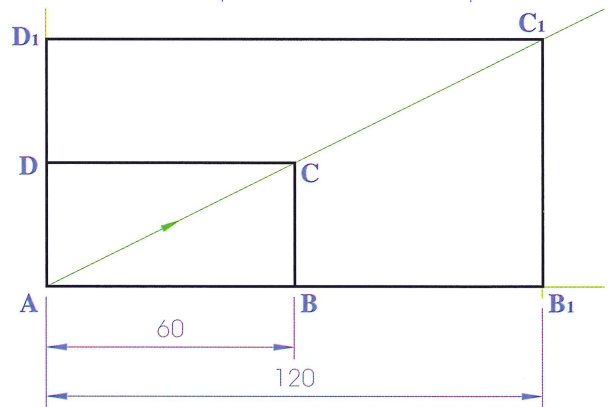
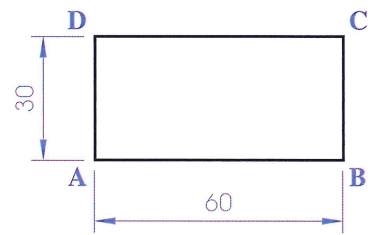
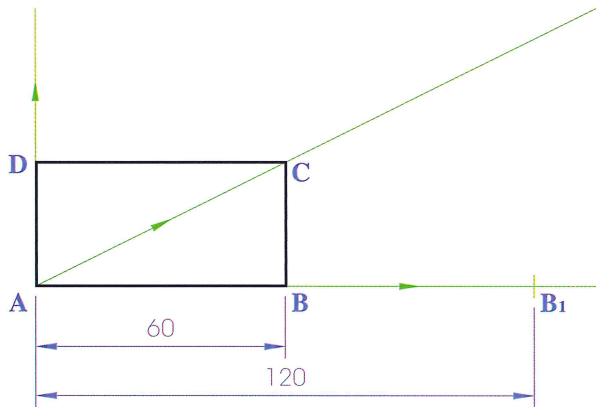


Example 1

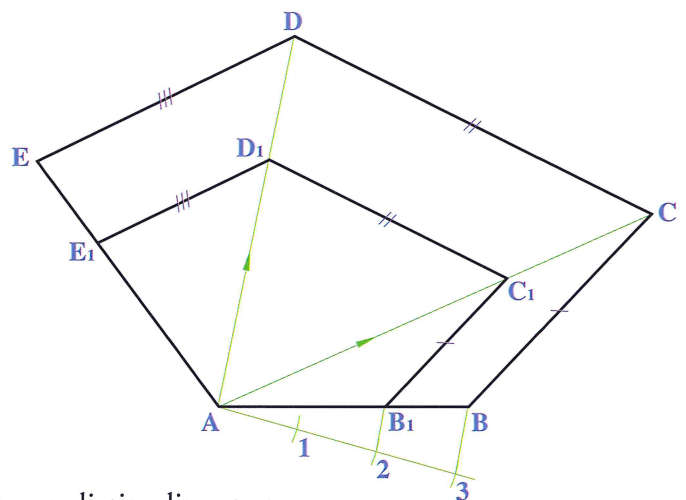
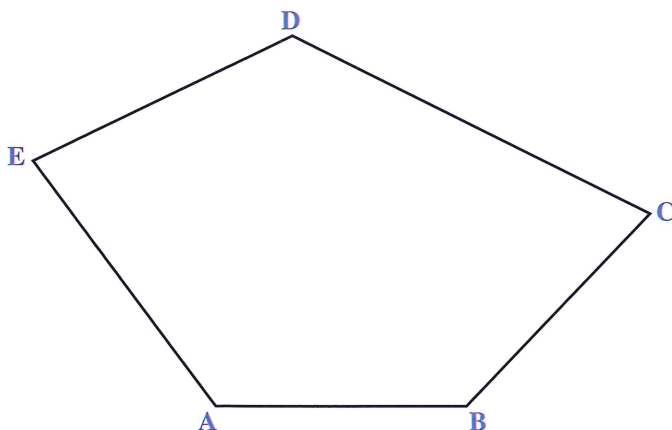
Draw a rectangle similar to the given rectangle ABCD but having sides twice the length of those in the given rectangle.



1. Using the vertex A as the centre of enlargement, draw radiating lines to pass through the vertices B, C and D (above, left).
2. Locate the point B_1 so that the length of AB_1 is twice the length of AB.
3. Draw a line through B_1 parallel to BC to locate the point C_1 (above, right).
4. Draw a line through C_1 parallel to DC to locate D_1 . $AB_1C_1D_1$ is the required enlarged rectangle.

Example 2

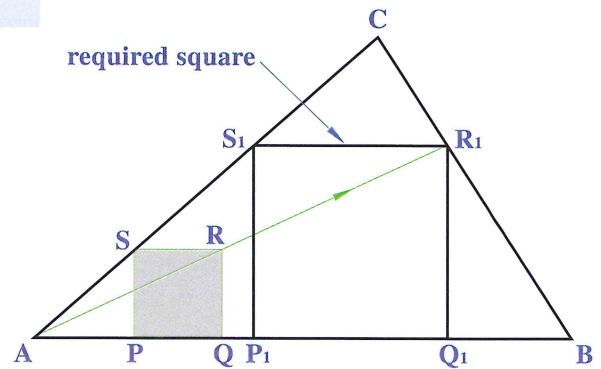
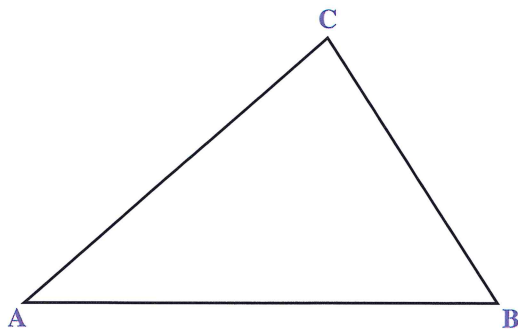
Draw a polygon similar to the given polygon ABCDE (below, left) and having sides two-thirds of the length of those of ABCDE.



1. Using the vertex A as the centre of enlargement, draw radiating lines to pass through the vertices C and D (above, right).
2. Divide AB in the ratio 2:1. Then AB_1 is two-thirds the length of AB.
3. Draw a line through B_1 parallel to BC to locate the point C_1 .
4. Similarly, draw lines through C_1 parallel to CD to locate D_1 , and through D_1 parallel to DE to locate E_1 .
5. $AB_1C_1D_1E_1$ is the required reduced polygon.

Example

Inscribe a square in the given triangle ABC (below, left).



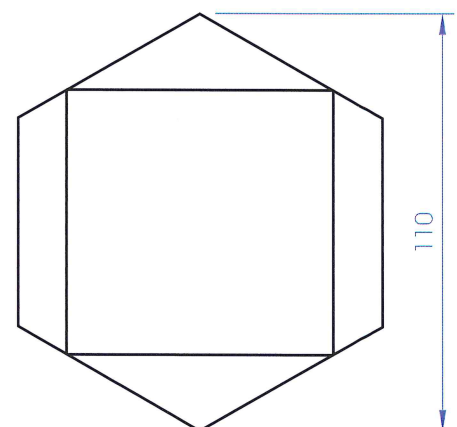
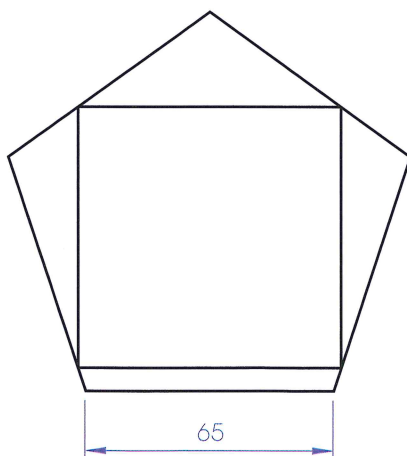
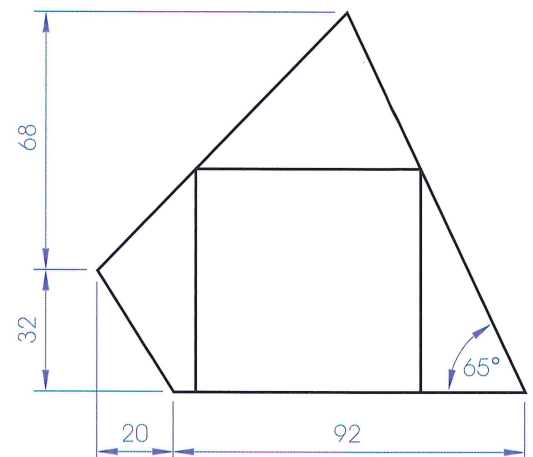
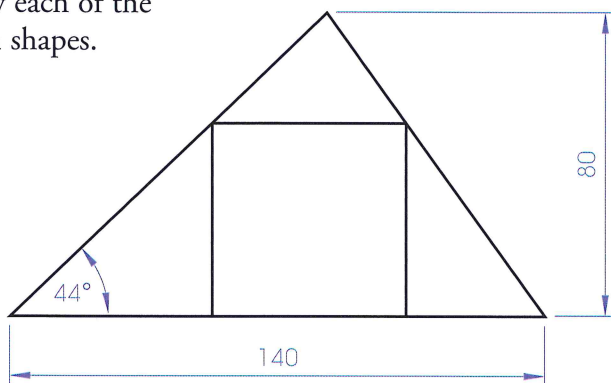
1. The solution involves using the principle of **relaxing one constraint** by drawing any square PQRS having two of its vertices on AB and another vertex on AC.
2. Join AR and extend to meet the side BC in R_1 . R_1 is the image of the vertex R under an **enlargement** with **centre of enlargement** A and **scale factor** AR_1/AR . R_1 is a point on the required square.
3. Complete the required square as shown.

Answer Worksheet 28C

Exercises

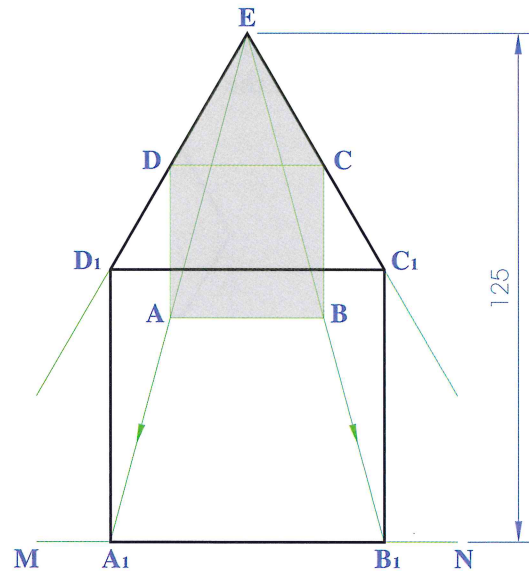
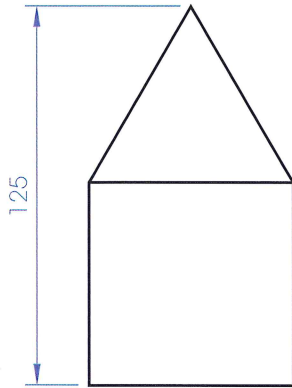
1. The figure below shows a **triangle**, a **quadrilateral**, a **regular pentagon** and a **regular hexagon**. Also shown is a **square** inscribed in each of the shapes.

Draw each of the given shapes.



Example

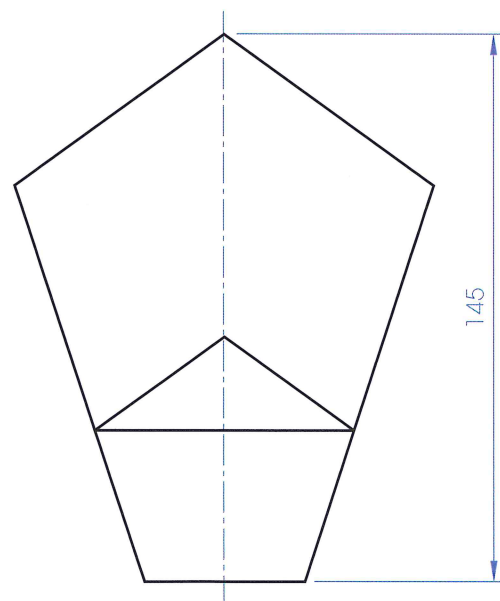
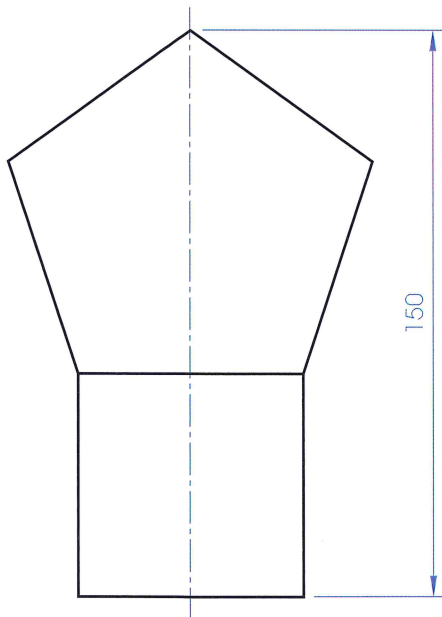
The figure (below, left) is based on a square and an equilateral triangle. Draw the given figure.



1. The principle of **relaxing one constraint** is used here. Draw any square ABCD and equilateral triangle CDE as shown. This shape is similar to the given figure.
2. Under an **enlargement** with **centre of enlargement** E, this shape may be mapped onto the required shape. Draw radiating lines from E passing through each of the vertices of the square ABCD.
3. Draw the line MN parallel to the side AB and a distance 125 mm from E, to cut the line EA at A_1 , and the line EB at B_1 . A_1B_1 is one side of the image figure.
4. Draw a line from A_1 parallel to AD to cut the line ED at D_1 , thus obtaining another vertex D_1 . Locate C_1 in the same manner and draw the required figure.

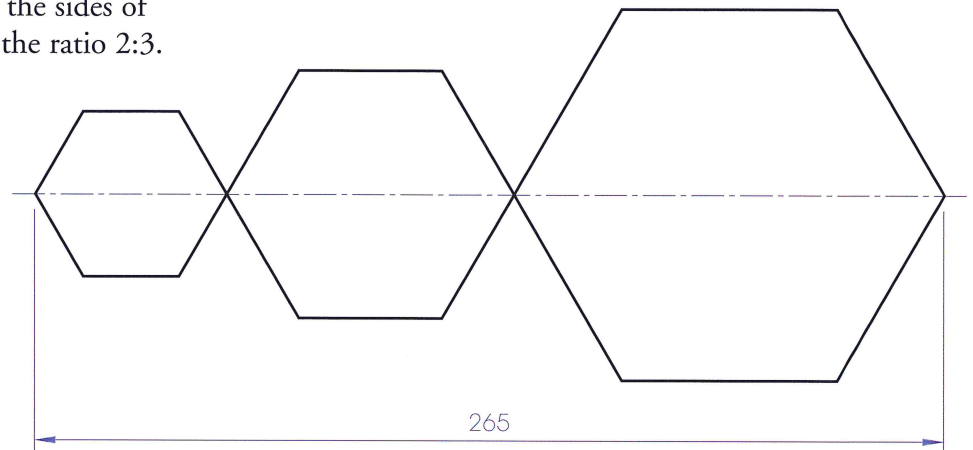
Exercises

1. The figure shown (below, left) is based on a **square** and a **regular pentagon**. Draw this figure.



2. Draw the figure above, right. It is based on two interlocking **regular pentagons**.

3. Use an **enlargement** to construct the three **regular hexagons** as shown below given that the sides of successive hexagons are in the ratio 2:3.

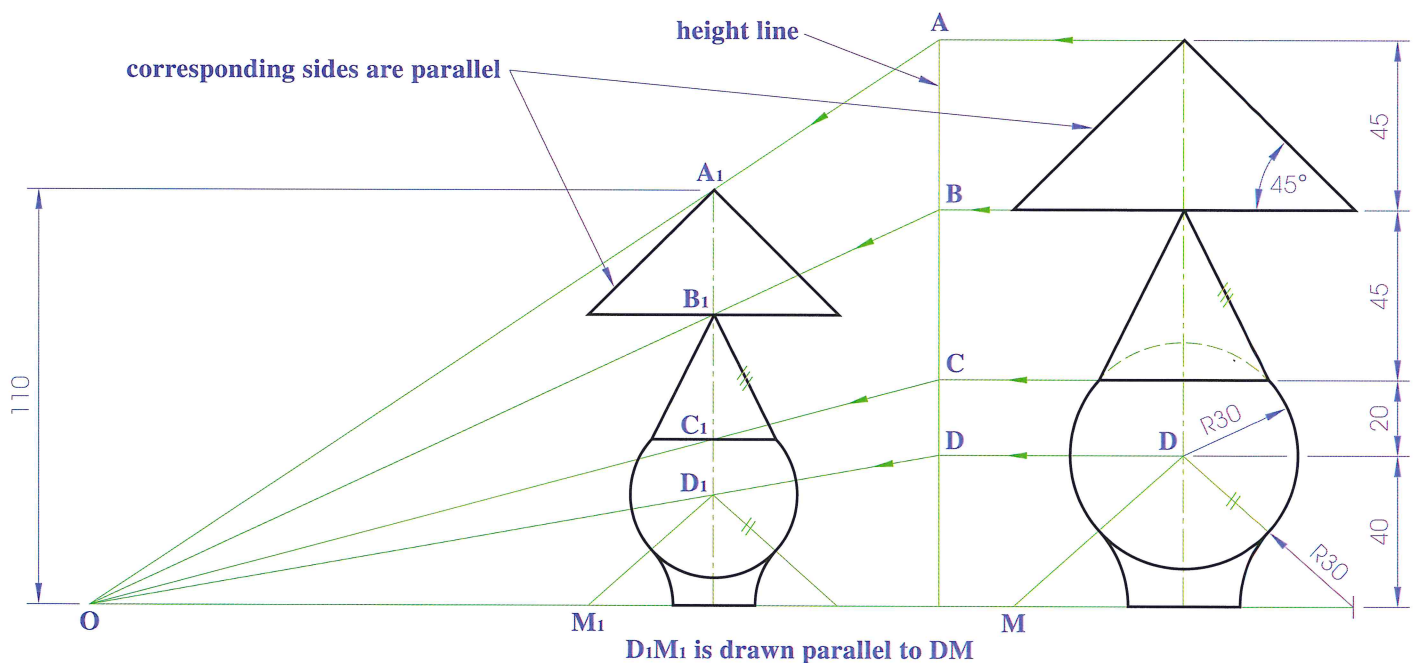


Enlarging and Reducing using an External Centre of Enlargement

The centre of enlargement may be positioned in any convenient position as shown in the following example.

Example

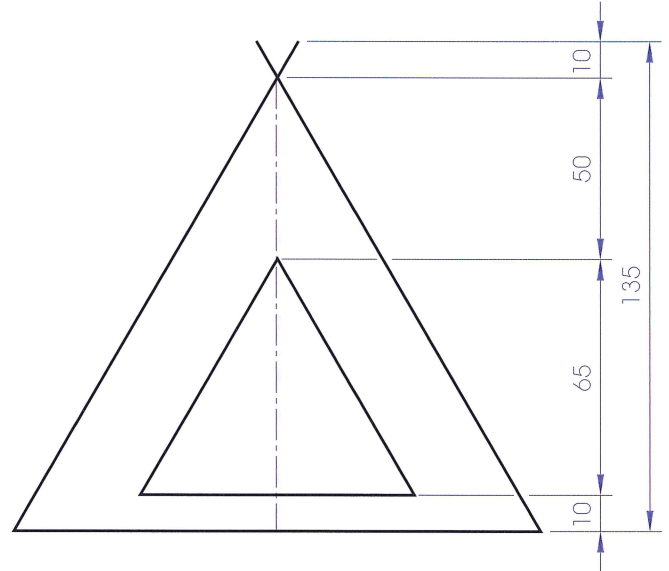
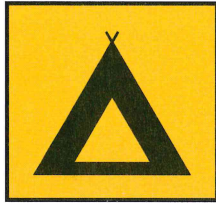
Draw a figure similar to the **table lamp** (shown below, right) having an overall height of 110 mm.



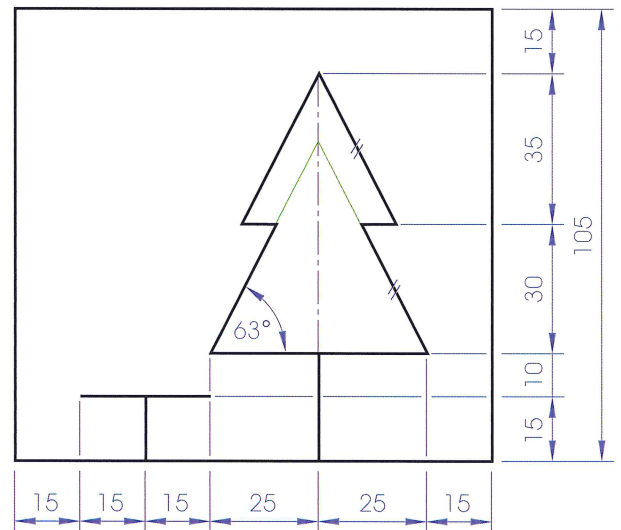
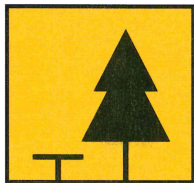
1. Select a suitable position for the centre of enlargement O on the base extended. Draw a height line and project the heights of the original lamp onto this line. Index the points as shown.
2. Draw a line parallel to the base and a distance of 110 mm from it. Draw a line from O to the point A to intersect this line at A₁.
3. Draw a vertical line from A₁ as shown. Draw lines from O to the points B, C, and D to locate B₁, C₁, and D₁ respectively. Draw horizontal lines through B₁ and C₁.
4. The reduced lamp can be completed because the corresponding sides of the original figure and the image figure are parallel.

Exercises

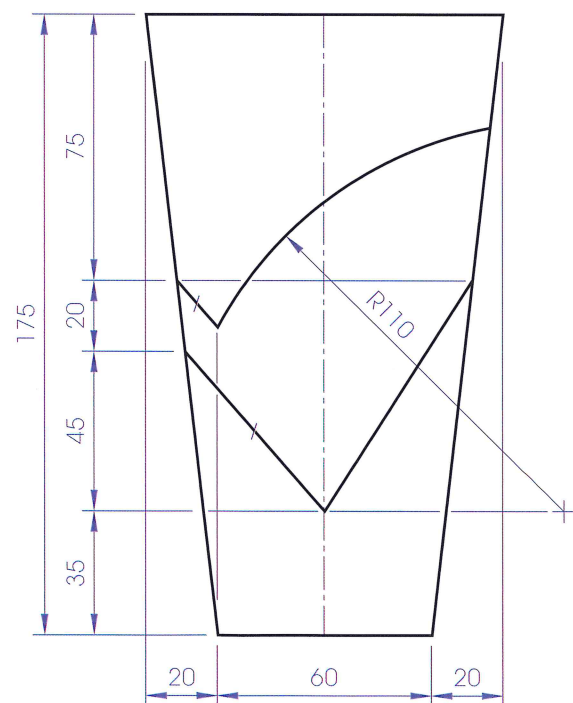
1. The figure across shows the **road sign** for a camp site. It contains two **equilateral triangles**.
 - (a) Draw the figure full-size.
 - (b) Draw a similar figure to the given figure having an overall height of 85 mm.



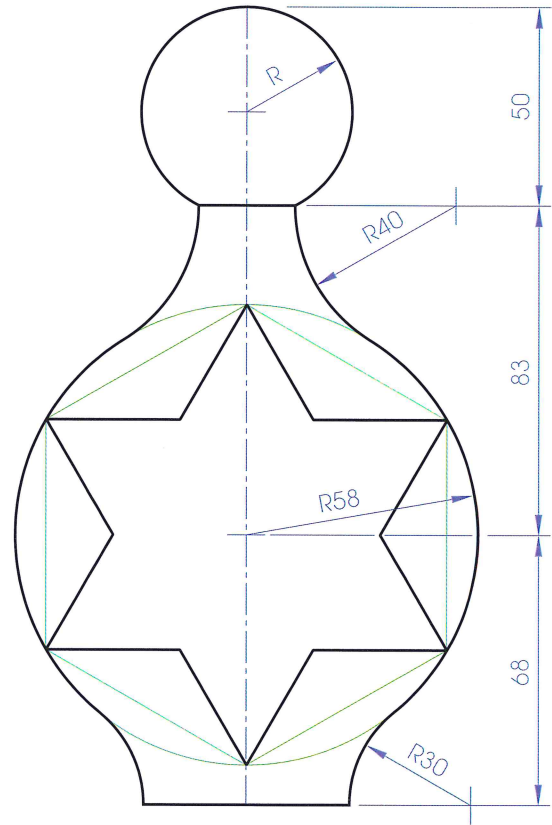
2. The figure across shows a **road sign** for a forestry and picnic area.
 - (a) Draw the given figure to the given dimensions.
 - (b) Draw a similar figure to the given figure having an overall height of 170 mm.



3. The figure over shows the outline of a **Celebrations** sweet box.
 - (a) Draw the figure to the given dimensions.
 - (b) Draw a similar figure to the given figure having an overall height of 130 mm.



4. The figure over shows the outline of a **bottle** including a label based on a six-pointed star.
- Draw the figure to the given dimensions showing all constructions clearly.
 - On a separate diagram draw a similar figure having an overall height of 140 mm.



5. The figure across shows the outline of a **Fairy washing up liquid bottle**.
- Draw the figure to the given dimensions showing all constructions clearly.
 - On a separate diagram draw a similar figure having an overall height of 130 mm.

