

CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**GEOMETRICAL AND MECHANICAL DRAWING**

**7040/01**

Paper 1

October/November 2003

**2 hours 40 minutes**

Additional Materials: A2 Drawing Paper (1 sheet)  
Standard drawing equipment

**READ THESE INSTRUCTIONS FIRST**

Print your name, Centre number and candidate number at the bottom right-hand corner of your Drawing Paper.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **five** questions.

Answer not more than **three** questions from any one section.

Unless otherwise stated, strictly geometrical methods must be used, solutions are to be drawn full size and no dimensions are required. All construction lines must be shown clearly, but lines which are parallel to, perpendicular to or inclined at angles of  $30^\circ$ ,  $45^\circ$  or  $60^\circ$  to other lines may be drawn without showing construction lines.

Use both sides of the Drawing Paper for your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

All dimensions are in millimetres unless otherwise stated.

This document consists of **8** printed pages.



## Section 1 Plane Geometry

Answer not more than **three** questions from this section.

- 1 (a) Construct, full size, the polygon ABCDE given lengths of the sides to be;  
 base line  $AB = 45$ ,  $BC = 60$ ,  $CD = 40$ ,  $AC = 75$ ,  $CE = 70$ ,  $BE = 70$ , and  $AD = 60$ . [6]
- (b) Construct a similar figure with the sides increased in the ratio of 4 : 3. [5]
- (c) Construct a square equal in area to that of the polygon drawn in (a). [8]
- (d) Measure and state the size of the square. [1]
- 2 Construct the path traced by point X, the free end of a piece of flexible wire 173 mm long, which is fixed at A and is wound clockwise around the component shown in Fig. 1. [20]

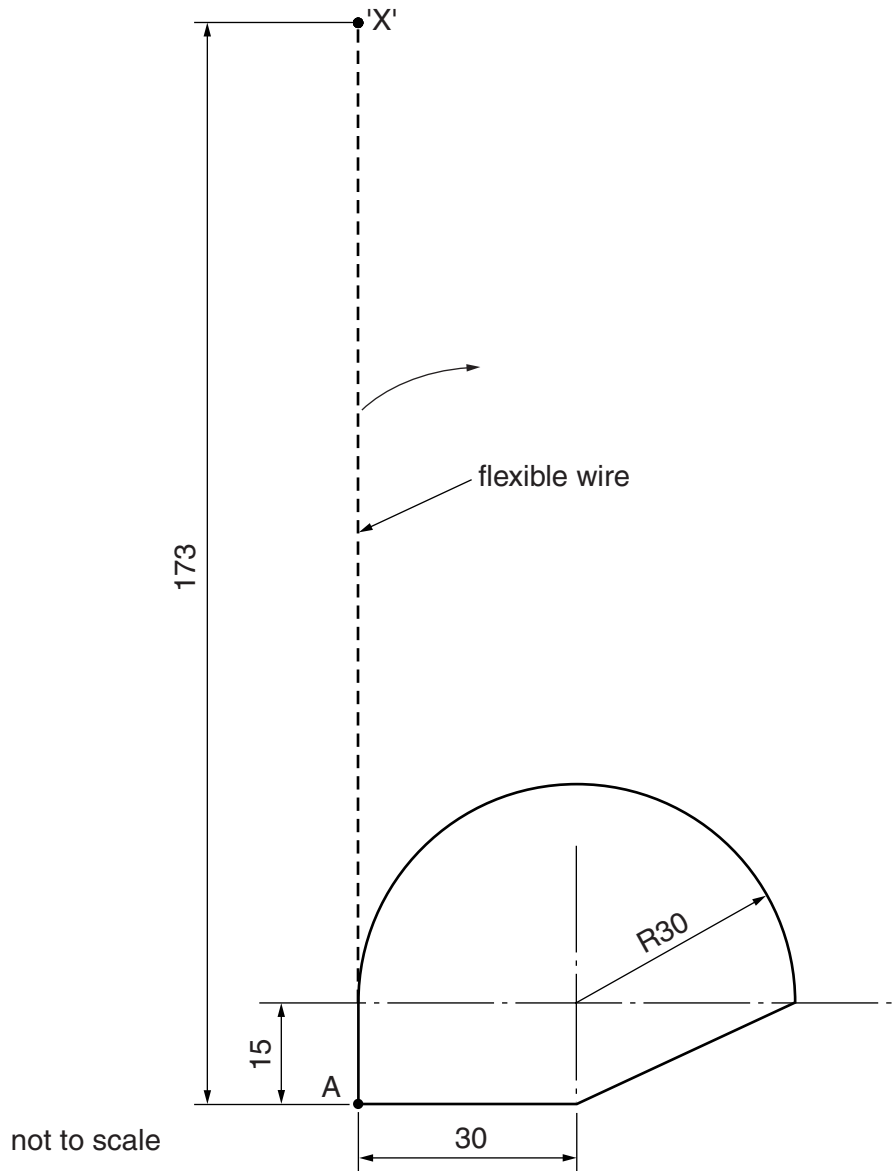


Fig. 1

- 3 Fig. 2 shows the outline of a simple mechanism in which the crank OA rotates about a fixed centre O. The link BC is connected to A by a pin joint, and is able to slide in the guide D which is free to swivel.

(a) Plot the loci of B and C as OA makes one complete revolution. [18]

(b) State the maximum and minimum distances that C makes relative to D. [2]

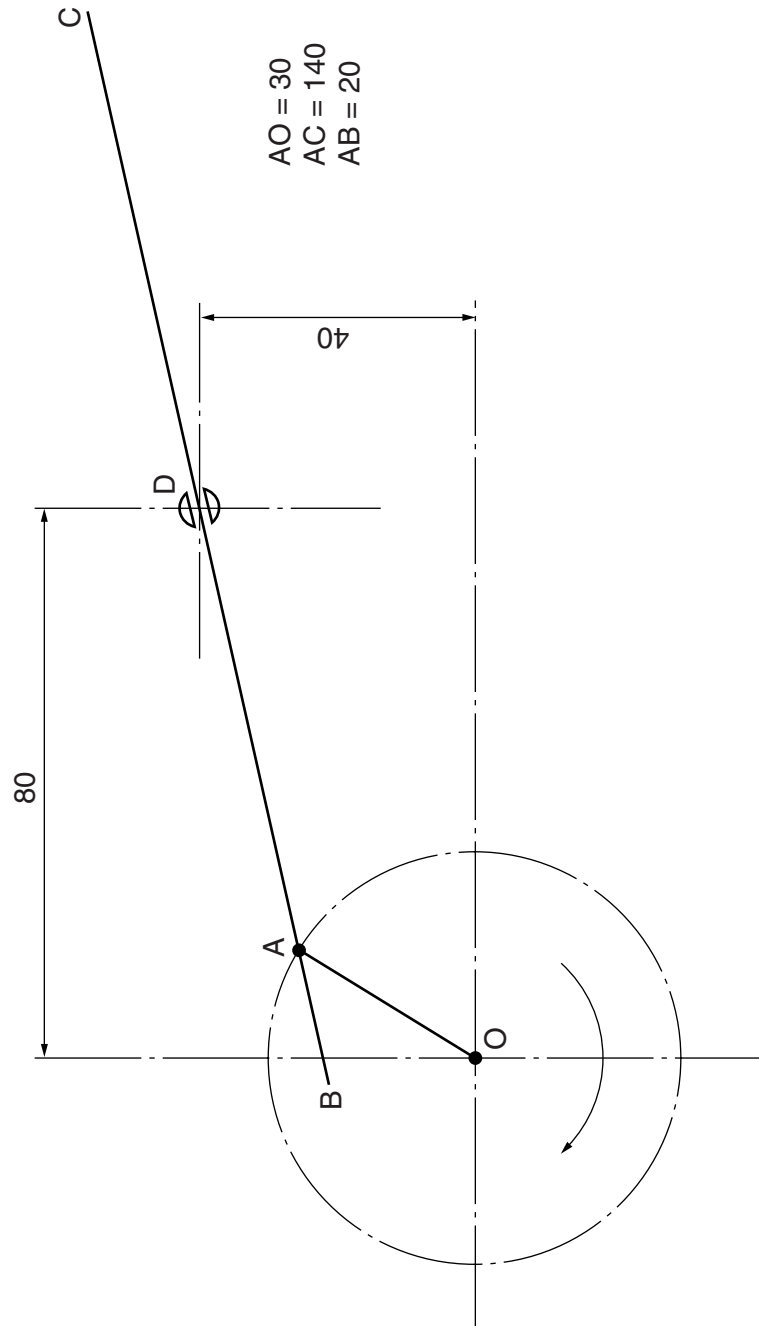


Fig. 2

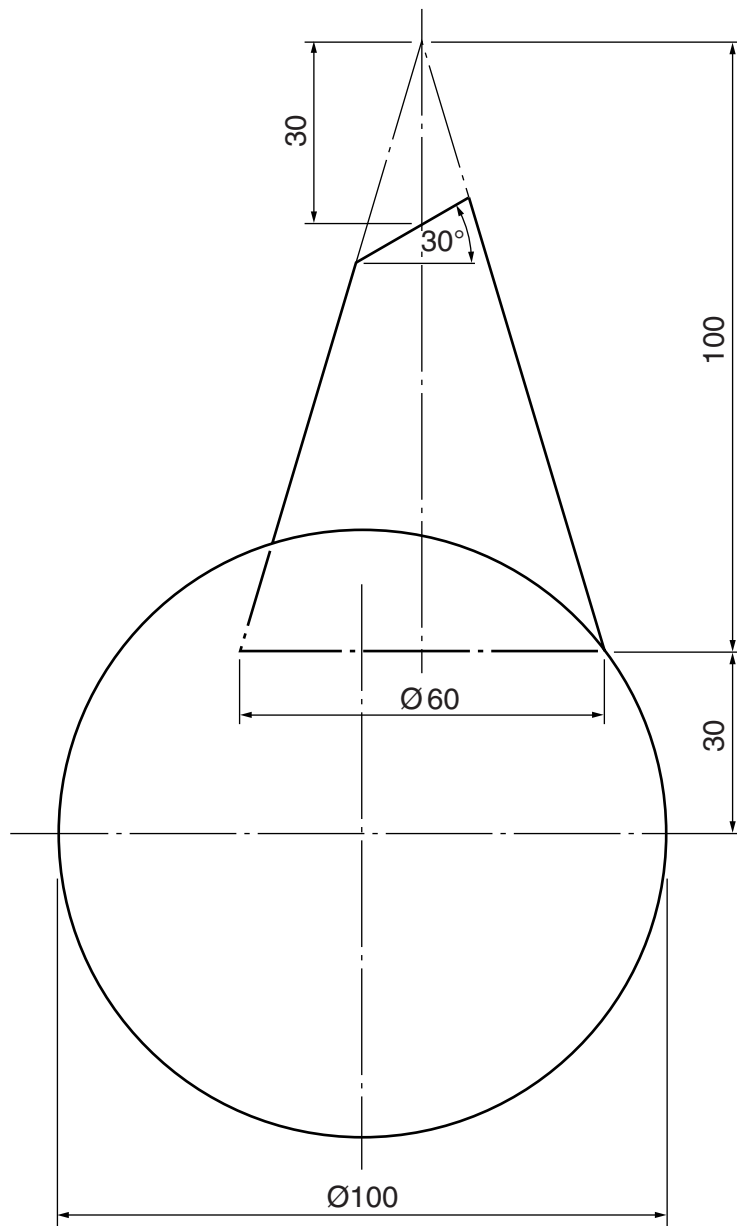
## Section 2 Solid Geometry

Answer not more than **three** questions from this section.

- 4 Fig. 3 shows the elevation of a right circular truncated hollow cone intersected by a thin metal circular air duct. The axes of the two parts are at right angles to each other.

Ignoring the thickness of the metal, draw;

- (a) the given view; [6]  
 (b) the development of the remaining surface area of the modified right circular cone. [14]



**Fig. 3**

5 Fig. 4 shows the plan and incomplete elevation of a right circular cylinder penetrated by a square prism.

(a) Draw the given plan. [2]

(b) Complete the elevation showing the curves of intersection between the cylinder and the square prism. [10]

(c) In projection with (b) draw an end view looking in the direction of arrow **A**, showing only the cylinder and the shape of the aperture into which the square prism fits. [8]

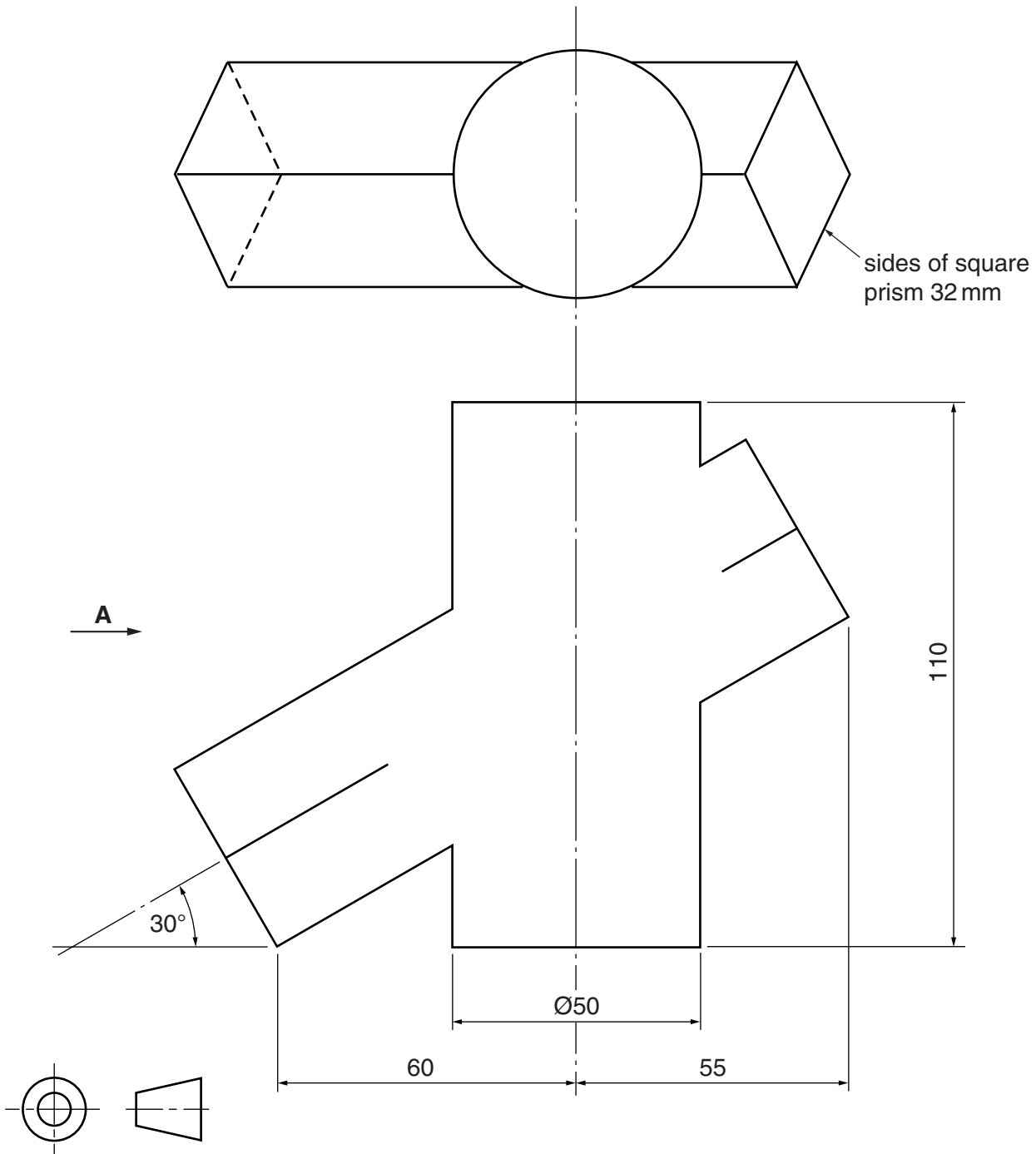


Fig. 4

6 Fig. 5 shows the elevation and end view of a block.

Draw:

(a) the given views;

[4]

(b) a plan view;

[7]

(c) an auxiliary view on  $X_1 Y_1$ , looking in the direction of arrow **A**.

[9]

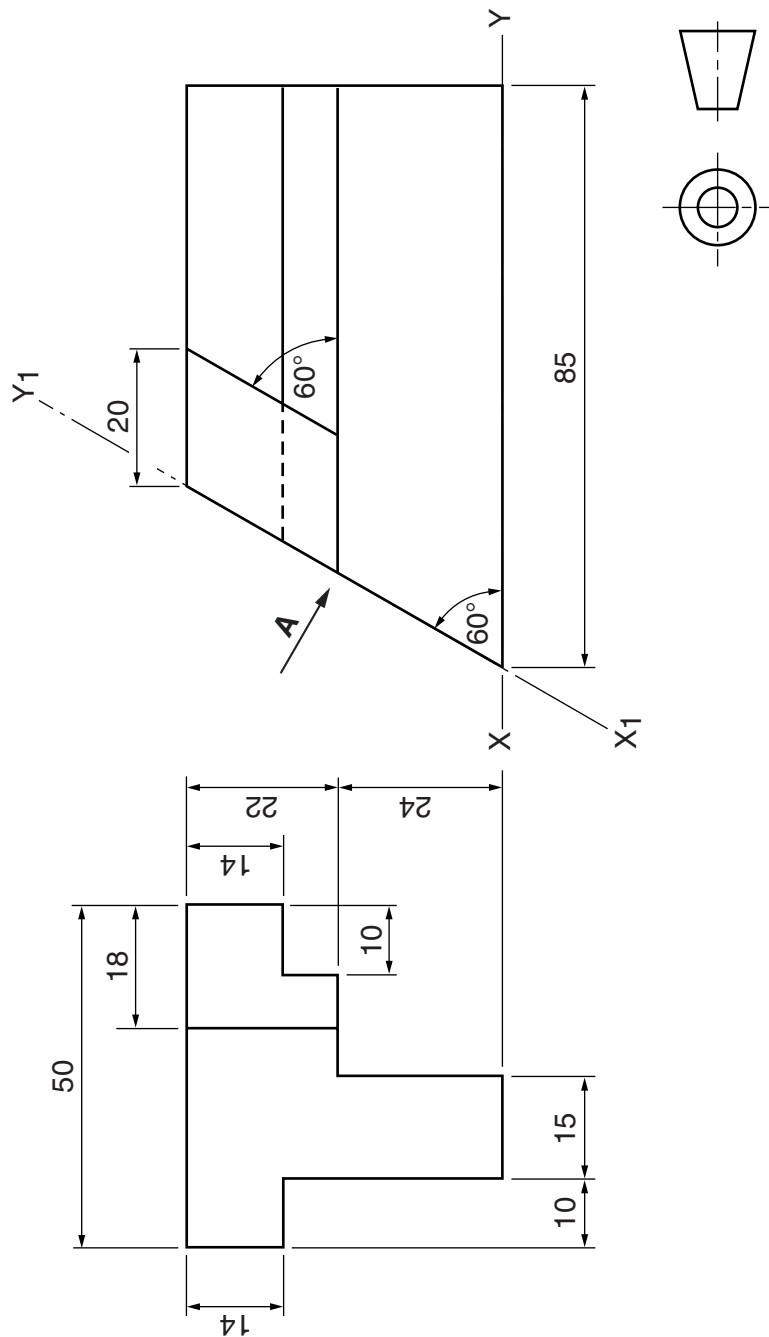


Fig. 5

- 7 Fig. 6 shows three views of a bracket drawn in first angle projection. Draw an isometric view of the bracket with corner C the lowest point in the view. Do not use an isometric scale or indicate any hidden details.

[20]

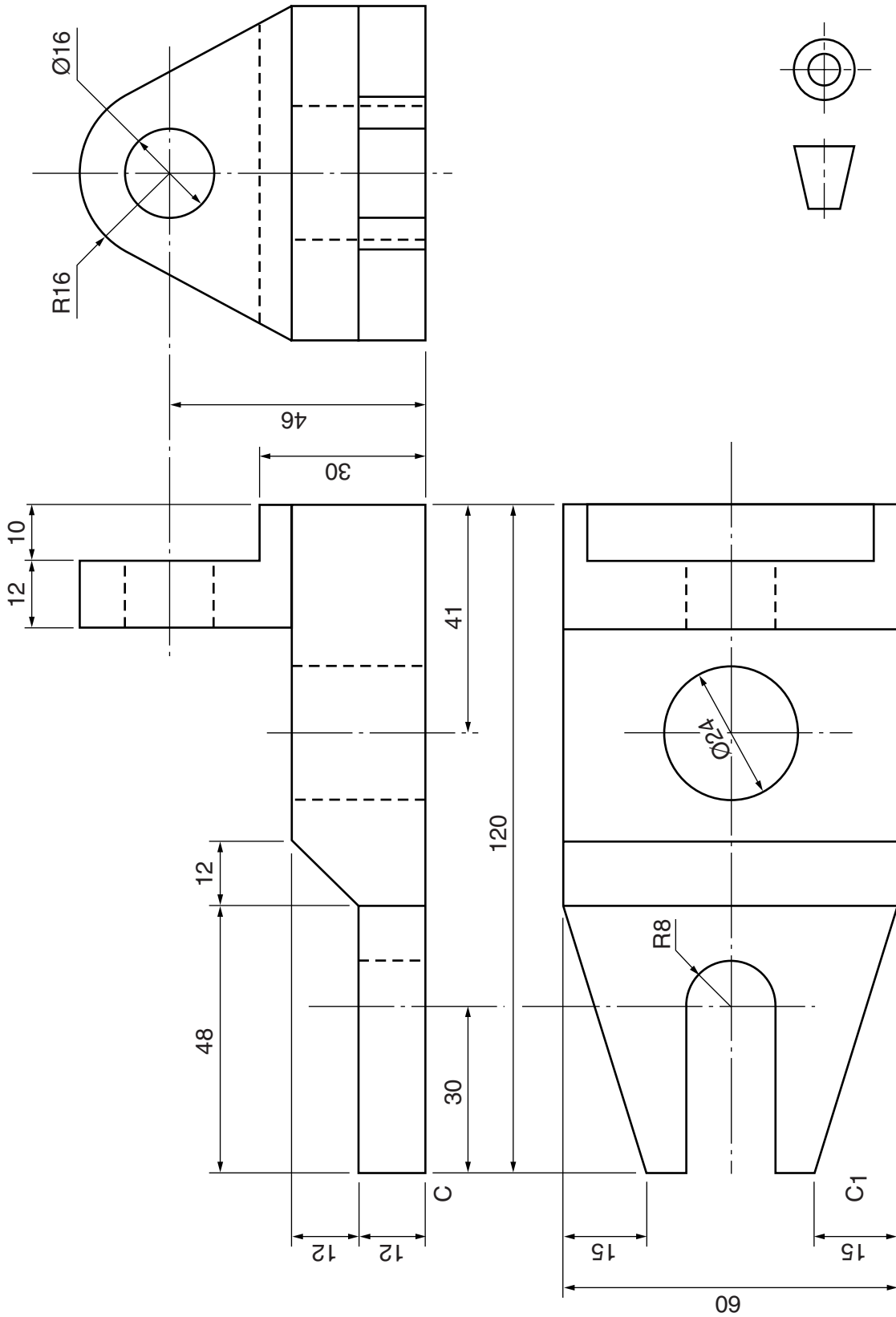


Fig. 6

8 Fig. 7 shows the plan and elevation of a triangular laminate ABC.

(a) Ignoring the thickness of the plate:

(i) draw the given views;

[6]

(ii) determine and state the true lengths of the three sides of the laminate;

[6]

(iii) draw the true shape of the laminate ABC.

[3]

(b) Construct the largest circle that could be drawn within the true shape ABC.

[4]

(c) Measure and state the diameter of this circle.

[1]

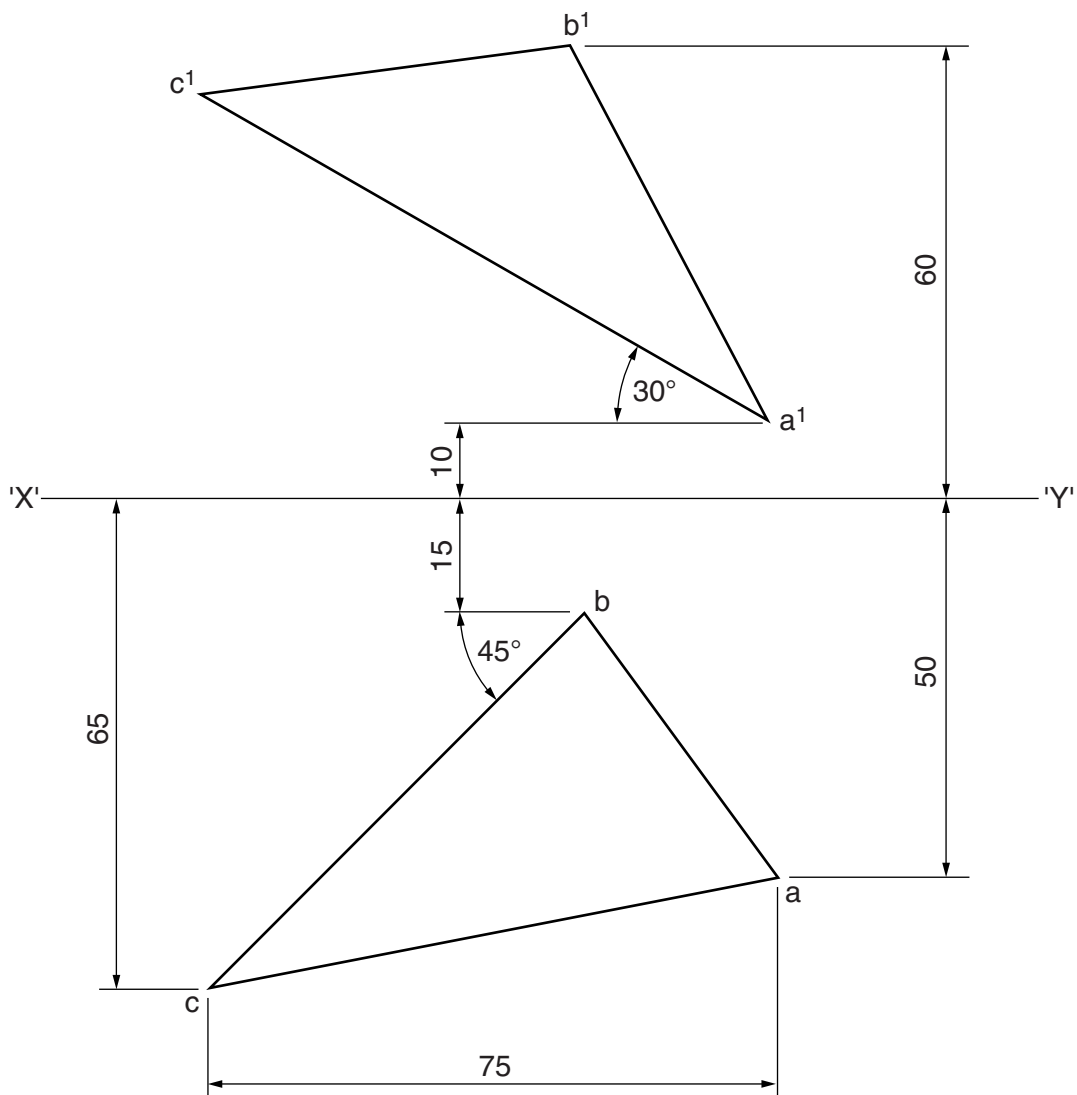


Fig. 7