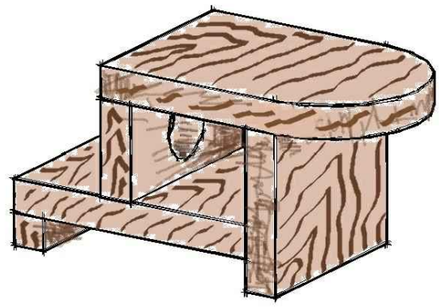
Step C - PLAN

1. Draw the semi-circular Top on the right;
2. Complete the outline of the Top and bottom shelf;
3. Draw the four Vertical Hidden lines;
4. Draw the hidden detail of the circular hole and centre lines.

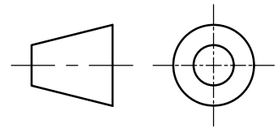


Step D

1. Draw the symbol of 1st angle projection;
2. Render the sketch.



SKETCH



SYMBOL for 1st ANGLE

DATE:	TITLE: COFFEE TABLE - STEP BY STEP SOLUTION	NAME:	CLASS:

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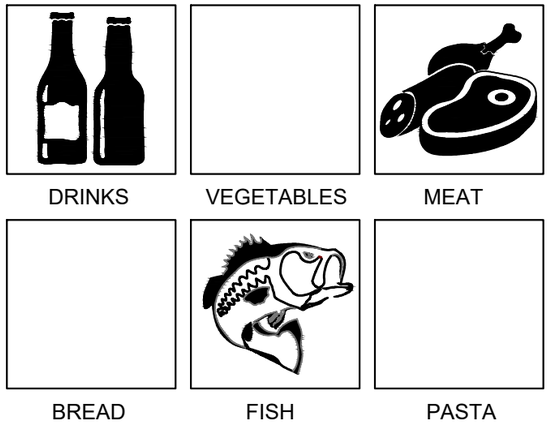
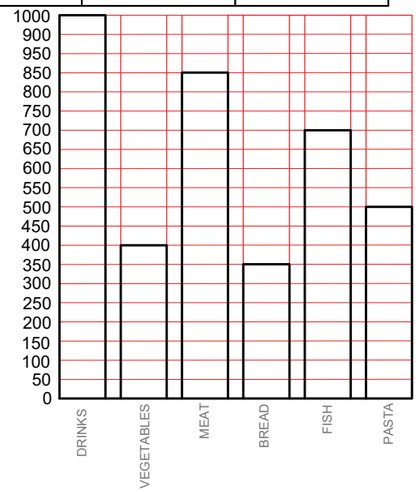
Step A

1. Draw a number of preparatory sketches in the space provided.

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500

Space for preparatory sketches



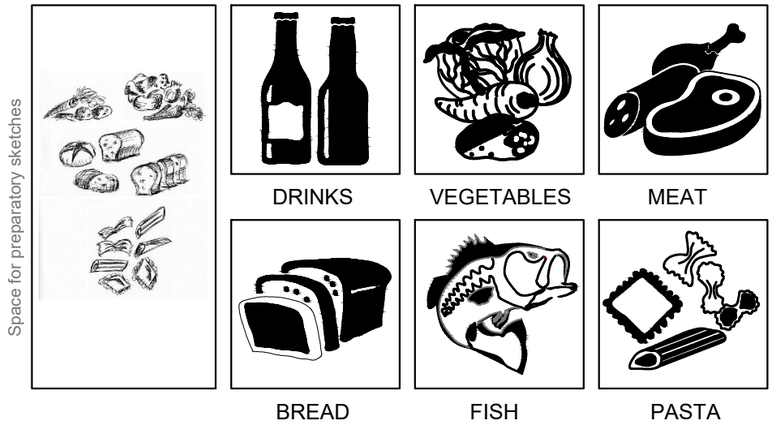


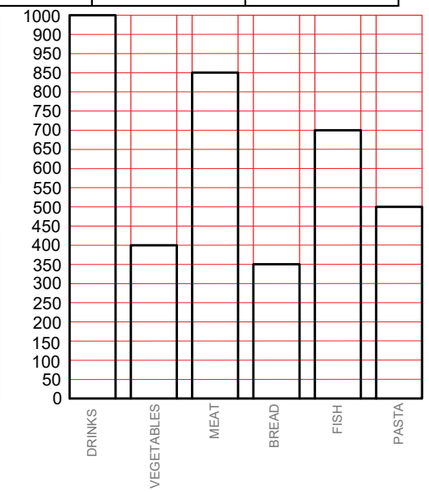
Step B

1. Choose the best sketches and draw the proper pictograms were appropriate;
2. Render the pictograms using black.

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500

Space for preparatory sketches



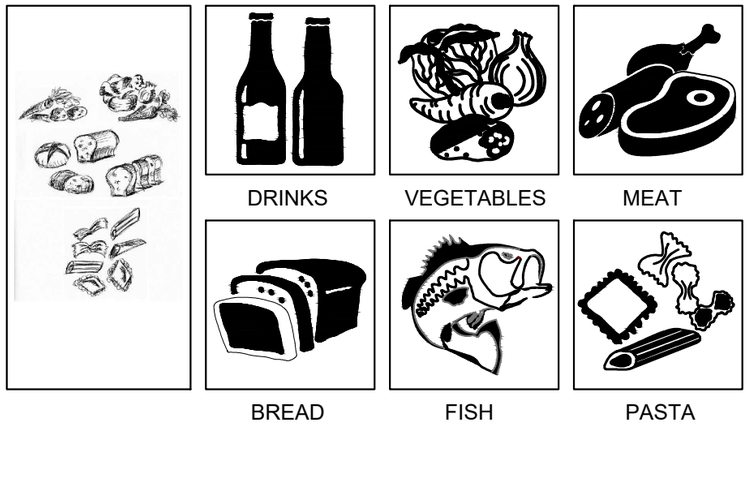


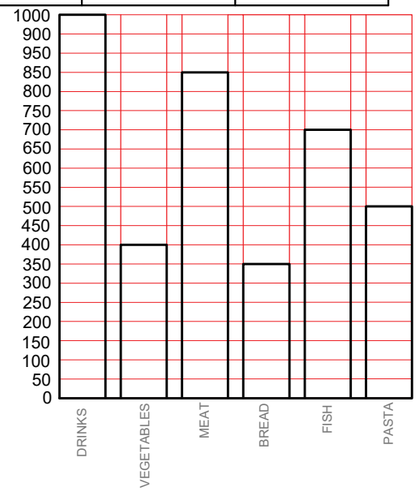
Step C

1. Transfer data from table to graph.

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500

Space for preparatory sketches



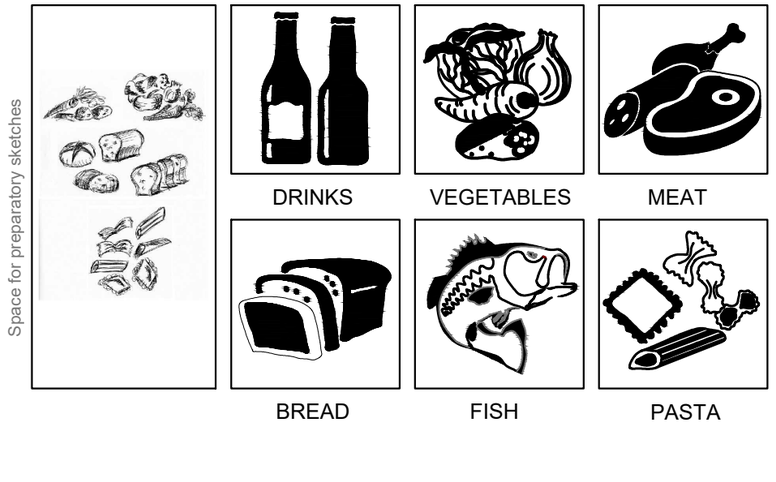


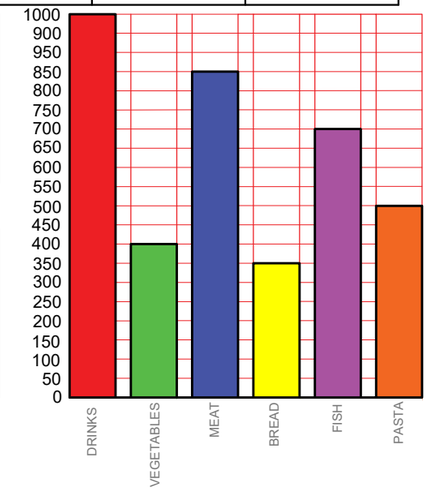
Step D

1. Colour the bars on the graph.

SOLD	DRINKS	VEGETABLES	MEAT	BREAD	FISH	PASTA
Amount in Euros	1000	400	850	350	700	500

Space for preparatory sketches





DATE:	TITLE: SUPERMARKET ITEMS - STEP BY STEP SOLUTION	NAME:	CLASS:

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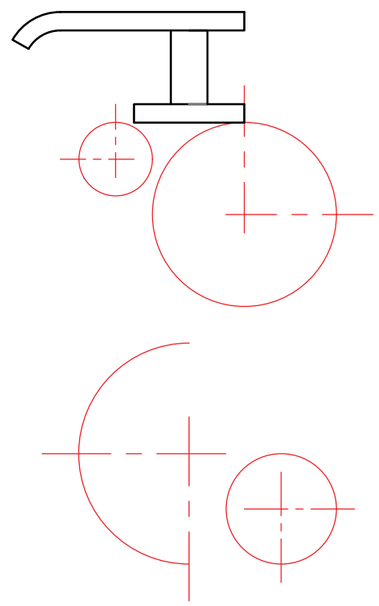
Step A

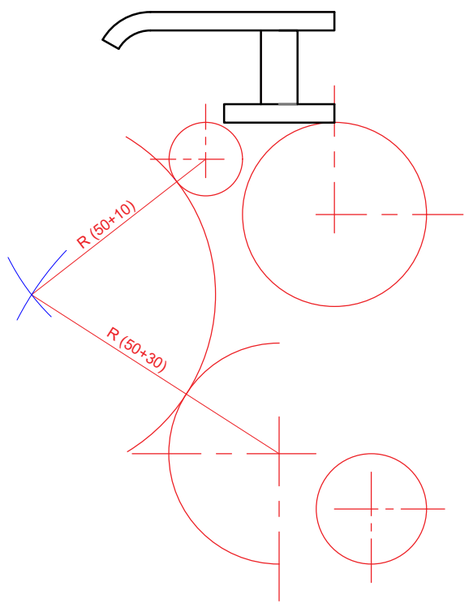
1. Draw circles R10, R25, R15, R30 on the centre lines provided.



Step B

1. Construct the centre of R50 (R50 + R10 = R60); (R50 + R30 = R80). Draw arcs of R60 and R80 to find the centre of the arc.

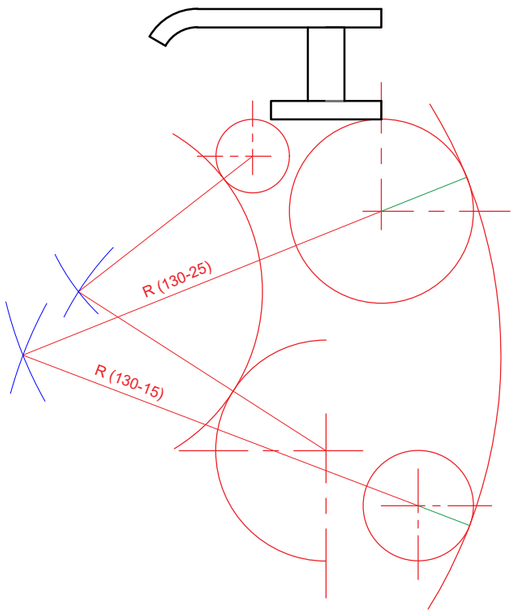
2. Draw arc R50 from the new centre.



Step C

1. Construct the centre of R130 (R130 - R25 = R105); (R130 - R15 = R115). Draw arcs of R105 and R115 from each appropriate centre.

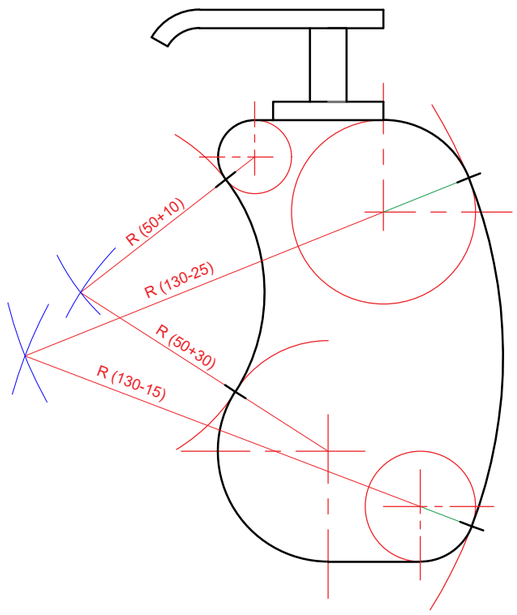
2. Draw arc R130 from the new centre.



Step D

1. Finish off the drawing by outlining the correct shape.

2. Mark tangential points between arcs by short dashes.



DATE:	TITLE: SOAP DISPENSER - STEP BY STEP SOLUTION	NAME:	CLASS:

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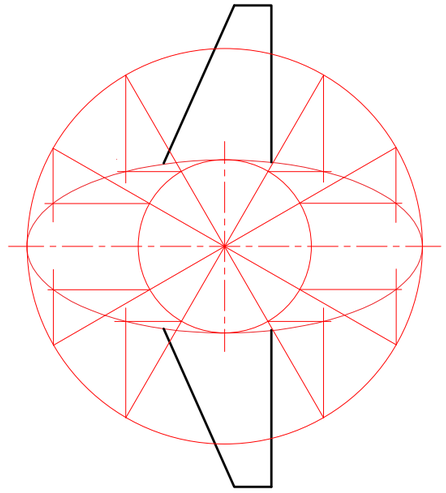
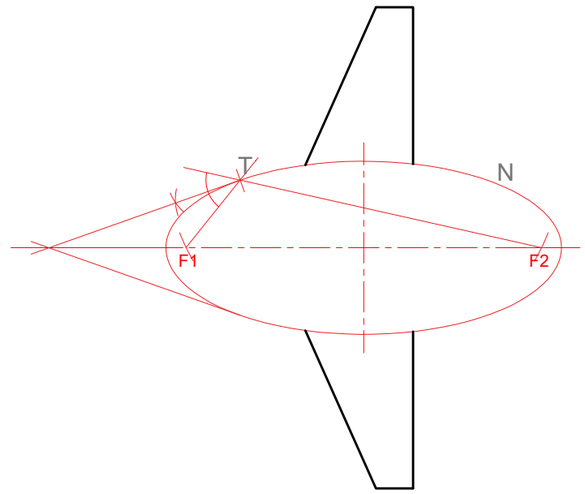
Step A

1. Construct the ellipse using any accepted method (in this case auxiliary / concentric circle method).



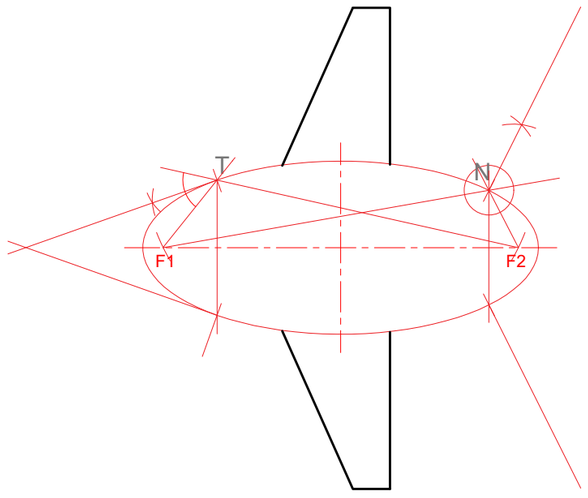
Step B

1. Find the Focal Points on the Major Axis;
2. Construct a Tangent at point T (bisection of angle);
3. Reflect the tangent horizontally.



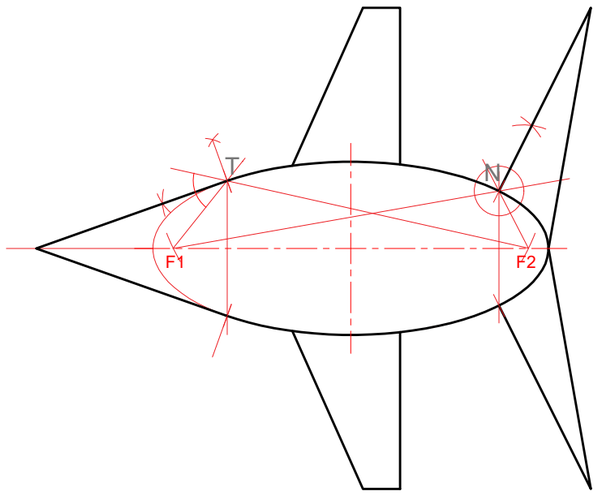
Step C

1. Construct a Normal at point N;
2. Reflect the Normal horizontally.



Step D

1. Finish off the tail (height is equal to that of the wings).



DATE:	TITLE: PLANE - STEP BY STEP SOLUTION	NAME:	CLASS:

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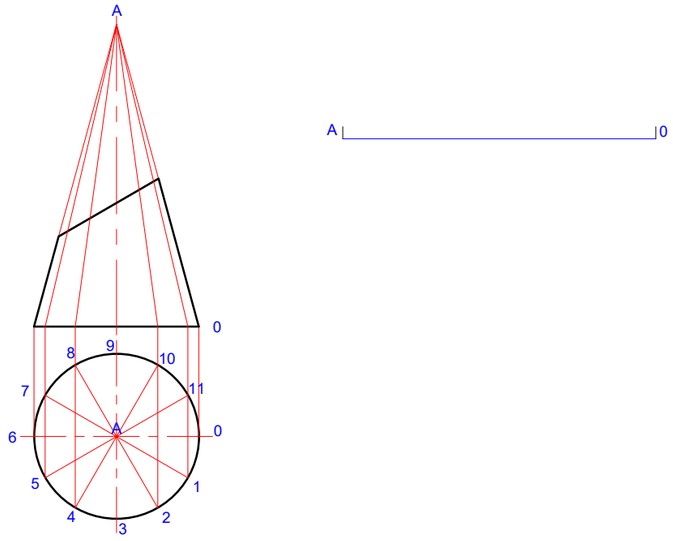
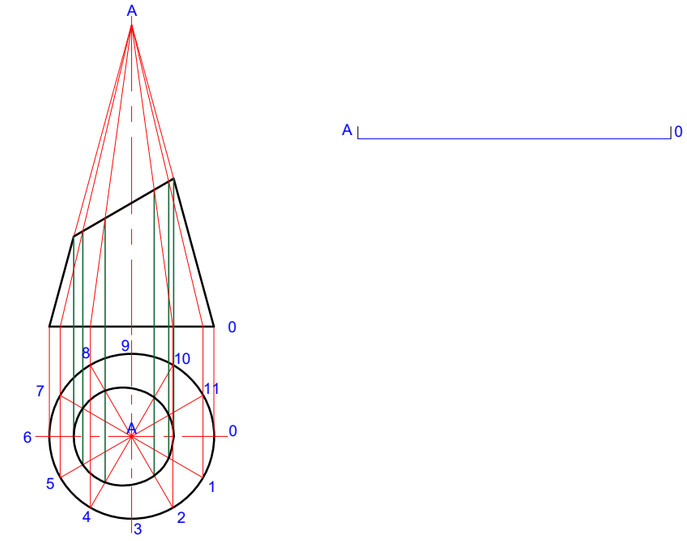
Step A - Cut on Plan

1. Divide the circle with 30°/60°;
2. Generate lines to the base of the Front elevation;
3. Connect radial lines to the vertex of the cone.



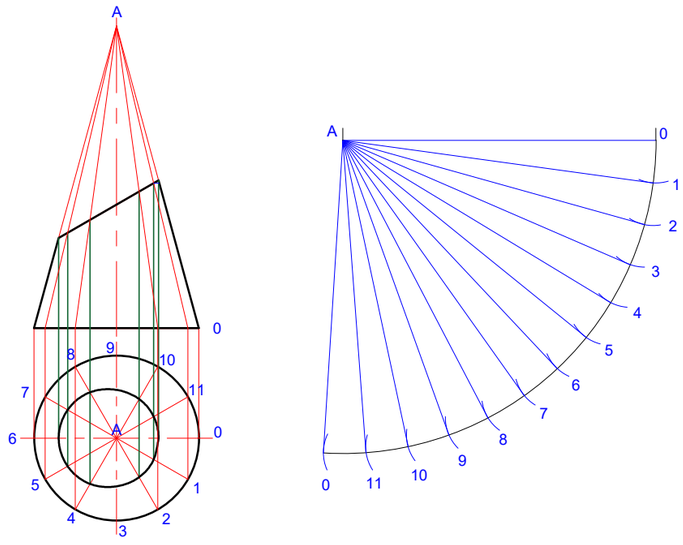
Step B - Cut on Plan

1. Generate radial lines from the cut on the Front elevation to the Plan and mark points of cut on the Plan;
2. Join points to form the cut on the Plan.



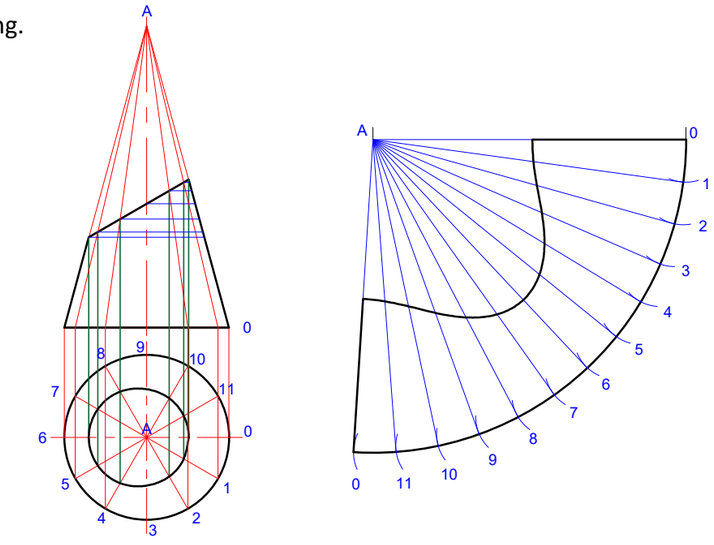
Step C - Development

1. Draw an arc at point A using the true length of the cone (furthest line out);
2. Mark twelve divisions on the development (equal to the sections on the circumference);
3. Connect lines from point A (vertex) to the twelve divisions on the Development.



Step D - Development

1. Generate horizontal lines from the cut onto the true length (furthest line out);
2. Mark the true lengths from the Front elevation onto the development (A - 0);
3. Join the points with a smooth curve to form the cut on the development;
4. Finish off the drawing.



DATE:	TITLE: PHARAOH'S HAT - STEP BY STEP SOLUTION	NAME:	CLASS:

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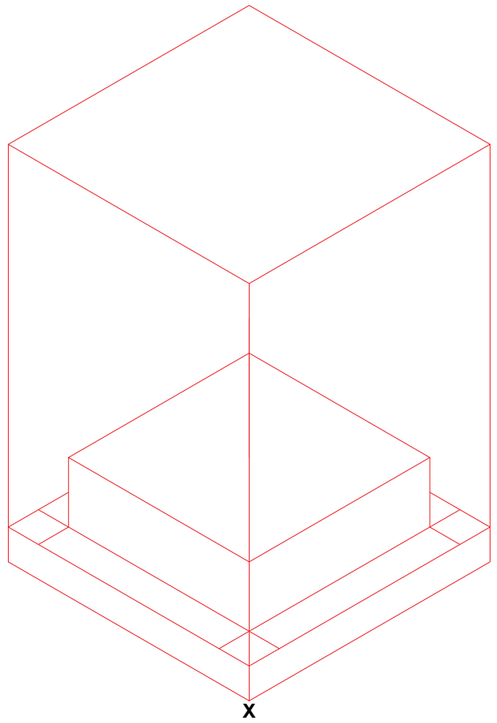
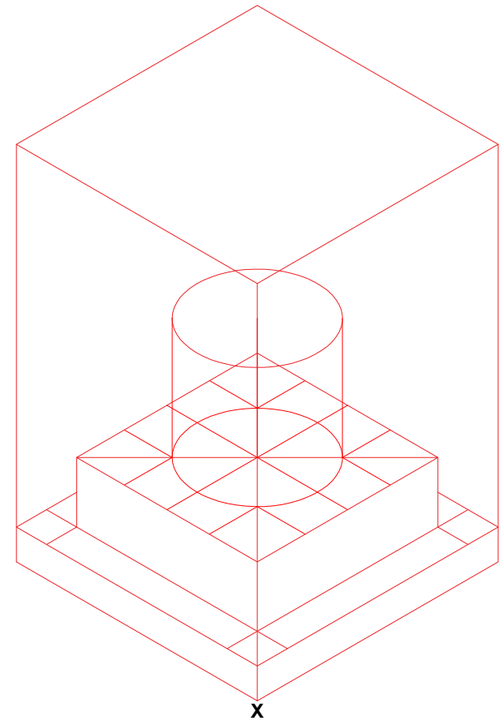
Step A

1. Draw the Isometric crate;
2. Draw the lowest step;
3. Draw the second lowest step.



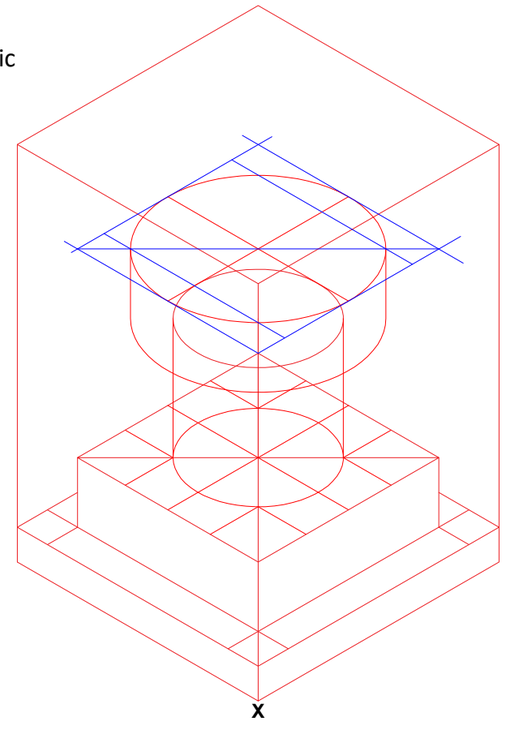
Step B

1. Construct the Isometric circle of the central column;
2. Project the sides of the column.



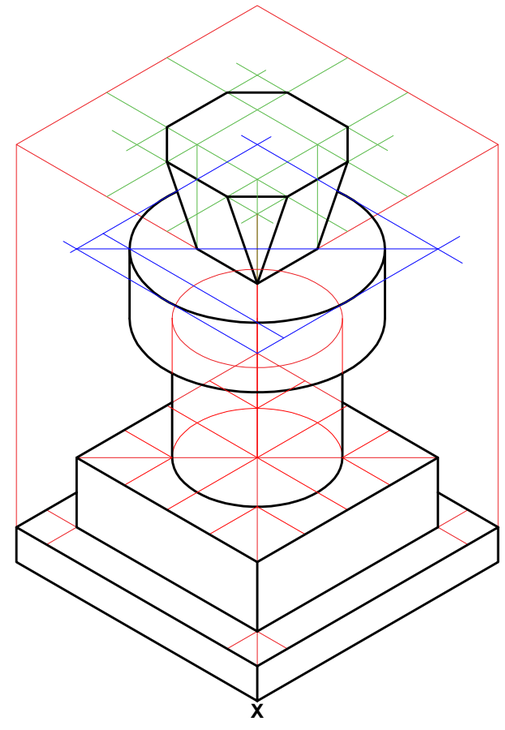
Step C

1. Find and mark the centre of the upper Isometric circle;
2. Construct the upper Isometric circle;
3. Project the depth of the Iso-circle to form the upper cylinder.



Step D

1. Construct the upper irregular octagonal diamond;
2. Finish off the drawing.



DATE:	TITLE: TROPHY - STEP BY STEP SOLUTION	NAME:	CLASS:

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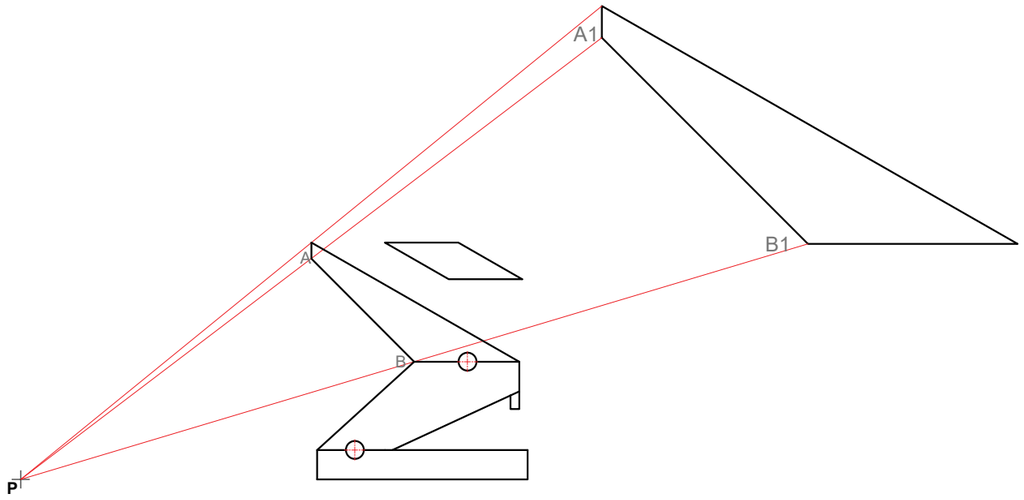
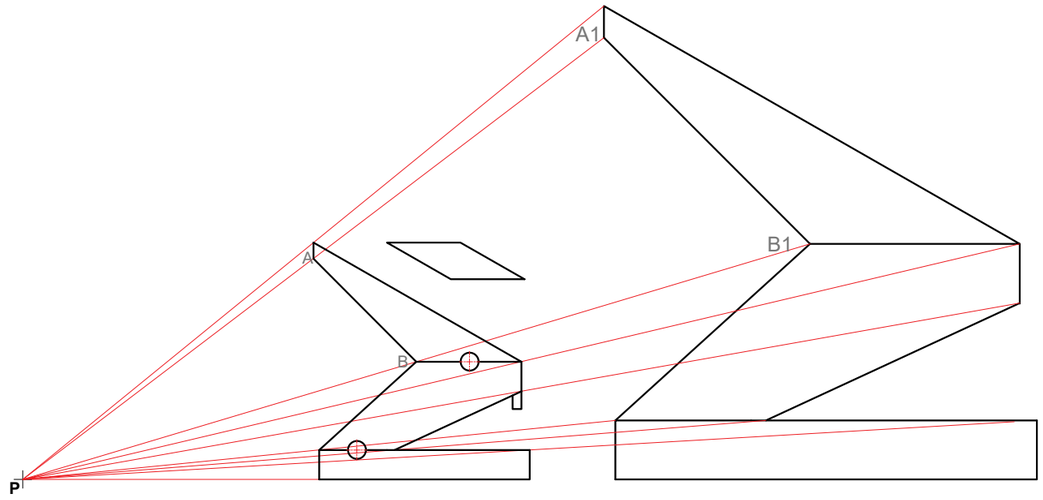
Step A

1. Produce radial lines from pole P towards the drawing and extend them outward;
2. Line in the upper part of the puncher parallel to the original drawing.



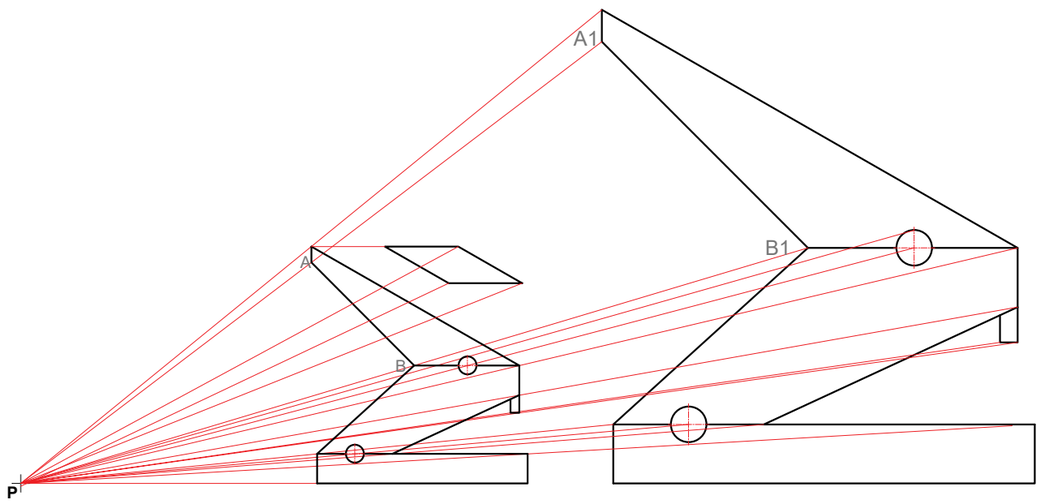
Step B

1. Line in the body of the puncher parallel to the original drawing;
2. Line in the base of the puncher parallel to the original drawing.



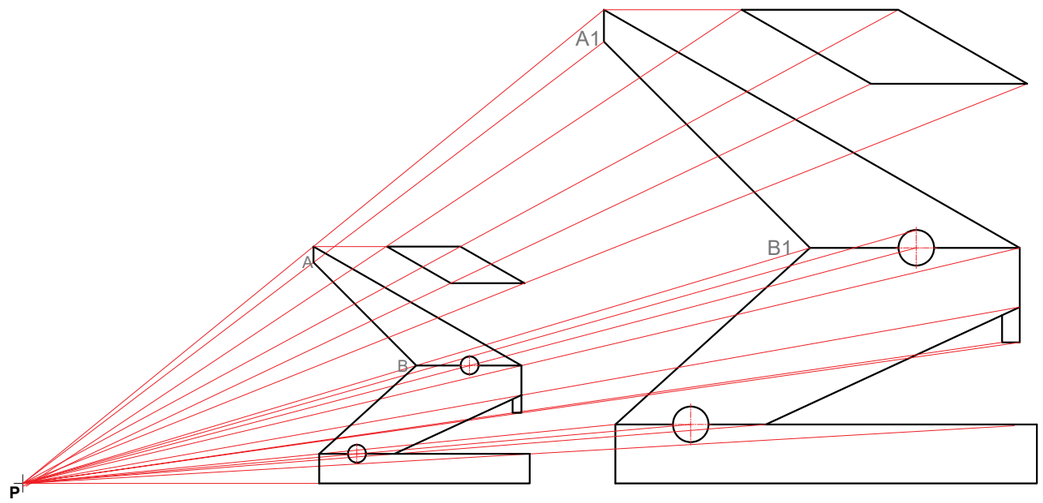
Step C

1. Enlarge the holes and tooth according to the right scale.



Step D

1. Create a link between the puncher and the outside paper (rhombus);
2. Transfer the link onto the enlargement;
3. Line in the enlarged paper (rhombus).



DATE:	TITLE: PAPER PUNCHER - STEP BY STEP SOLUTION	NAME:	CLASS:

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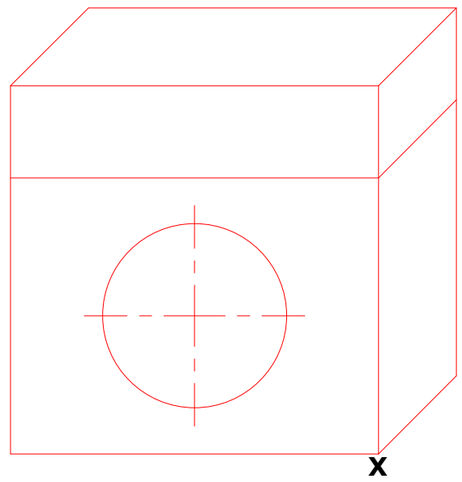
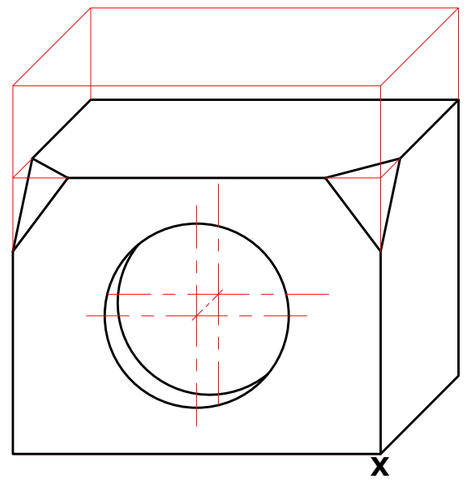
Step A

1. Draw the Oblique crate;
2. Mark the height of the lower part of the scales and draw the circle on the front;
3. Draw the circle on the Front.



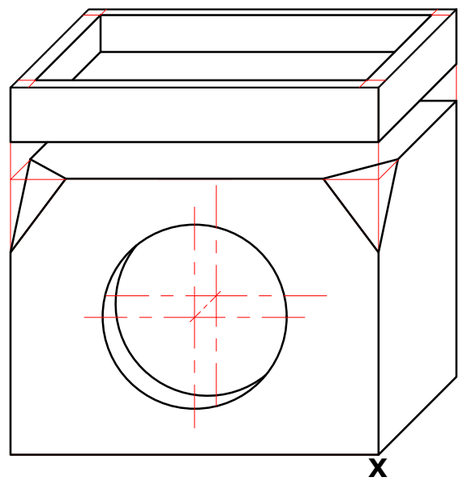
Step B

1. Project the circle on the front back 5mm at 45°;
2. Draw the right-hand and the left hand chamfers.



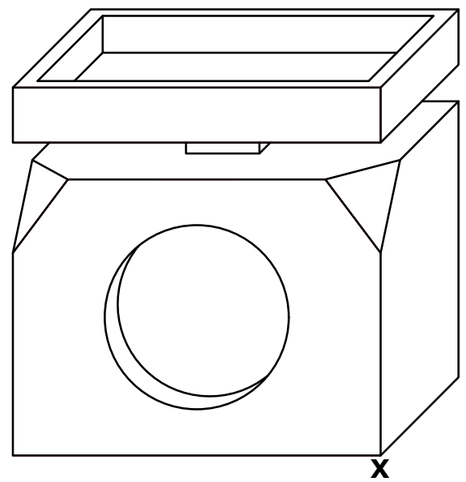
Step C

1. Draw the outer part of the upper tray;
2. Draw the inner part of the upper tray.



Step D

1. Finish off the drawing by adding the tray stand.



DATE:	TITLE: KITCHEN SCALES - STEP BY STEP SOLUTION	NAME:	CLASS:

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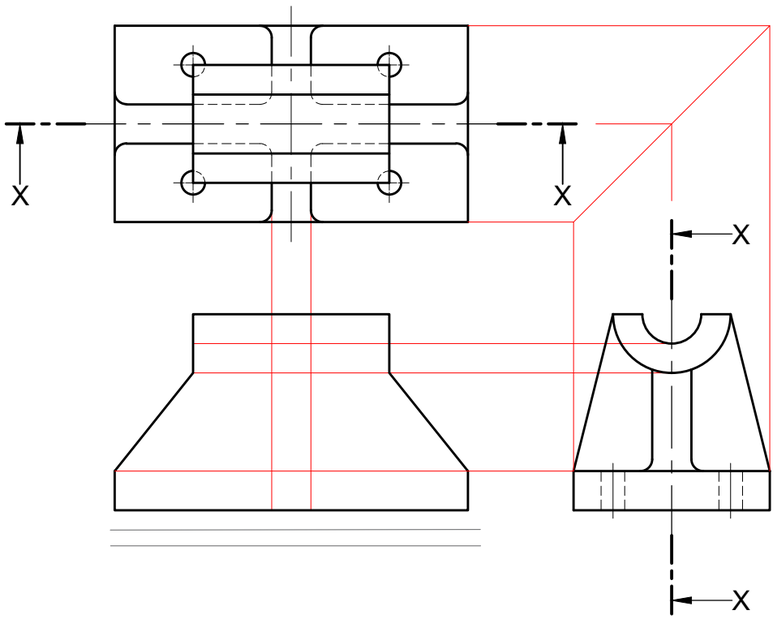
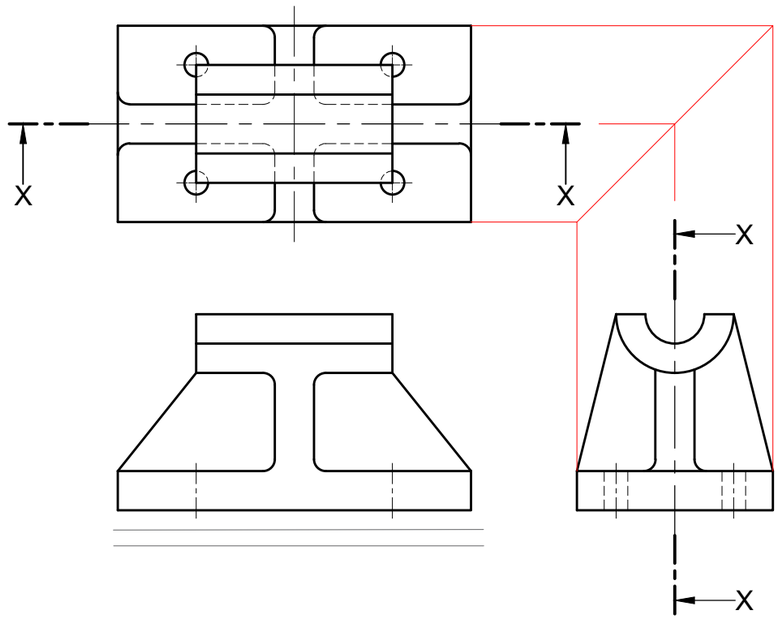
Step A

1. Project lines from the End elevation and Plan onto the Front elevation.



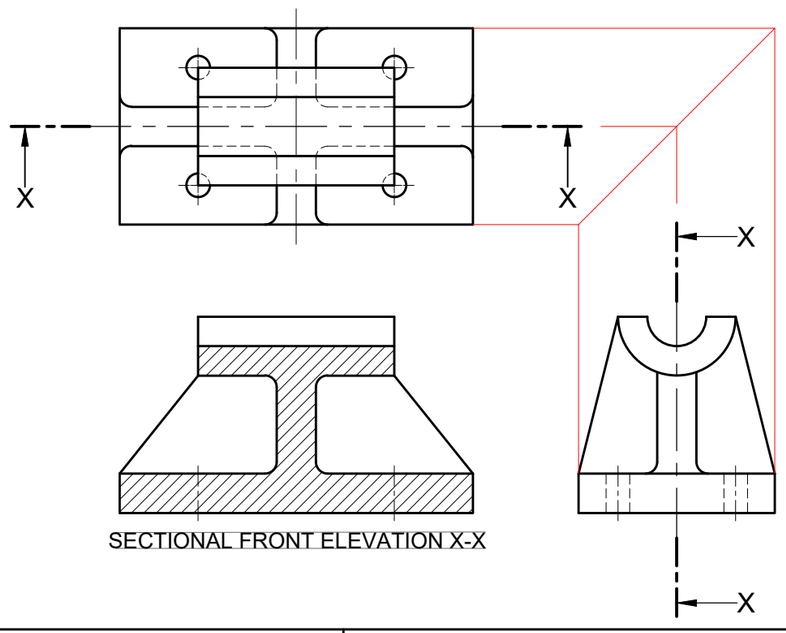
Step B

1. Complete the sectional Front elevation by lining in the upper semi-cylinder and the webs;
2. Mark the two centre lines on the base.



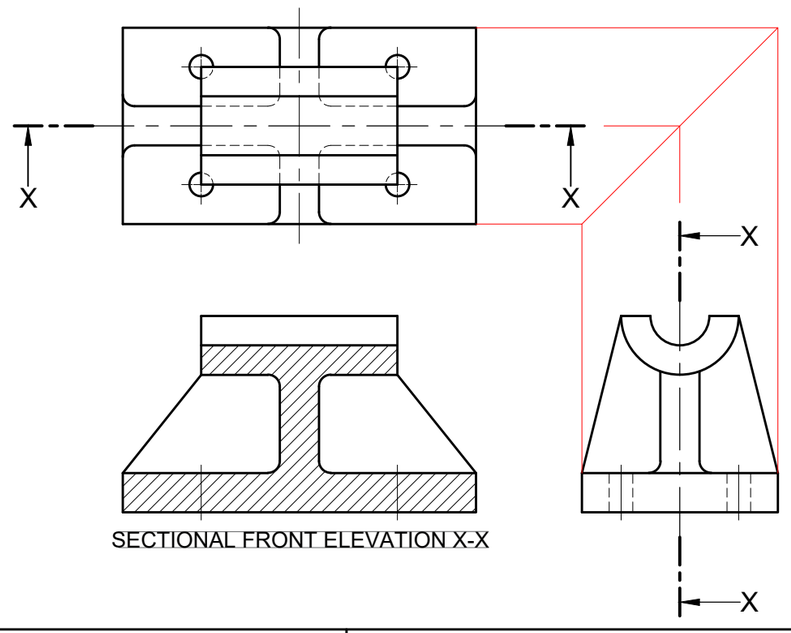
Step C

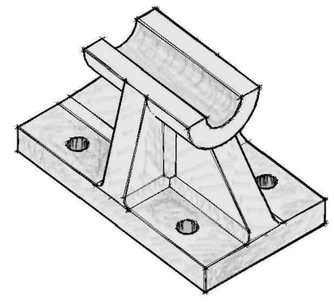
1. Add the hatching at 45°;
2. Label the sectional front elevation.



Step D

1. Render the sketch (metal).





DATE:	TITLE: SECTIONING - STEP BY STEP SOLUTION	NAME:	CLASS:

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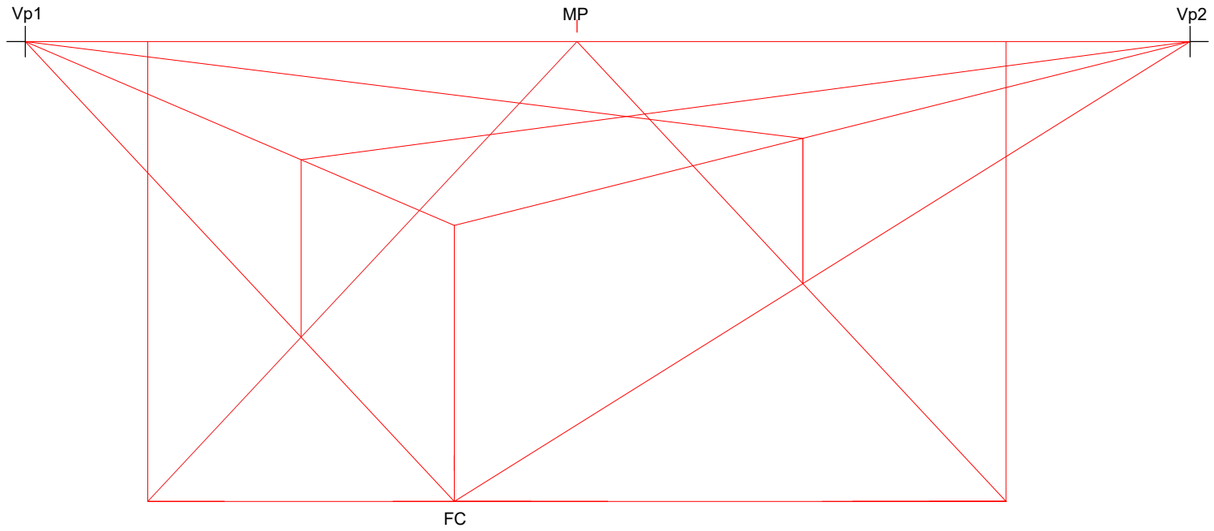
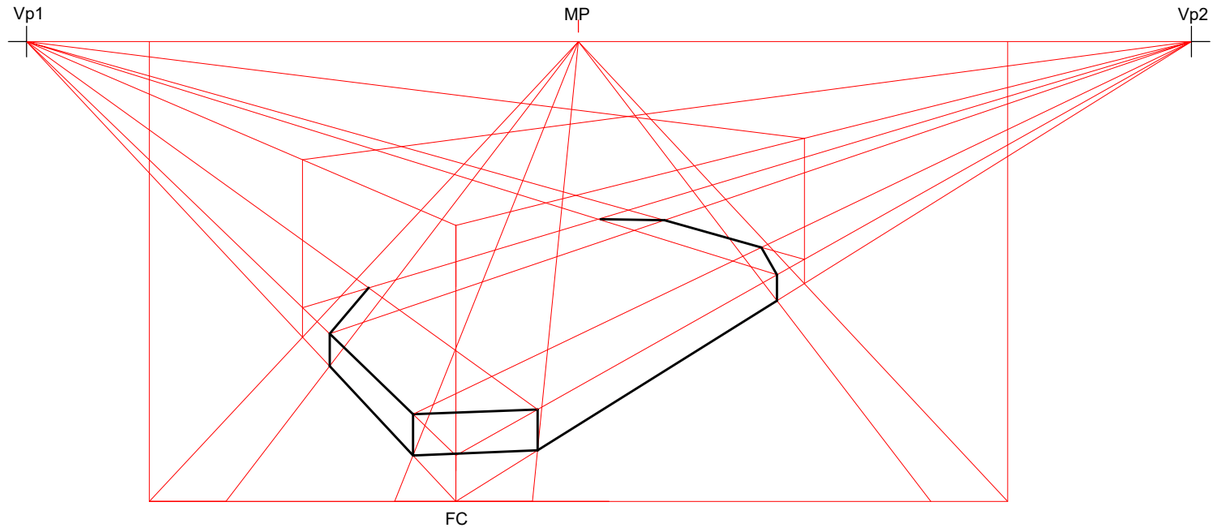
Step A

1. Join Vp1 and Vp2 (Horizon);
2. Mark the lengths on either side of the front corner (FC);
3. Erect vertical lines to touch the horizon and find the Mid-point (MP);
4. Join the lines from the front corner to Vp1 and Vp2;
5. Join lines to Mid-point (MP) from marked lengths and erect the sides of the crate;
6. Finish off the crate.



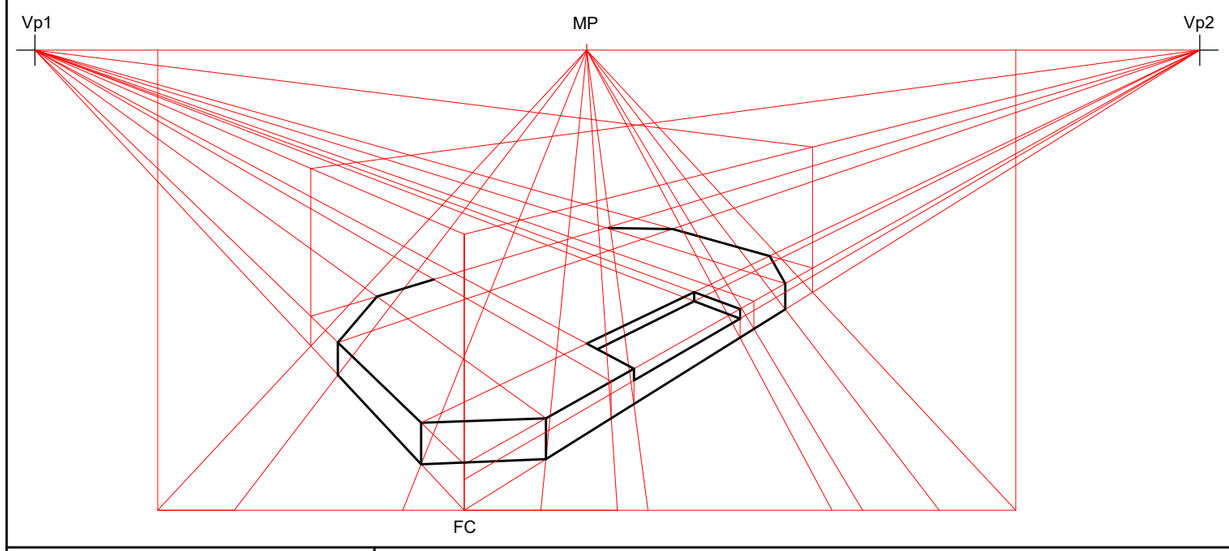
Step B

1. Mark the height of the base and close the base plane;
2. Mark and outline the front base chamfers;
3. Mark and outline the back base chamfers.



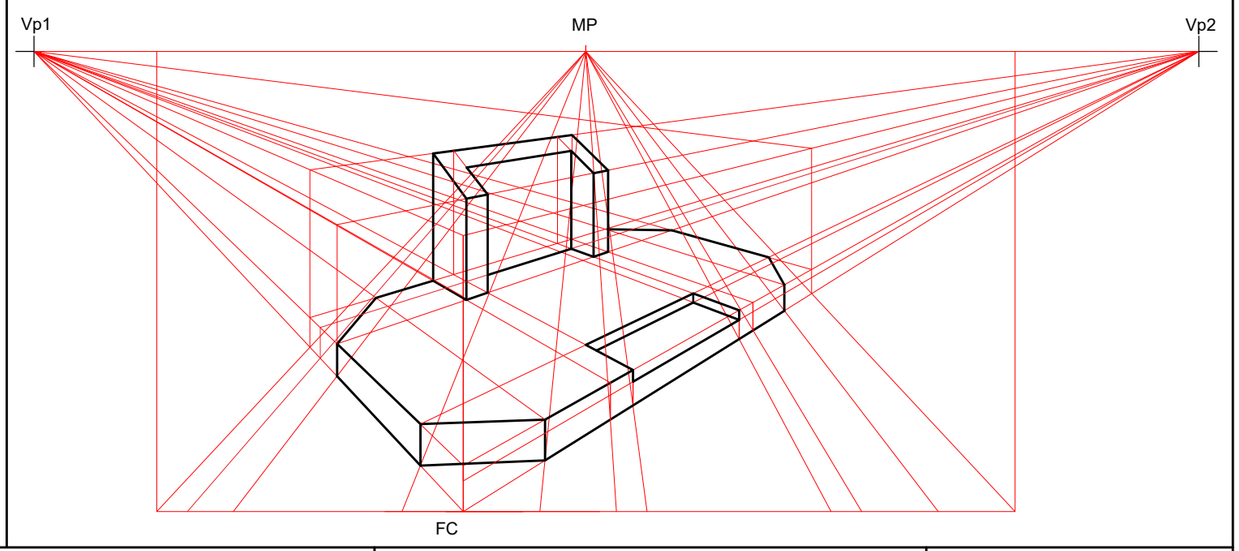
Step C

1. Mark the height and width of the front step and shift lines back to Vp1 and Vp2 to form the step in perspective.



Step D

1. Mark and erect the sides of the podium;
2. Finish off the podium by adding its front.



DATE:	TITLE: STAGE AND PODIUM - STEP BY STEP SOLUTION	NAME:	CLASS:

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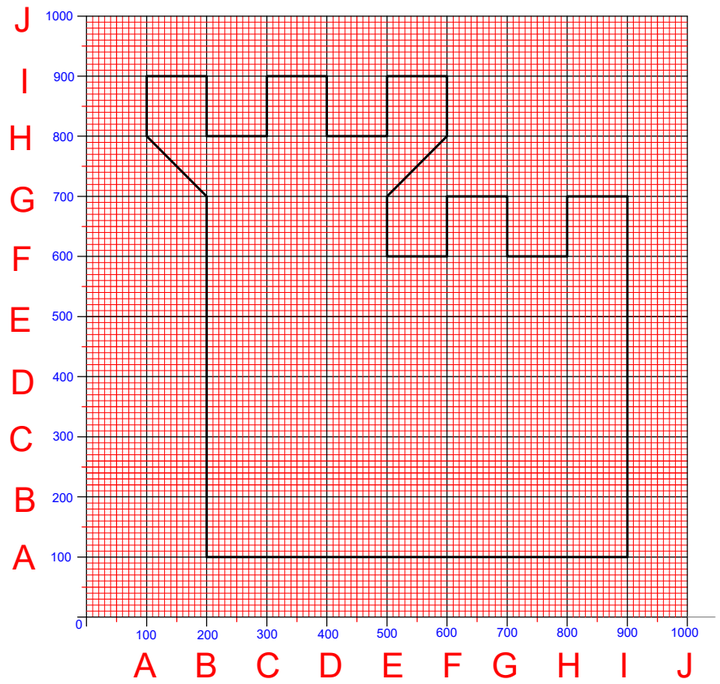
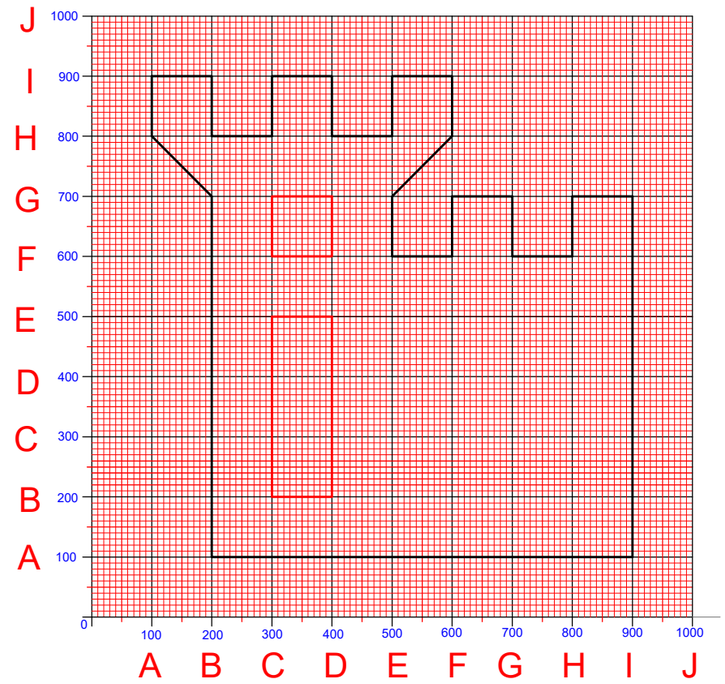
Step A

1. Mark letters on the Grid according to the given data;
2. Draw Part 1 according to the given data set;
3. Apply colour to Part 1.



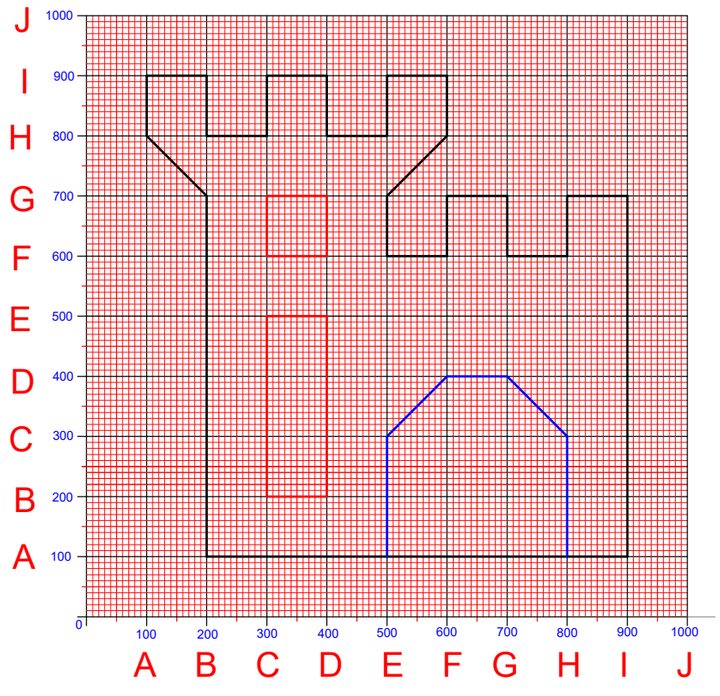
Step B

1. Draw Part 2 according to the given data set;
2. Apply colour to Part 2;
3. Draw Part 3 according to the given data set;
4. Apply colour to Part 3.



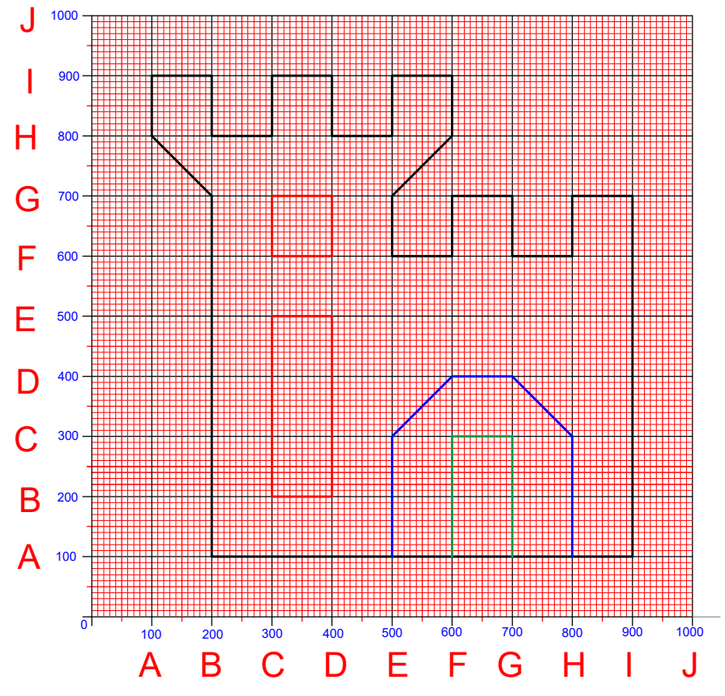
Step C

1. Draw Part 4 according to the given data set;
2. Apply colour to Part 4.



Step D

1. Draw Part 5 according to the given data set;
2. Apply colour to Part 5.



DATE:	TITLE: CASTLE - STEP BY STEP SOLUTION	NAME:	CLASS:

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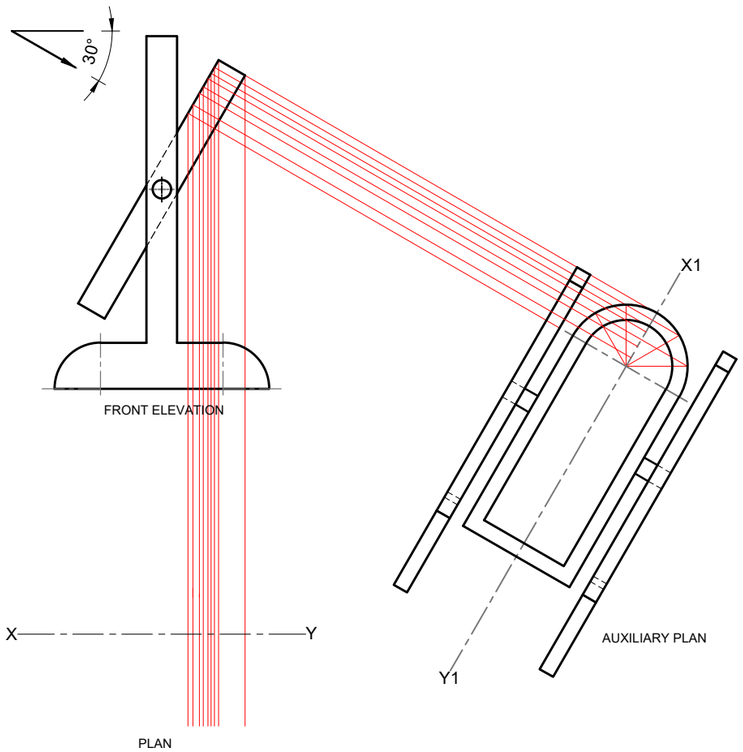
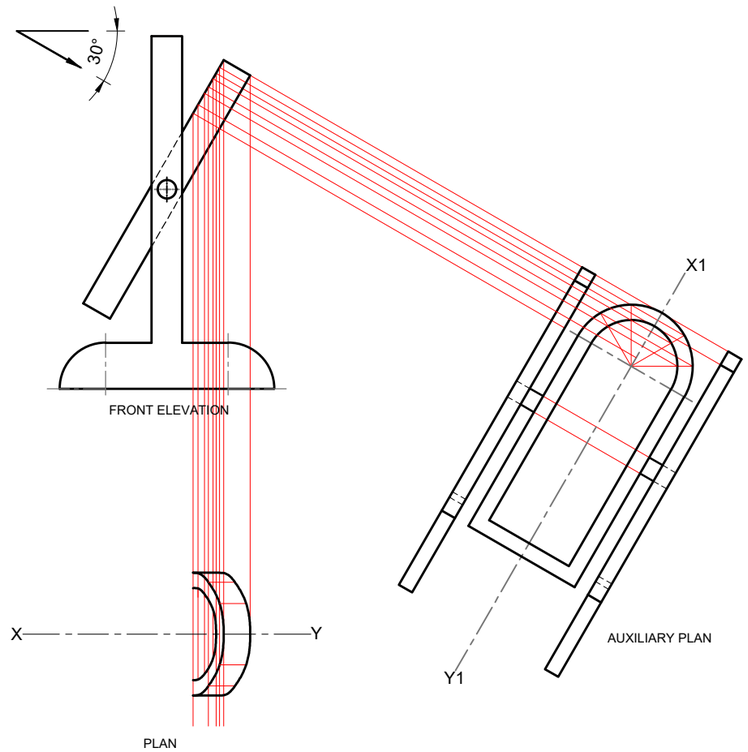
Step A

1. Use 30°/60° to divide the semi-circle on the Auxiliary plan (you can take extra points if necessary);
2. Generate lines from the 30°/60° divisions onto the Front elevation;
3. Drop lines onto the plan from the Front elevation.



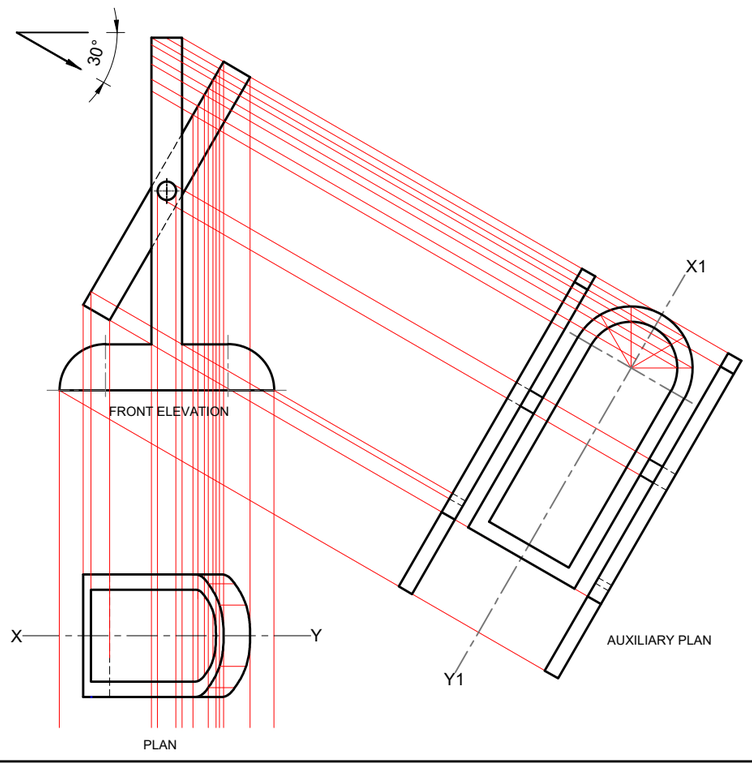
Step B

1. Mark the widths of the arcs on the orthographic plan from the auxiliary plan using X1-Y1 as the datum;
2. Draw the two arcs of the frame on the orthographic plan.
3. Mark and draw the depth of the arced frame.



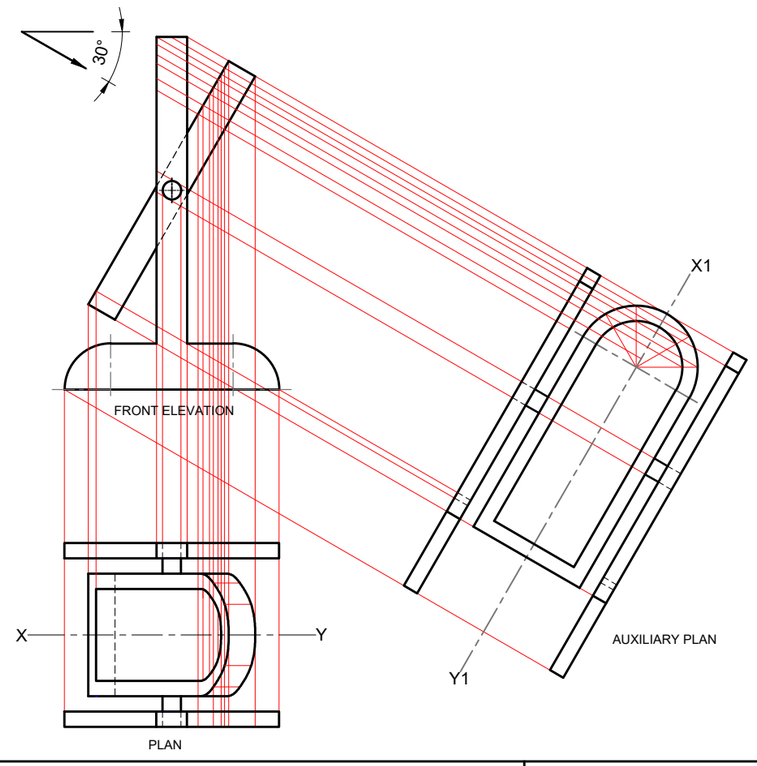
Step C

1. Generate the remaining lines from the auxiliary plan to the Front elevation;
2. Drop the remaining generators from the Front elevation onto the orthographic plan;
3. Mark the widths from the auxiliary plan onto the orthographic plan using the X1-Y1 line as datum;
4. Line in the frame of the mirror.



Step D

1. Mark the width and line in the left stand;
2. Mark the width and line in the right stand;
3. Finish off the drawing including hidden detail.



DATE:	TITLE: STANDING MIRROR - STEP BY STEP SOLUTION	NAME:	CLASS:

This resource pack forms part of a study funded by the ENDEAVOUR scholarships scheme
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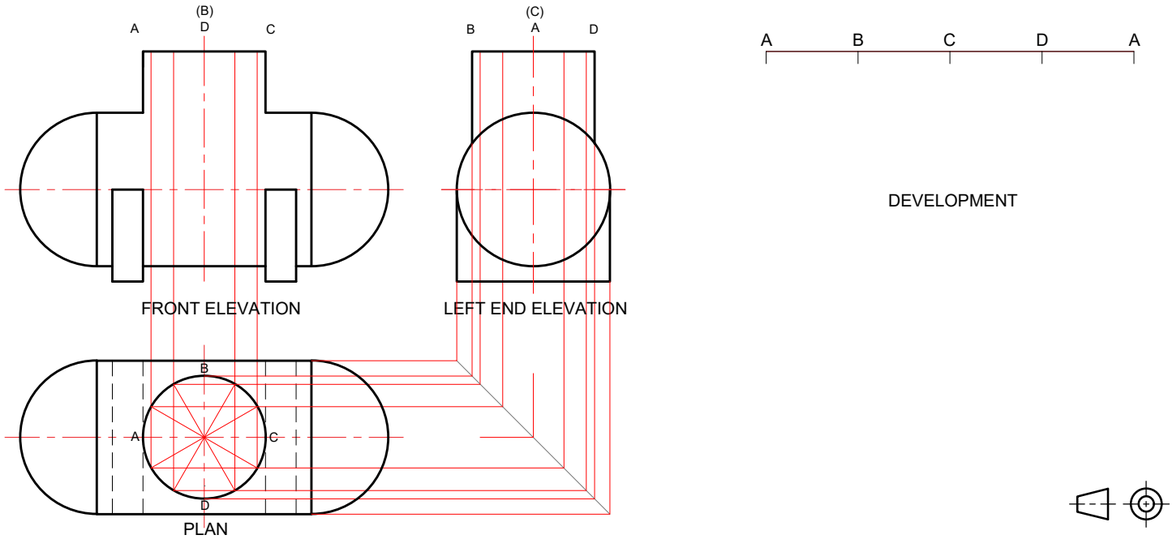
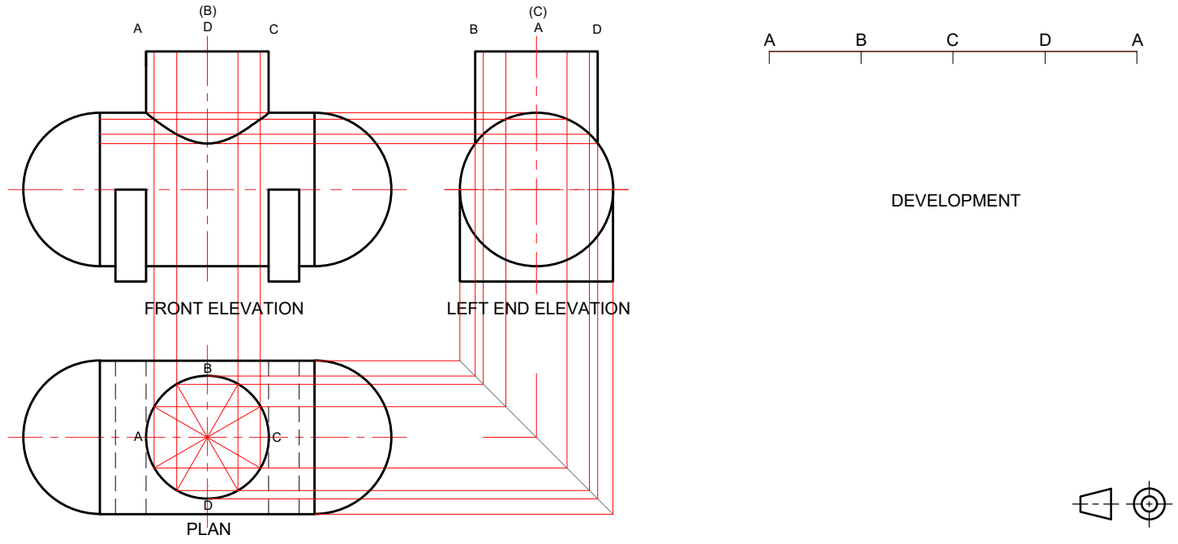
Step A

1. Divide the circle in the Plan into twelve parts;
2. Project lines upwards onto the Front elevation;
3. Project lines onto the End elevation via the 45° line.



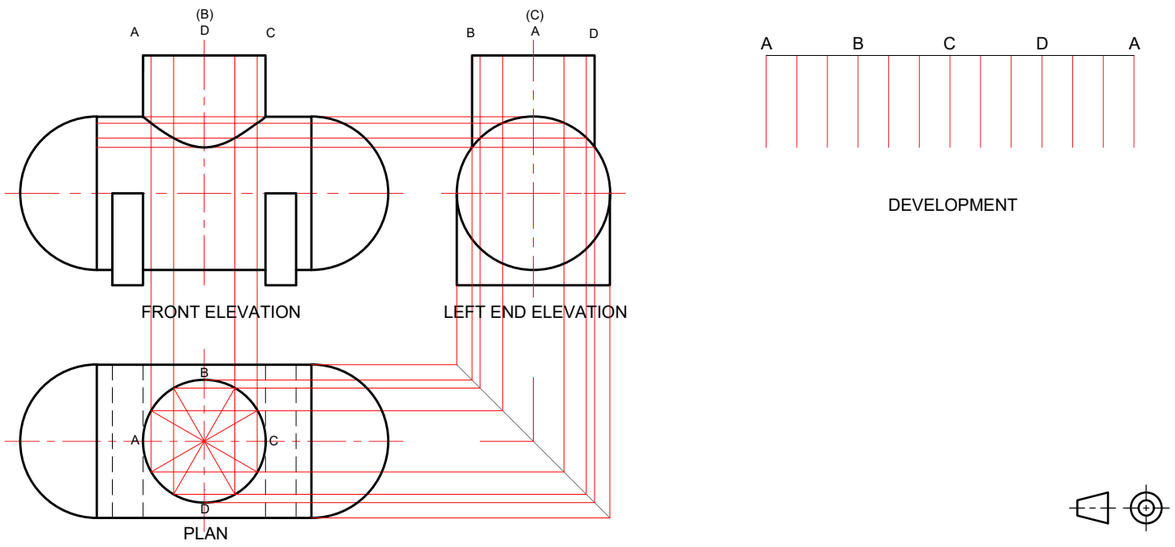
Step B

1. Generate lines from the End elevation onto the Front elevation;
2. Mark the points of the cut on the Front elevation and line in with a smooth curve (intersection).



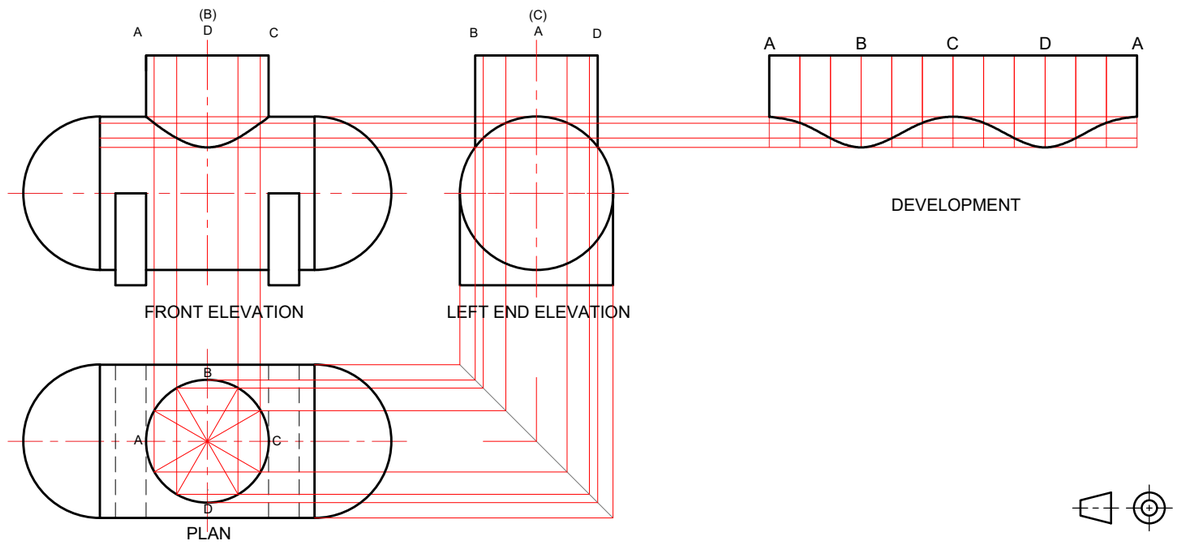
Step C

1. Mark the same twelve divisions on line AA (Development) as those marked on the Plan, (AA is equal to the circumference);
2. Drop vertical lines from the divisions.



Step D

1. Generate lengths from the Front elevation onto the development;
2. Line in the cut on the development with a smooth curve;
3. Outline the rest of the development.



DATE:	TITLE: RESERVOIR - STEP BY STEP SOLUTION	NAME:	CLASS:

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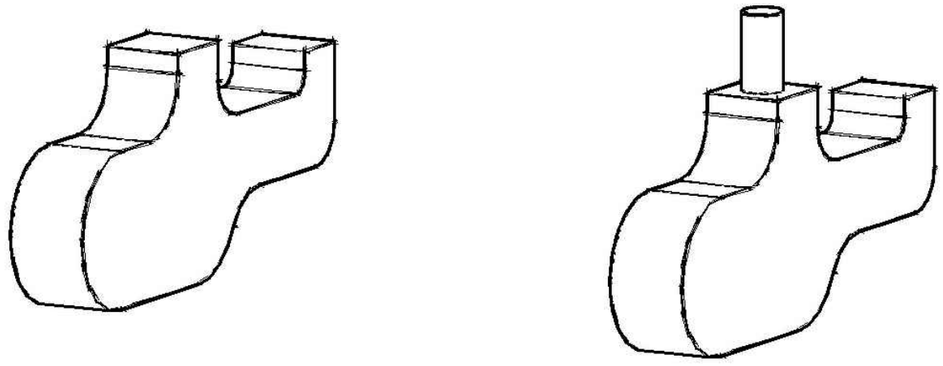
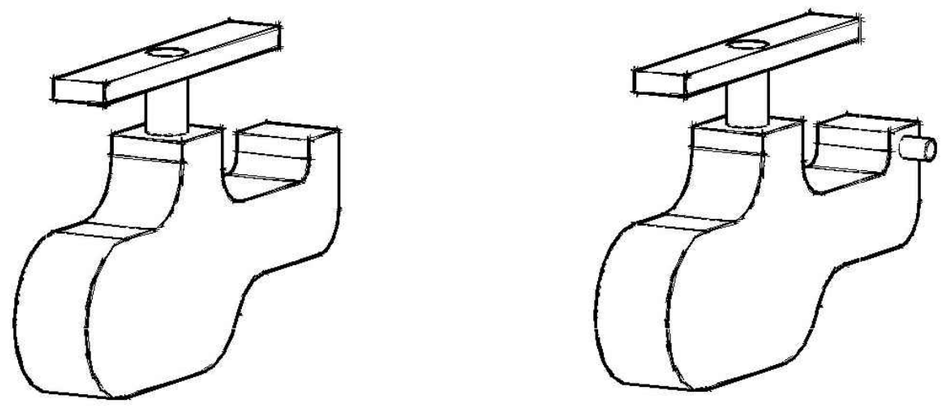
Step A

1. Draw the profile of the helicopter's body (fuselage) and generate its width;
2. Draw the top vertical cylinder (rotor mast).



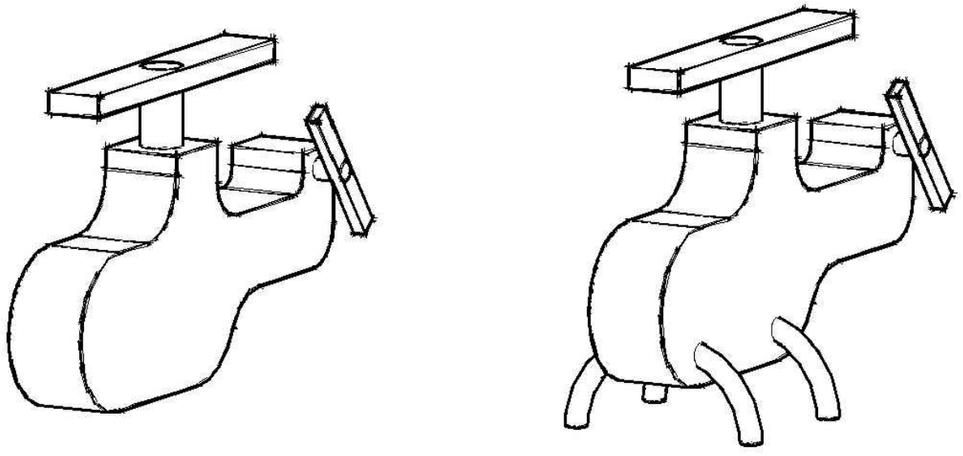
Step B

1. Draw the top rotor blade;
2. Draw the small horizontal cylinder that attaches to the tail rotor.



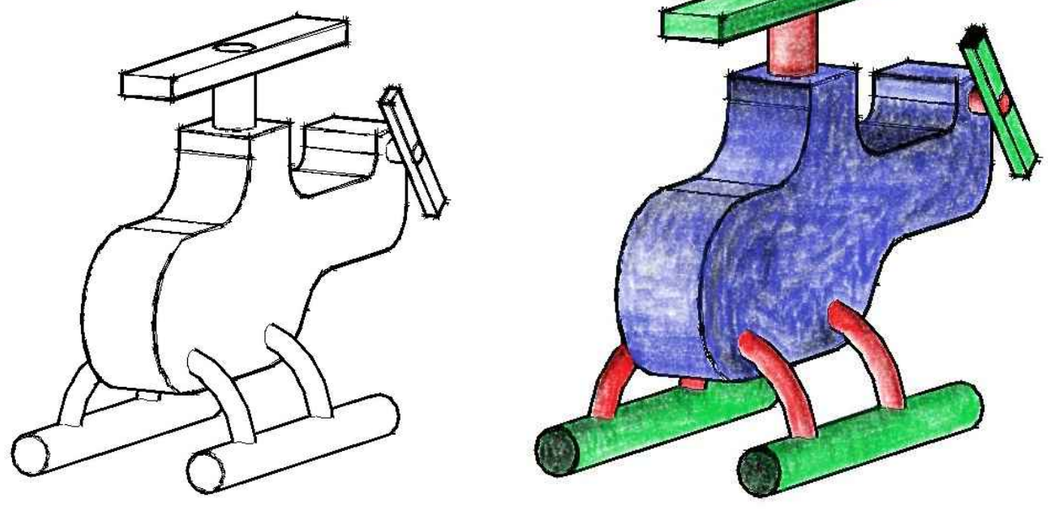
Step C

1. Draw the tail rotor;
2. Draw the four curved bars attaching the fuselage to the landing skids.



Step D

1. Draw the two cylindrical landing skids;
2. Colour the helicopter.



DATE:	TITLE: TOY HELICOPTER - STEP BY STEP SOLUTION	NAME:	CLASS:

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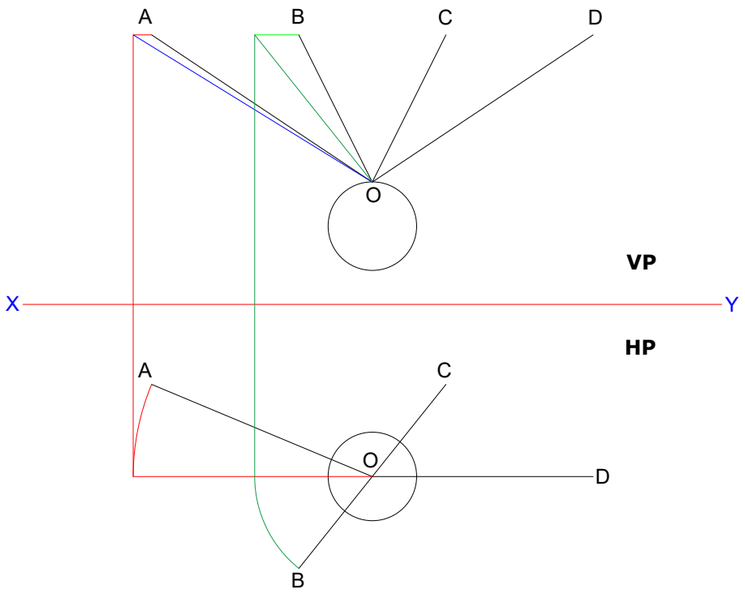
Step A

1. Find by construction the true length of OA and OB.



OA = 76 mm
OB = 51 mm
OC =
OD =

a) True length of original string: _____ mm

b) True angle with the horizontal of:

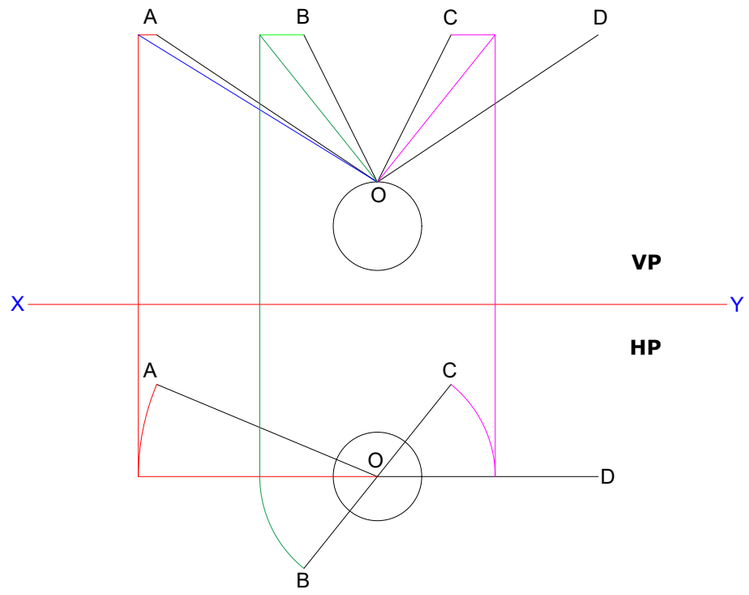
AO:_____ °

BO:_____ °

CO:_____ °

Step B

1. Find by construction the true length of OC;
2. Measure the true length of OD.



OA = 76 mm
OB = 51 mm
OC = 51 mm
OD = 72 mm

note: since OD is parallel to the VP, as can be seen when looking on the HP, it can be measured directly from the VP

a) True length of original string: _____ mm

b) True angle with the horizontal of:

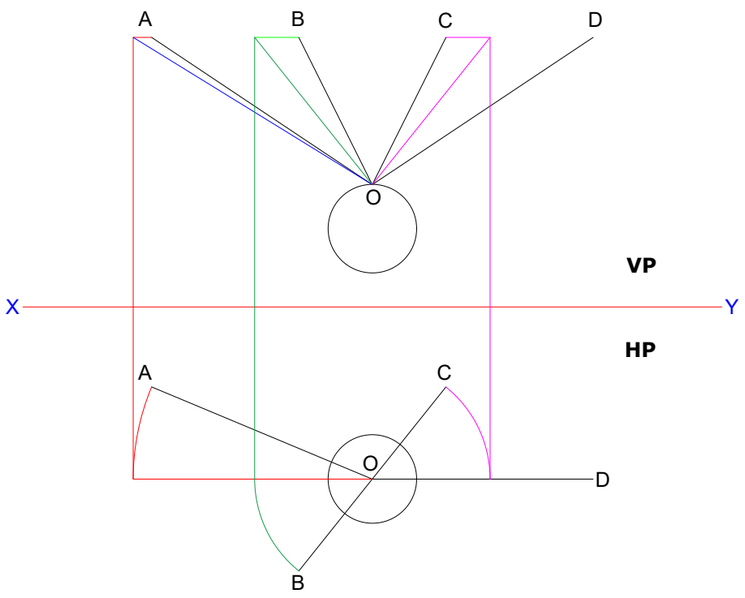
AO:_____ °

BO:_____ °

CO:_____ °

Step C

1. Calculate the sum of all true lengths and print it down in the space provided (true length of original string).



OA = 76 mm
OB = 51 mm
OC = 51 mm
OD = 72 mm

note: since OD is parallel to the VP, as can be seen when looking on the HP, it can be measured directly from the VP

a) True length of original string: 250 mm

b) True angle with the horizontal of:

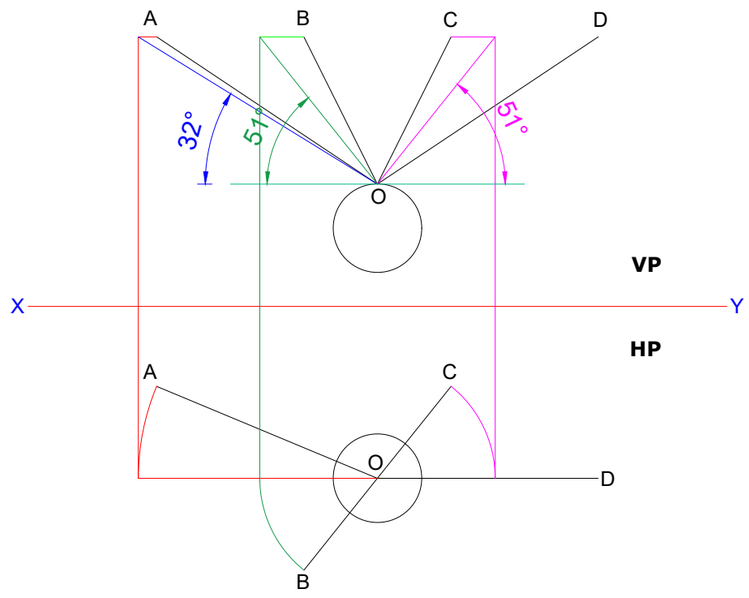
AO:_____ °

BO:_____ °

CO:_____ °

Step D

1. Measure the true angle that each true length makes with the horizontal plane and print down the answers in the spaces provided.



OA = 76 mm
OB = 51 mm
OC = 51 mm
OD = 72 mm

note: since OD is parallel to the VP, as can be seen when looking on the HP, it can be measured directly from the VP

a) True length of original string: 250 mm

b) True angle with the horizontal of:

AO: 32 °

BO: 51 °

CO: 51 °

DATE:	TITLE: DECORATION BALL - STEP BY STEP SOLUTION	NAME:	CLASS:

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Part 2

Graphical Communication resource pack

Ideas on Tasks and Methods of Assessment

The ideas provided below are fashioned around the findings of the present study. These tasks have been grouped under the five subject foci covered in Graphical Communication; *Design Graphics*, *Orthographic projection*, *Geometry*, *Pictorial drawing*, and *Solid Geometry*. These tasks have also been stratified by major topics. Every task can be assessed by one or more methods at the discretion of the teacher. In fact, most of the suggested tasks can be assigned as a take-home project and be presented with a small portfolio when submitted for marking. Some are well suited for group work and can be orally presented as well. Peer evaluation can also ensue. Suggestions on the methods that can be used are given in the far-right column, even though these are not to be taken as being prescriptive.

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Ideas on tasks and methods of assessment

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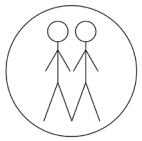
Focus	Design Graphics 	
Topic	Task Description	Assessment Methods
Graphs & Charts	• Carry out a questionnaire between students of your own age to understand their preference in sports activities, the amount of money they spend in a year on sport clothing, whether they are affiliated in a sports club, their favourite team, how many times they have assisted to a match, and whether this happened locally or abroad. Design a number of separate and different charts and graphs to graphically represent the gathered information. This can be done through a poster or an infographic featuring information about benefits gained from sports activity. • Design an infographic to promote a healthy lifestyle in the younger generation. Get information such as statistics from the internet. This infographic should be in full colour and the size of an A2 sheet. Computer software can be availed of.	• Project work • Group work (The questionnaire can be discussed as a class and the questions' format agreed to. Different groups can take on different aspects of the questionnaire to represent these graphically • Oral Presentation (The poster or infographic can be orally

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		presented in class by each group
Pictograms	• Design a set of pictograms to be placed in a (science lab / workshop / school / public garden). These pictograms should include at least one of each of the following signs (mandatory, prohibition, safe conditions, general information, warning, and fire). • Design a set of pictograms to be planted on a sandy beach. These should include one of each of the following (mandatory, prohibition, general information, warning). These should be presented on a chart divided into four sections. The title for each sign should be given underneath each one.	• Project work • Group work (Groups of four members with each member being responsible for one section of the chart) • Peer assessment (Whole class appraisal of the charts) • Small presentation
Logos	• Design a Logo for a new computer store by the name of 'Keyboard Enterprises'. You should include at least six preparatory sketches demonstrating the progression of thought from initial concept to the final rendition of the logo. Your work should be presented in a portfolio. • Design a Logo for a sports shop selling trainers for athletics. Name this shop after your surname and then trainers (eg., Borg Trainers). Preparatory sketches leading to the final Logo design should be presented in a portfolio.	• Project work • Portfolio • Oral presentation (The logo can be presented in class with the progression from conception to final drawing explained)

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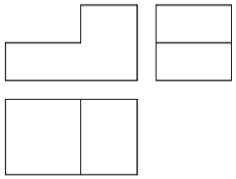
All of the above	• Produce a poster for the advertisement of a new fashion watch called 'Timeless'. The final poster should be presented in digital form. Any kind of software can be used. You need to present a progression portfolio to show the stages leading to the final poster.	• Project work • Portfolio • Oral Presentation – (The poster can be presented in class and the progression from conception to final drawing explained)

Focus	Orthographic Projection 

Topic	Task Description	Assessment Methods
1st & 3rd Angle Orthographic	• Use either 1st or 3rd angle Orthographic projection to draw three views of a kitchen appliance of your choice. The measurements should be taken directly from the appliance and scaled down to fit an A3 paper. Do not include hidden detail. Present a photo of the appliance together with your work. • Use either 1st or 3rd angle Orthographic projection to draw three views of a laptop computer. The screen of the laptop should be opened at an angle of 90°. Put the Front elevation where the screen is visible. The Plan should show the keyboard. Use simple block letters for the keys. Use freehand to make a line drawing on the screen of your favourite game.	• Project work • Portfolio
Sectional views	• Present a sectional Plan of one of the floors of your house or the apartment you live in. This sectional Plan should clearly indicate how each room is set, the direction doors open, any windows present, and internal yards. You need to measure the room and scale the dimensions down to fit an A3 paper. • Develop an exam question dealing with sectioning for a class of your age. The block that you design should include at least a cylinder, a base, and two webs. It is suggested that you make some research online to identify possible cast iron blocks that can be used. This question should be presented in CAD format.	• Project work • Portfolio
Assembly	• Conduct some research on at least five types of Timber joints. Draw freehand exploded views (dissembled) of each type of joint, then use your instruments to make an	• Project work • Portfolio

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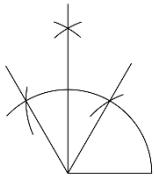
	assembled drawing of each type of joint. Dimensions are left to your discretion. Render the joints in colour. • Use freehand drawing to design a simple solid toy made out of wood for a five-year-old. This toy should at least be made up of four separate pieces that are then joined together. Your exploded views should clearly show how the pieces fit together. Also include two freehand assembled drawings of the toy from two different angles. Preparatory sketches should be included.	
Auxiliary	• Develop an exam question dealing with Auxiliary views. The auxiliary view should partly or fully show the true shape of one of the faces of the object you choose to represent. Design the marking scheme to go along this question.	• Group work

Focus	Geometry 

Topic	Task Description	Possible assessment methods
Triangles	• Draw a coloured design for a table placemat consisting solely of triangles (isosceles/scalene/equilateral). Preparatory sketches leading to the final design should be presented in a portfolio. • Design at least three different pairs of earrings consisting of intertwined triangles. These triangles can have circles inscribed or circumscribed to them. Freehand preparatory sketches should be presented with your final drawings in a portfolio.	• Project work • Portfolio • Peer assessment - (Whole class appraisal activity of the best designs) • Small Presentation
Quadrilaterals	• Use a number of quadrilaterals (square/rectangle/rhombus/parallelogram/ kite/trapezium/trapezoid) combined to produce an original design. Colour your design. Freehand preparatory sketches should be presented with your final drawing in a portfolio. • Design a chart / poster to be exhibited in class explaining the properties of quadrilaterals (square/rectangle/rhombus/parallelogram/kite/trapezium/trapezoid). Use colour to simplify the information given.	• Project work • Portfolio • Peer assessment - (Whole class appraisal activity of the best designs) • Oral presentation
Polygons	• Draw a coloured design (factual or abstract) composed of a number of Polygons to be placed in the reception area of a play school. A portfolio containing preparatory sketches leading to the final design should be presented alongside.	• Project work • Portfolio • Peer assessment - (Whole class appraisal activity of the best designs)

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	• Draw several regular polygons in colour onto recycled cardboard. Cut these out and attach them to strings to create Christmas tree decorations. (Five-pointed stars (pentagrams) can be created through pentagons as well).	
Ellipses	• Use ellipses as part of drawings for an animal protection campaign (eg., the ellipse can be used to draw swans, turtles, elephants, bird nests etc…). • Design a keychain having the outline of an ellipse. Decorate this keychain with words and coloured patterns of your choice.	• Project work • Portfolio • Group work – (Individual drawings can be combined within one poster) • Oral Presentation – (These posters can be presented in class by the group)
Loci	• Use involutes, helices and spirals to design a set of jewellery items such as necklaces, rings, bracelets, and earrings. Preparatory sketches leading to the final designs should be presented within a portfolio. The final drawings should be geometrically constructed. • Go around the house and find a mechanism of your choice that uses one or a combination of linkages, levers, or cranks. Observe and sketch this mechanism using freehand. Then construct a detailed line drawing of this mechanism using your drawing instruments. Present all your work within a portfolio.	• Project work • Portfolio • Group work – (every student in the group can take one jewellery item or one type of locus)
Circles in Contact	• Use the principles of circles in contact to create at least four different original designs for soft drink bottles. Freehand sketches should be presented alongside the four final drawings in a portfolio. • Use a combination of arcs, points, and lines in contact to create two original designs for a vase. These two drawings should be constructed geometrically to measurements of your choice. Add a freehand 3D drawing of one of the vases and decorate it in colour.	• Project work • Portfolio

Conversion of shapes having equal area	• Design an exam question dealing with the principles of conversion of shapes having equal area, to solve a real-life problem (ex: simplifying the calculation of the area of a quadrilateral field or that of a pentagonal shaped swimming pool). • Create a chart / poster to explain the conversion of a Pentagon into a square having the same area to students of your own age. Colour should be used. Written steps should also be included in the chart using simple block letters.	• Group work – (Discussion and sketching of question in group) • Oral presentation
Vectors	• Together as a class, think of a situation that can be solved using the principles applied when covering the topic of Vectors. With the help of your teacher, turn this situation into a problem that can be solved using graphical construction. After formulating this situation into a graphical problem, create a marking scheme to compliment it.	• Group work – (Whole class activity guided by the teacher)

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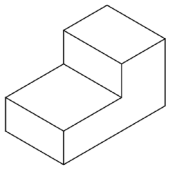
Focus	Pictorial Drawing 

Topic	Task Description	Assessment Methods
Isometric	• Choose a piece of furniture in your house (table/cabinet/chair/wardrobe/desk) and take measurements of it. From these measurements draw an Isometric scaled down version fitting an A3 paper. Render your drawing in colour matching the same piece of furniture. Include a coloured photo of the piece of furniture together with your drawing. • Design your dream house with surroundings. These surroundings should include at least a swimming pool and a garden. You can search the internet for ideas. Include a print of all the ideas used together with the final drawing.	• Project work • Portfolio • Peer assessment – (A class appraisal exercise of all drawings can be made)
Planometric	• Use the concepts of Planometric drawing to design the interior layout of a kitchen including the appliances (fridge/cooker/hob/sink) therein. The kitchen should also include a window and a dining table. Render your drawing in colour, including furnishings such as carpets, table cloth, and curtains. • Design the interior layout of a sitting area. This should at least include a two-seat sofa, a coffee table, a cabinet with T.V, a window with curtains, and a carpet. Render your drawing in colour. Include any freehand sketches used in the preparation phase.	• Project work • Portfolio

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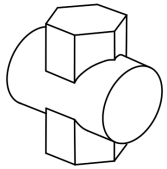
Oblique	• Present a drawing of your name and surname written in cabinet Oblique projection. The entire size of both name and surname should fit an A3 paper. Render your drawing with vibrant colours. • Design a trophy in cabinet oblique. This trophy should be dedicated to the architect of the year. Include all preparatory sketches involved in its design. Dimensions are left to your discretion, but the entire drawing should fit an A3 paper. Render the trophy to make it look like (marble/glass/silver – separate or combined).	• Project work • Portfolio
Perspective	• Use 2pt. Perspective drawing to represent a public recreational area. This should include benches, trees, a food take away outlet, and a water fountain. The drawing should be in full colour. Take a number of photos from various locations for reference sake to help you set this environment. A progress portfolio should be presented featuring the development of the creation of this perspective drawing. Include any photos taken in the portfolio. • Draw a 1pt. Perspective drawing of your dream bedroom. This drawing should be in full colour. Preparatory sketches should be included in a portfolio.	• Project work • Portfolio

Focus	Solid Geometry 

Topic	Task Description	Assessment Methods
Truncation of solids	• Make a design for a monument that should consist of a mixture of truncated Pyramids, Prisms, Cones, and Cylinders. The axis of these shapes can lie at any angle, but if they intersect, the axis of intersection should be perpendicular. At least, four preparatory freehand sketches should be presented to show the development of your idea. A cardboard model of the monument should also be presented and should not be larger than 400mm^3. The use of recycled cardboard is recommended. A copy of the geometric drawings, including developments of the said shapes should be presented in a portfolio together with the model. • Go around the house or garage and observe everyday objects that are made out of intersecting solids. You can also use the internet for your research. The axis of intersection of the solids in these objects can be inclined. Make at least six freehand 3D drawings of such objects. Shade or render these drawings according to their material.	• Project work • Portfolio • Group work - (students can be grouped in pairs)
Lines in space	• Design a stand for a fair composed of at least four combined triangles. Draw the Front elevation and Plan of this stand and find the true lengths of each side, so that a miniature cardboard model of it can be constructed. All the drawings leading to the design of this model should be presented in a portfolio. The model should not be larger than 400mm^3. The use of recycled cardboard is recommended.	• Project work • Portfolio

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Six steps, seven rules, and two suggestions on the design and delivery of classroom tests

The six steps hereunder have been adapted from Athanasou and Lamprianou (2002).

Step 1 – Write down the topics which are going to be covered by the test. Decide on the duration of the test and determine how many questions you need to prepare in relation to the time it will take students to answer the set questions. Design the appropriate questions and assign marks to each question according to the level of difficulty, to the number of topics involved in each question, and to the amount of time needed to work out each question.
Step 2 – Set out the questions in the space provided. In the case of Graphical Communication, this should mainly be on A3 paper. Decide on the number of papers needed. Give a title to each question according to the topic/s involved. Write down proper instructions for each question and list any instruments or equipment that can be used. Number each question and place the easier ones first. Ensure that questions are not split between pages. Provide enough space for questions to be worked out and provide start lines where necessary. Write down the amount of marks that will be awarded for each question.
Step 3 – Prepare a marking scheme with a model answer to each question with guidelines on the marks to be awarded for each separate part of each question.
Step 4 – Proof-read the written questions and review the given drawings. A second proofreading and reviewing of the paper can be assigned to a colleague teaching the same subject. This exercise can draw your attention to any errors or omissions committed. It would be ideal if your colleague could work out the questions him/herself against the time allocated. This would guarantee that the time given for answering the paper is suitable and that all marks are rightly distributed.
Step 5 – Administer the test making sure that everyone has understood the instructions given and is aware of what is expected of him/her. Special concessions might be needed

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for persons with disability or learning difficulties, such as extra time, assistant readers, or the setting up of special equipment.
Step 6 – Mark the tests following the prepared marking scheme as faithfully as possible. Mark the same question of each paper of every student before moving to the subsequent question. Negative marking should always be avoided. It would be ideal if a colleague could act as marker-moderator.

The seven rules hereunder have been adapted from Taylor and Nolen (2005).

Rule 1 – When writing questions, choose fonts which are easy to read such as Verdana, Calibri, or Arial, and of a size which is not smaller than twelve.
Rule 2 – Avoid cramming each page with too much material, keep the writing to a minimum and avoid the pitfalls of 'construct irrelevant variance'.
Rule 3 – Use Capital letters and Bold type to accentuate certain important words and avoid the use of Italics.
Rule 4 – Minimize any visual distractions by providing unnecessary drawings which might hinder comprehension instead of facilitating it.
Rule 5 – Make sure that any given item in any question does not provide the answer to any other part of any other question.
Rule 6 – Design the test to proceed from the general to the specific in any one question, and from easier to more difficult questions as the test progresses.
Rule 7 – Try to measure students' knowledge and skills in a variety of ways and more than once to make sure that their responses are a true measure of their understanding.

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Two further suggestions

Suggestion 1 – Avoid asking for a compulsory method to be used when several exist. If students are able to solve a given problem, it should not matter which route they take to do so.
Suggestion 2 – Avoid designing questions that are dependent on any other to be solved. Students should not be hindered to solve any problem due to their inability to solve any other problem within the same test.

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Part 3

Graphical Communication resource pack

Taxonomy and Oral presentation rubric

A Taxonomy is being proposed to help Graphical Communication teachers classify learning objectives and align these with instruction and assessment. Benjamin Bloom (1971), the author of the original taxonomy, suggested that every discipline should fashion its own taxonomy in its own technical language. Taking cue from Clark and Ernst (2010), the presented taxonomy has had its knowledge dimension changed to the five subject foci that compose the subject, namely; *Design Graphics*, *Orthographic Projection*, *Geometry*, *Pictorial Drawing*, and *Solid Geometry*. On the other hand, the cognitive processes have been changed to *Remember*, *Understand*, *Utilize*, *Evaluate*, and *Develop*, to be more congruent with the language and concepts used in Graphical Communication.

A rubric to help assess oral presentations is also being proposed. This rubric can be used by teachers and students, provided that the latter are made familiar with the criteria, the related levels, and the soring scale before any assessment is attempted. Three of the used assessment criteria in the proposed rubric are those identified by Van Ginkel et al. (2017), namely; *knowledge content*, *presentation's structure*, and *interaction with audience*, while the fourth criterion is that of *use of digital media*. The rubric uses a four point scoring scale and pictures have been added to facilitate understanding by students and make it more user-friendly.

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Taxonomy

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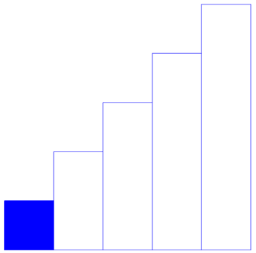
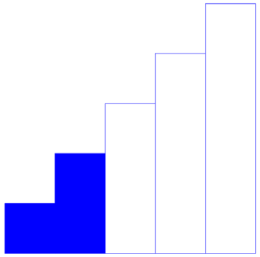
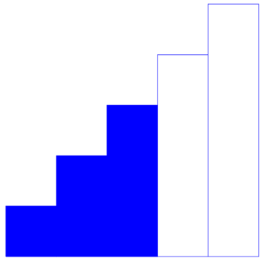
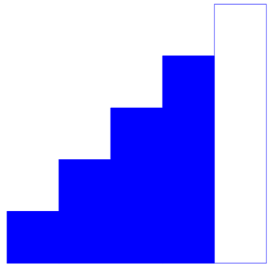
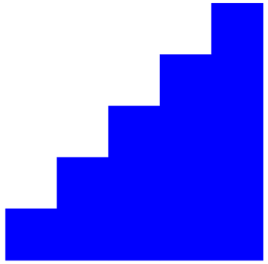
GRAPHICAL COMMUNICATION TAXONOMY					
	Remember	**Understand**	**Utilize**	**Evaluate**	**Develop**
Design Graphics 	different shapes/colours associated with information and safety signs	the meaning of the different shapes/colours associated with information and safety signs	given information to draw information and safety signs	the best idea to use from several sketches	information and safety signs according to specific needs
	different names of charts and graphs	the readings taken from charts and graphs	information to draw charts and graphs	which type of chart or graph better explains the available information	charts and graphs according to need and collected information
	names of computer commands (move, draw, mirror, copy, and ACI) associated with graphics software	the function of computer commands (move, draw, mirror, copy, and ACI) associated with graphics software	the computer commands given to draw an image	the most efficient way a series of commands can be written to form an image	a series of computer commands through which an image can be generated
	the names and uses of various design software packages	simple standard software commands	a software package to produce a drawing	the best software package to use according to need	a parametric drawing using a CAD software package

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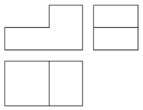
	Remember	Understand	Utilize	Evaluate	Develop
Ortho-graphic Projection 	the two types of orthographic projection used (1st / 3rd Angle) and their respective symbols	the difference between 1st and 3rd angle orthographic drawings and between 1st and 3rd angle orthographic projection symbols	information from pictorial projections to draw 1st and 3rd angle orthographic drawings	which orthographic projection matches the right pictorial drawing	pictorial drawings from orthographic projections
	the conventions associated with sectional drawings	the reason why sectional drawings are used	information from two complete views of an orthographic projection to produce a 3rd sectional view	the best way to section a solid in order to show the most detail on the inside	sectional 3D solids made out of modelling material like clay
	the meaning of the word assembly with regard to Graphical Communication	that most everyday objects are composed of discrete pieces that are then assembled together	discrete 2D or 3D drawings to form a one piece 2D or 3D drawing	the most effective drawings (2D/3D) that show how best an object can be assembled	a series of pictorial dissembled pieces that can be assembled to form an object
	what the word auxiliary means	the principal need for drawing auxiliary views	two given views in orthographic to project an auxiliary view showing a true shape	the best angle to use in order to represent a drawing in auxiliary view	an orthographic elevation when another elevation and an auxiliary view are given
	that you need at least to views of a line in orthographic to determine its true length	the concept of finding true lengths of lines and why they are used	two orthographic views of a line to find its true length	which method can best be used to find the true length of a line	the true shape of a triangle, from two elevations of the same triangle in orthographic projection

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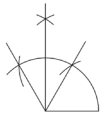
	Remember	Understand	Utilize	Evaluate	Develop
Geometry 	the names of different types of angles/lines/triangles/ polygons/quadrilaterals/ parts of circles	the difference between types of angles lines/triangles/ polygons/quadrilaterals/ parts of circles	given information to construct drawings consisting of different types of lines/triangles/ polygons/quadrilaterals/ parts of circles	the type of geometry best suited to accomplish desired drawings	original drawings by combining one or more of the following (lines/triangles/ polygons/quadrilaterals/ parts of circles)
	lettering conventions	why rules of lettering exist	lettering to label drawings	the best size of lettering to use according to need	an eye test board using suitable lettering in various sizes
	that regular / irregular shapes can be enlarged or reduced geometrically	the concept of ratios with regard to enlargement and reduction of shapes	a given ratio to enlarge or reduce a shape	the area needed to enlarge or reduce a given shape	a set of reduced and enlarged drawings of a geometric shape with the pole placed in various positions
	the names of various types of loci (glissette / involute / cycloid / spiral / helix)	the concept of loci as being paths traced by moving points	given information to construct loci	whether a given mechanism is feasibly through loci design	an original exam question dealing with at least two types of loci
	the names of different characteristics related to the ellipse (major axis / minor axis / focal points / tangents and normals)	the relation between the major axis, the minor axis, and the focal points	given information to draw an ellipse, including tangents and normals if necessary	the most adequate method to draw an ellipse	an original design involving the ellipse, normal and tangents
	the four different types of situations involving circles in contact	the principle of adding and subtracting radii to find the centres needed for circles in contact	given information to complete a drawing partly made out of circles in contact	the most eye catching freehand sketch of a real life object made out of circles in contact	an original design of a real life object using circles in contact

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	Remember	Understand	Utilize	Evaluate	Develop
cont. Geometry	the various types of tangent to circle/s possibilities	the relation between tangents and circles, and tangents and normals	given information and right construction methods to draw tangents to/between circles	whether exact points of tangency are identified by the adopted method	an original design consisting of various types of tangents to/between circles
	the names of the two methods used for calculating the area of irregular shapes (mid-ordinate / grid)	the concept of the methods used for finding the area of irregular shapes	one of the two known methods to find the area of an irregular shape	which of the two known methods can best be used to calculate the area of an irregular shape	an original exam question to find the area of a recreational space (eg. playground / golf course)
	the various steps used to convert a pentagon or a quadrilateral into a square	the mathematical concept of the construction involved to convert a pentagon or a quadrilateral into a square	the appropriate methods to convert a pentagon or a quadrilateral into a square	mathematically the area of converted shapes to test construction accuracy	a coloured chart showing all the discrete steps used for converting a pentagon or a quadrilateral into a square
	the definition of vectors, and of coplanar and concurrent forces	the concept of resultants	given graphic and numerical information to solve a system of coplanar and concurrent forces	the most efficient way to solve a system of coplanar and concurrent forces	an exam question dealing with finding the equilibrant in a suspended structure

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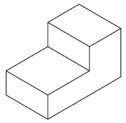
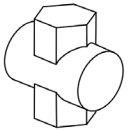
	Remember	Understand	Utilize	Evaluate	Develop
Pictorial Drawing 	the names of pictorial drawings (Isometric/Oblique/Planometric/1pt. & 2pt. Perspective)	the difference between various types of pictorial drawings (Isometric/Oblique/Planometric/1pt. & 2pt. Perspective)	given information to construct pictorial drawings (Isometric/Oblique/Planometric/1pt. & 2pt. Perspective)	the strength of each type of pictorial drawing according to need	original pictorial drawings of real life objects/areas that conform to conventional properties of construction (Isometric/Oblique/Planometric/1pt. & 2pt. Perspective)
Solid Geometry 	the four types of solid shapes used in Graphical Communication at SEC level (Cylinders/Prisms/Cones/Pyramids)	that different truncations produce different types of true shapes (eg., when using cones – ellipse / hyperbola / parabola)	the information from two given views in orthographic projection to produce a third view, a true shape of cut, and also the development of a truncated solid	which truncated solids can best be used to produce a real life object (eg., a funnel / kettle etc…)	drawings from truncated and non-truncated solids to produce designs for real life objects
	that different solids can intersect to form more elaborated solids	the primary aim of the topic of intersecting solids is to find and draw the precise seam between them	the information from two intersecting solids in orthographic to construct the missing seam between the same solids, including their developments	the most efficient way to place developments to be cut, into restricted paper space	3 dimensional cardboard models of two intersecting solids

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Rubric for oral presentations

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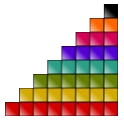
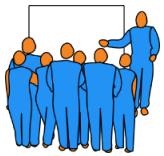
Student's name:	Class:	Title of Presentation:

		1	2	3	4
Knowledge of Content 		Reads everything from a script or from board slides	Reads from a script or from slides but interjects with an example/explanation during/after each section/slide	Uses script or slides but gives own rendering of what is being shown/said	Confident with content as to not read from script/slides, and only uses these to enhance audience's understanding
Presentation's Structure 		No introduction is made and jumps from one point to the other of the presentation without coherence	Presents the main points of the presentation systematically without introduction and conclusion	Introduces the topic/work and builds the presentation coherently without conclusion	Introduces the topic/work and builds the presentation coherently and systematically with a good conclusion
Interaction with audience 	*Eye Contact*	Faces the board most of the time instead of audience	Faces audience but avoids eye contact	Uses eye contact but focuses on same part of the audience all the time	Uses good eye contact with entire audience
	Voice	Voice trembles and speaker seems to be unsure of what is being said	Speaker seems sure of what is being said but can barely be heard	Speaker seems sure of what is being said but uses monotone for the entire presentation	Uses voice efficiently to emphasise important points
Use of digital media 		No use of digital media is made during the presentation Digital media is only used for preparation	Uses simple text/picture slides (eg., power point) during presentation	Uses computer slides with animation, pictures and video during presentation	Uses computer slides with animation, pictures and videos together with a design software (eg., google sketchup) during presentation

Name of teacher:	Date:	Score out of 20:

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