PROBLEMS FOR

ENGINEERING GRAPHICS

Workbook 1

MEYERS · CROFT

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JOHN WILEY & SONS

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This problem book is designed to accompany Engineering Graphics by Croft, Meyers, Boyer, Miller and Demel. It will also be found useful with any other standard text as all basic topics are covered.

You will find two or more sheets covering most topics. The topic is identified with the sheet number in the upper right corner. The first sheet introduces simple problems covering the basic concept with more than one problem per sheet. This arrangement enables the instructor to lead the student through the method on one problem which the students have before them. The instructor may wish to outline the method of attack on other problems. The students can solve one problem directly and then apply the method to the other problems. Some sheets carry a statement of the principle which will be demonstrated in the problems. Successive sheets in a set carry more difficult problems. The last sheet in a group is a more difficult problem with practical applications included in many cases.

Each sheet has a useful work area on the back. These include rectilinear grids for sketching or graphing, isometric grids, scales, graph fields or blank sketch paper. The backs may be used on unassigned problems or the sheets may be used on both sides.

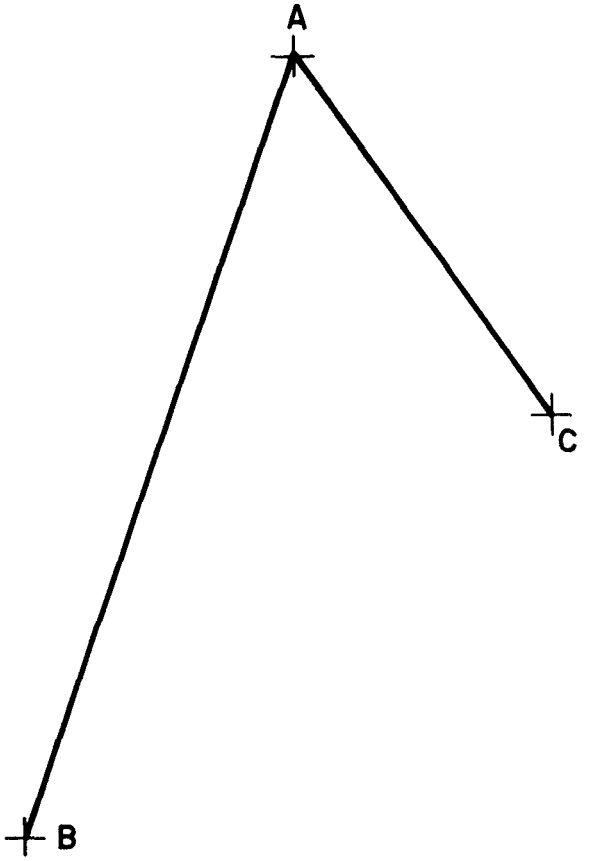
The problems may be solved manually or transferred to a computer for solution. Your authors have provided descriptive geometry problems which may be solved by projection or rotation: one or two problems specify rotation. This is easier on the computer but has been an established manual method for many years.

Regardless of the tools for solution we believe that all engineers will need some manual skills -- sketching with free hand lettering is a totally portable skill requiring only a pencil or pen and a medium (paper, napkin, tablecloth or the back of an envelope). Several problems call for freehand sketching and two types of Gothic capital letters, vertical and inclined, are given on problem sheets. The instructor may assign one or both types of lettering.

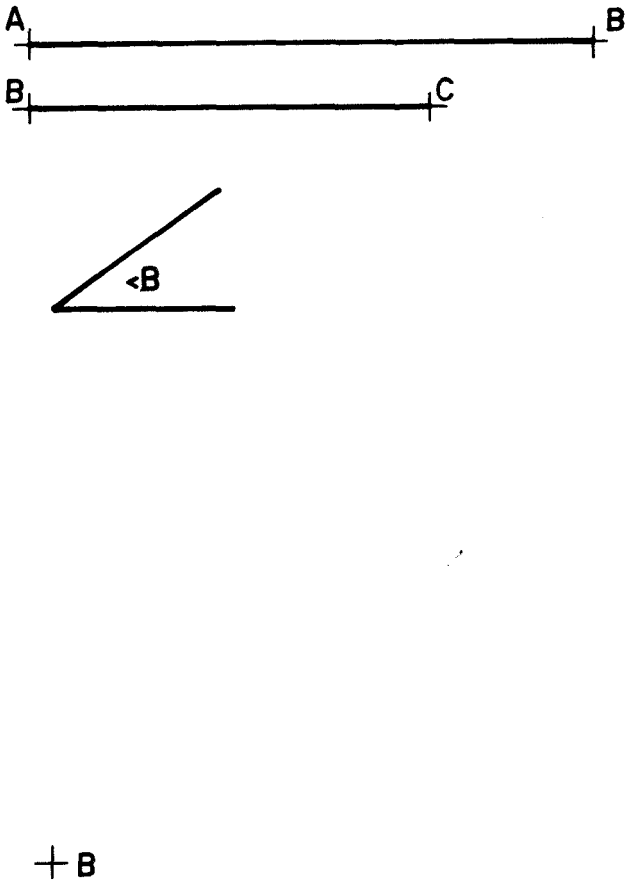
Have fun with this book! Learning new skills and applying new knowledge is rewarding. Winning performance in graphic communication is fun and also requires work.

The authors gratefully acknowledge the contributions of Professor Richard W. Parkinson, Miss Marilyn Bahney, Mr. James Kaehr and Mr. Wayne Kleman, Jr. to the preparation of this manual.

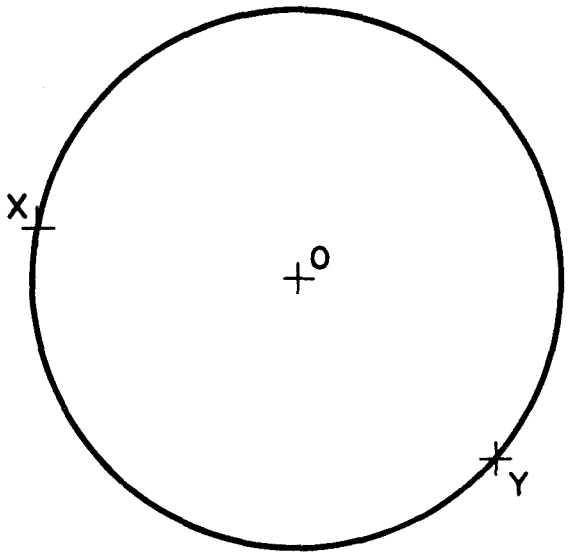
Divide line AB into 7 equal parts using the similar triangle method. Bisect angle BAC.



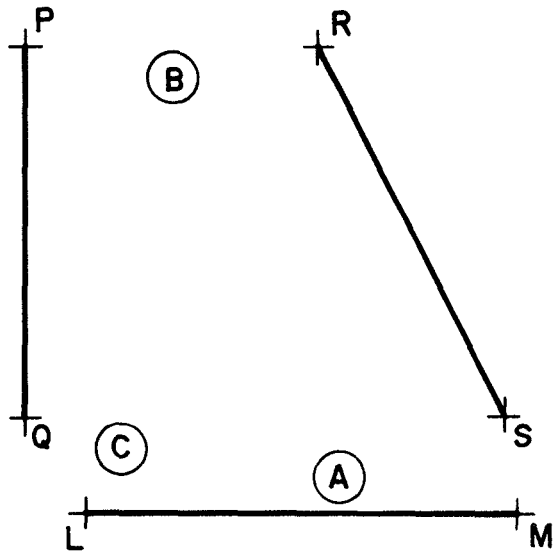
Construct a triangle given two sides (AB, BC) and B.



Construct tangents to circle O at point X and Y. Show and label construction.



Construct arcs tangent to lines LM, PQ, and RS. Arcs radii: A= 10mm, B= 30mm, C= .5in.



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Rectilinear grid - fractional inches

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Construct an isosceles triangle with an altitude of 155mm on the given base. Inscribe a circle in the isosceles triangle, then construct a six pointed star in the circle. A point of the star should be directly below the vertex of the isosceles triangle.

BASE

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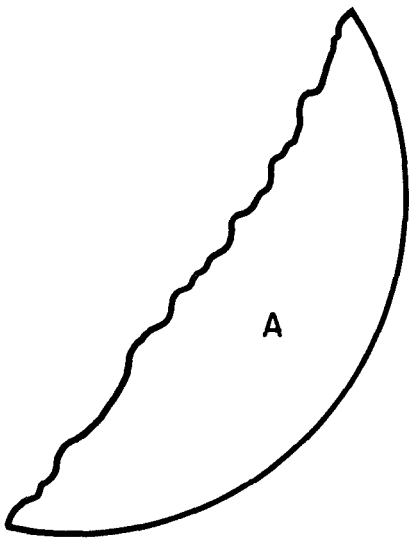
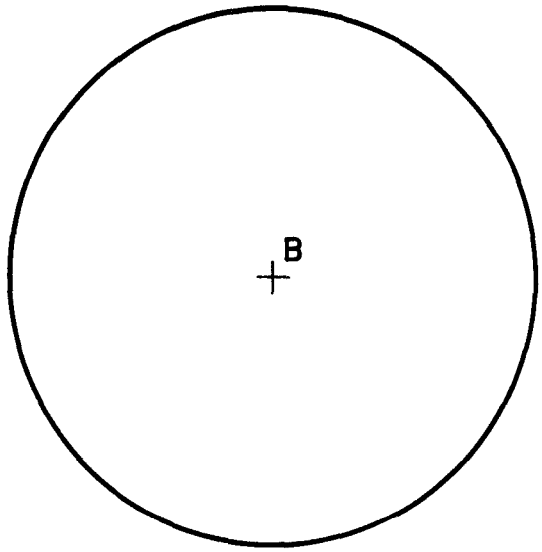
A flat belt operates over two pulleys. Pulley A is broken and all that remains is shown. Reconstruct pulley A and show the path of the belt around the pulleys. How long is the belt? The drawing is full size.

Belt is _____ mm long.





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Rectilinear grid - fractional inches

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L T E F H N X Z A V M W K Y

LIFE FILTH ZETA MIKE

KEY WAVE HEX NINE

THINK ROUND! O! O! O!

O Q C G D U J B P R S &

QUORUM PRICE JUICE

GOBS JUDGE&RACQUET

4 7 0 6 9 8 3 2 5 60% 45# 2'-3"

$\frac{1}{2}$ $\frac{3}{4}$ $\frac{7}{8}$ $\frac{5}{9}$

| | | |

Rectilinear grid - fractional inches

	SCALE DATE	NAME SECTION	DWG

ANGLE IS 67½°

L I T E F H N X Z A V M W K Y

LIFE FILTH ZETA MIKE

KEY WAVE HEX NINE

THINK ROUND! O! O! O!

O Q C G D U J B P R S &

QUORUM PRICE JUICE

GOBS JUDGE & RACQUET

4 7 0 6 9 8 3 2 5 60% 45# 2'-3"

$\frac{1}{2}$ $\frac{3}{4}$ $\frac{7}{8}$ $\frac{5}{9}$

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Rectilinear grid - fractional inches

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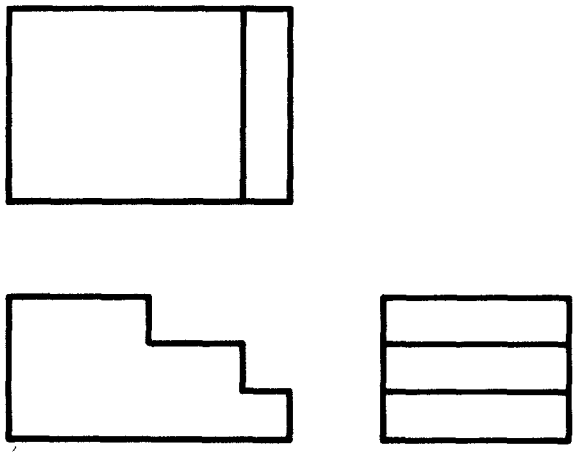
One line is missing in each of the sets of views below. Draw the line in RED. Solve by visualization, naming points, naming lines, naming surfaces, sketching or modeling.

1



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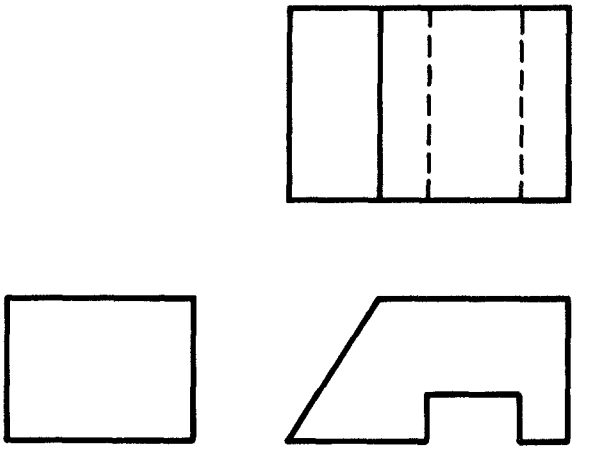

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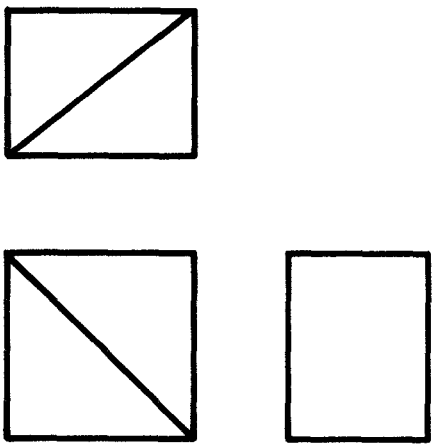

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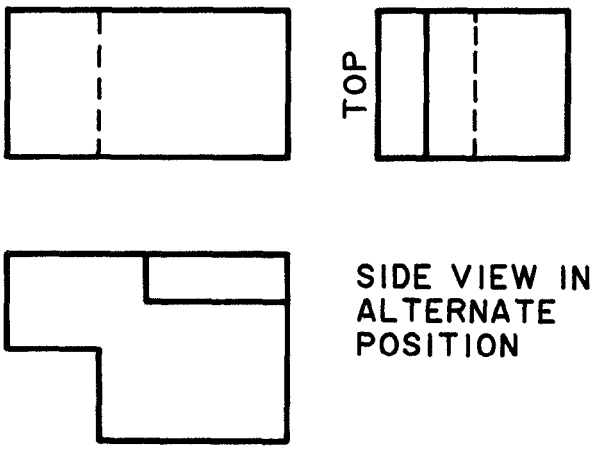

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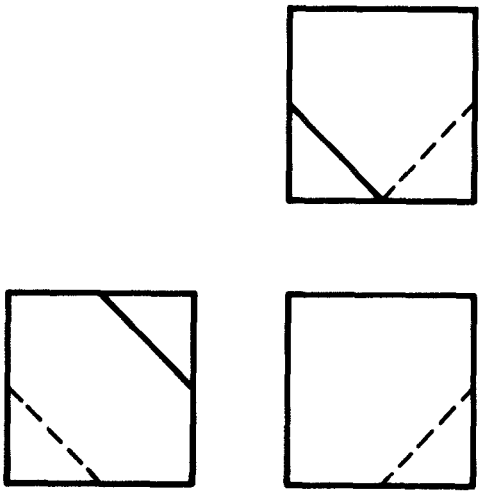

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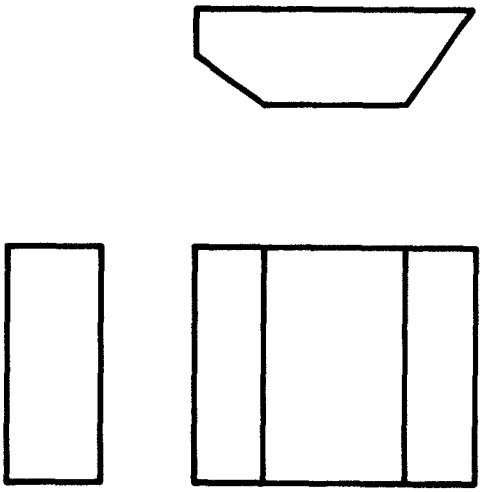

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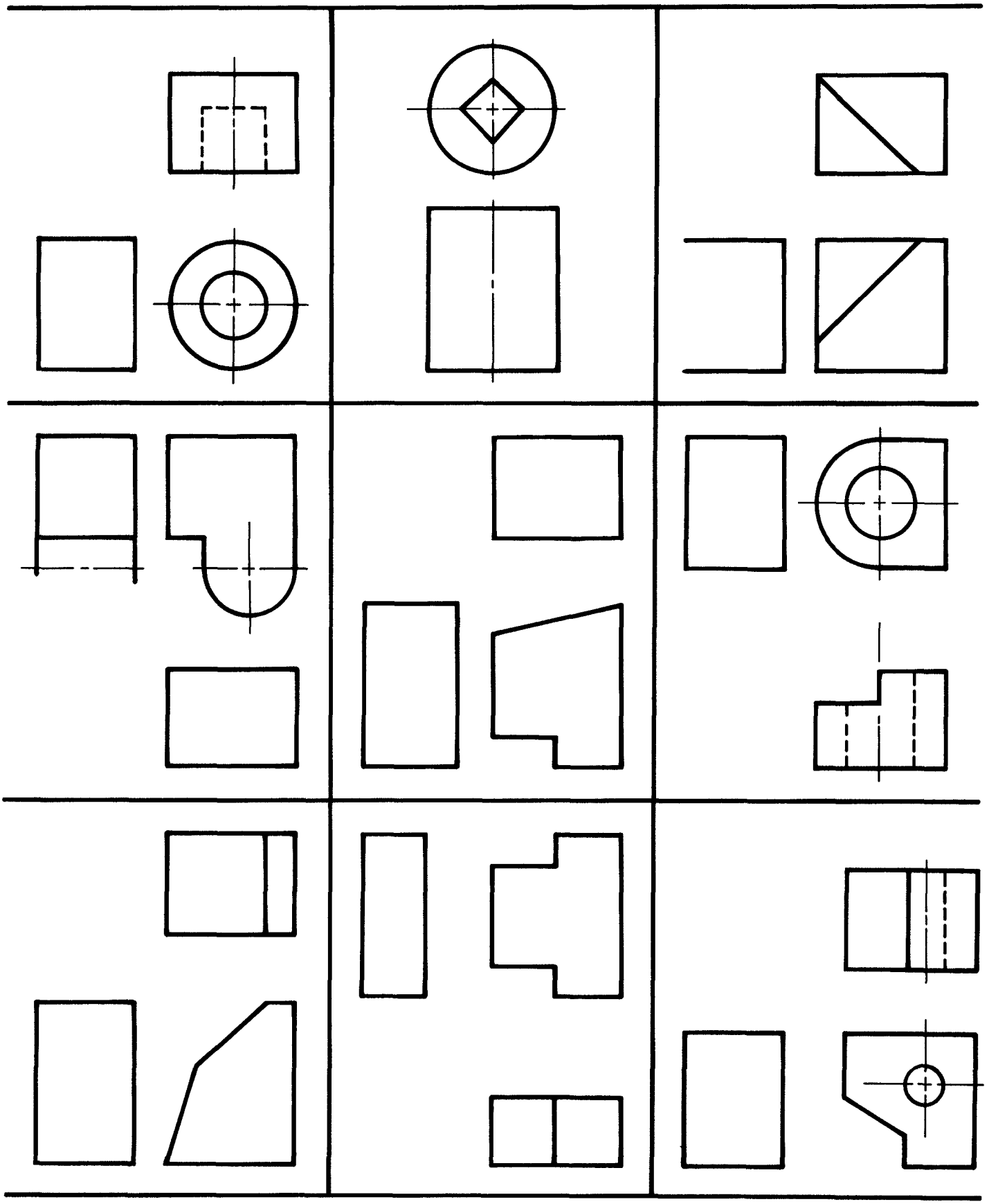
In each of these problems one view is incomplete. Add the missing lines to complete the view.



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