



普通高等工科教育机电类规划教材
机械工业出版社精品教材

机械工程制图基础习题集

JIXIE GONGCHENG ZHITU JICHU XITIJI

第2版

万静 陈平 © 主编



机械工业出版社
CHINA MACHINE PRESS

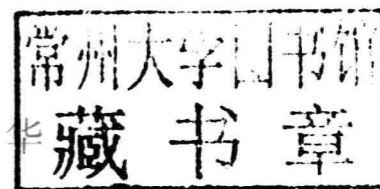
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机械制图基础习题集

第2版

EXERCISE WORKBOOK OF MECHANICAL ENGINEERING DRAWING
THE SECOND EDITION

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主 审 管 华



机械工业出版社

本习题集与万静主编的《机械工程制图基础 第2版》教材配套使用。《机械工程制图基础 第2版》是高等学校规划教材,是在2006年第1版的基础上修订而成的。习题集精选和继承了多年来行之有效的各类练习题,新增了为开发智力、培养能力、调动学生学习积极性的练习题,使题目类型更具多样性。

本习题集的主要内容包括:制图基本知识与技能,投影基础,点、直线、平面、立体的投影,组合体的绘制与读图,机件的各种表达方法,标准件及常用件、零件图、装配图等。

本习题集可作为高等工科院校(近机类、非机械类)等专业的教材,也可供其他类型学校有关专业师生和自学者使用。

为方便教学,本书配备电子课件等教学资源。凡选用本书作为教材的教师均可登录机械工业出版社教材服务网 www.cmpedu.com 注册后免费下载。如有问题请致信 cmpgaozhi@sina.com,或致电 010-88379375 联系营销人员。

This workbook is used alongside "Basis of Mechanical Engineering Drawing (the Second Edition)", edited by Jing Wan. "Basis of Mechanical Engineering Drawing (the Second Edition)" revised on the basis of the first edition in 2006 is the textbook for higher education. This workbook selects and inherits various useful exercises used over the past years, and adds some exercises for intelligence developing, ability training and enthusiasm arousing, which enhance the diversity of exercise types.

The main contents of this workbook include basic knowledge and skills of drawing, basic projection, the projections of points, lines, planes and solids, the drawing and reading of composite solids, representations for machine components (standard parts and commonly used parts), detail drawings, assembly drawings and so on.

This workbook can be used as a textbook for engineering university (subjects closely related to mechanical or non-mechanical engineering). It is also available for teachers and students of other schools majored in related subjects.

图书在版编目(CIP)数据

机械工程制图基础习题集/万静,陈平主编. —2版. —北京:机械工业出版社,2012.6
普通高等工科教育机电类规划教材. 机械工业出版社精品教材
ISBN 978-7-111-39024-4

I. ①机… II. ①万…②陈… III. ①机械制图-高等学校-习题集 IV. 1TH126-44

中国版本图书馆CIP数据核字(2012)第145548号

机械工业出版社(北京市百万庄大街22号 邮政编码100037)

策划编辑:余茂祚 责任编辑:余茂祚 王丹凤

版式设计:霍永明 责任校对:闫玥红

封面设计:马精明 责任印制:李妍

北京振兴源印务有限公司印刷

2012年9月第2版第1次印刷

370mm×260mm 17印张 215千字

0001-3000册

标准书号:ISBN 978-7-111-39024-4

定价:29.00元

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前 言

本习题集第1版自2006年出版以来,以其题型设计精心、与教材理论教学内容紧密结合,将教学中的重点和难点,通过习题训练,落实到位,受到读者好评。该习题集增加了计算机制图和三维实体设计的新内容,有一定的广度和难度。本次修订,保留第1版的特点外,突出以下几点:

1. 贯彻执行最新的《技术制图》、《机械制图》国家标准。
2. 新增了为开发智力、培养能力,调动学生的学习积极性的练习题,使题目类型更具多样性。
3. 采用中英文对照形式,便于开展双语教学的师生选用。
4. 本习题集与同步出版的教材《机械工程制图基础第2版》(万静主编,机械工业出版社出版)配套使用。

参加本书编写的有:张苏华(北京科技大学)、陈华(第1、6章),杨皓(第2章),和丽、陈平(第3、4章),许倩(第5章),杨光辉(第7章),万静、樊百林、李晓武(第8、9、10章)。全书由万静、陈平统稿。本书第1版主编管华老师在第2版的编写修订过程中,为本书提出了许多宝贵的意见和建议,虽已退休,仍接受邀请承担了本书的主审工作,在此表示衷心的感谢和敬意。

由于编者水平有限,书中不足及错误在所难免,敬请广大读者批评指正。

编 者

Foreword

Since the first edition of this workbook was published in 2006, it has been well received by readers for its elaborate exercise types, combining closely with theoretical teaching materials and emphasizing the key points and difficulties through practice. This workbook, added new contents of "Computer Graphics" and "3D solids Design", has a certain range and difficulty. Taking the essence of the first edition, the revision renovates with the following prominent features:

1. The newly published national standards, such as "Technical Drawing" and "Mechanical Drawing" are adopted.
2. Some exercises for intelligence developing, ability training and enthusiasm arousing are added to enhance the diversity of exercise types.
3. The layout adopts an English - Chinese bilingual layout, which provides a favorable condition for bilingual education.
4. The supporting Basis of Mechanical Engineering Drawing (the Second Edition) edited by Jing Wan is published simultaneously by China Machine Press.

This workbook is edited by Suhua Zhang and Hua Chen (Chapter 1 and 6), Hao Yang (Chapter 2), Li He and Ping Chen (Chapter 3 and 4), Qian Xu (Chapter 5), Guanghui Yang (Chapter 7), Jing Wan, Bailin Fan and Xiaowu Li (Chapter 8, 9 and 10), and unified by Jing Wan and Ping Chen. Prof. Hua Guan, the chief editor of the first edition, contributed many invaluable advises and suggestions to the second edition. Although retired, she completed the work of primary review. We acknowledge her gratefully for her significant contributions.

Due to various limitations, this workbook may contain mistakes and all criticisms and corrections from all readers are welcome.

Jing Wan and Ping Chen

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1-1 Basic drawing exercises 基本手法练习

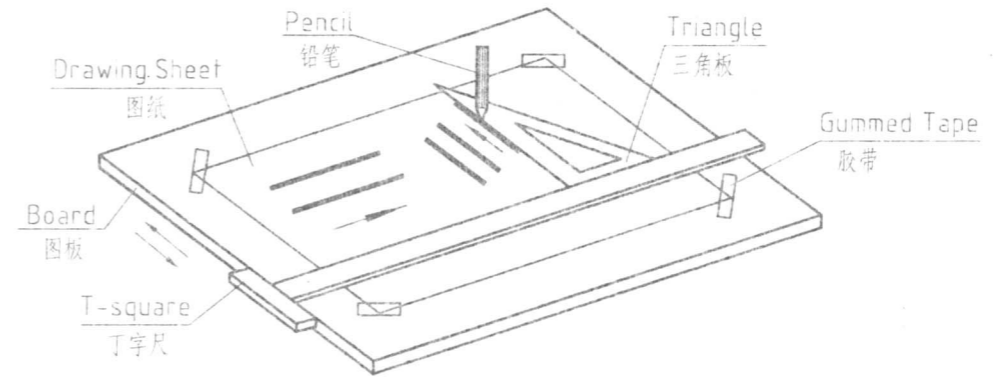
1. Requirements 要求

(1) Master the ability of the proper usage of common drawing tools (seen in Fig. 1). 掌握常用绘图工具的使用方法 (见图1)。

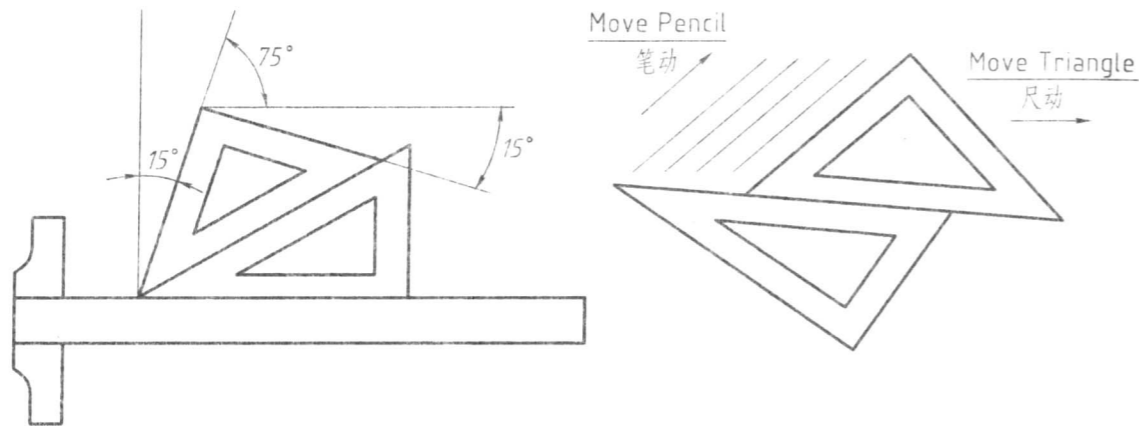
(2) Be familiar with the national standards on "Mechanical drawing" about sheet, line style, scale, lettering and dimension. 熟悉《机械制图》国家标准关于图纸幅面、图线、比例、字体、尺寸注法的规定。

(3) Learn geometric construction, drawing methods of 2D objects and dimensions. 学会几何作图以及平面图形的画法和尺寸注法。

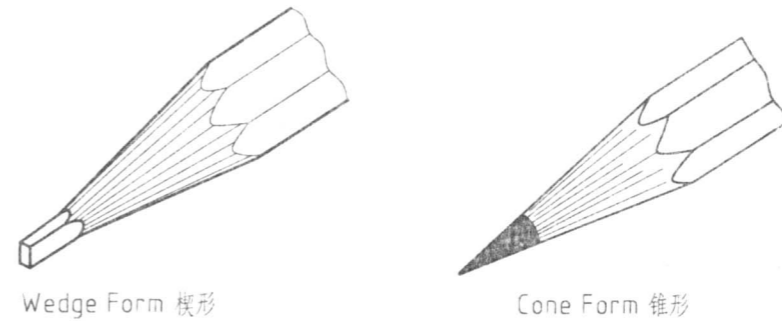
(4) Keep a serious, responsible and meticulous attitude. Each drawing should be produced with appropriate layout, beautiful lines, tidy lettering and clean drawing. 作业要严肃认真, 一丝不苟。要布图匀称, 图线美观, 字体工整, 图面整洁, 养成良好的画图习惯。



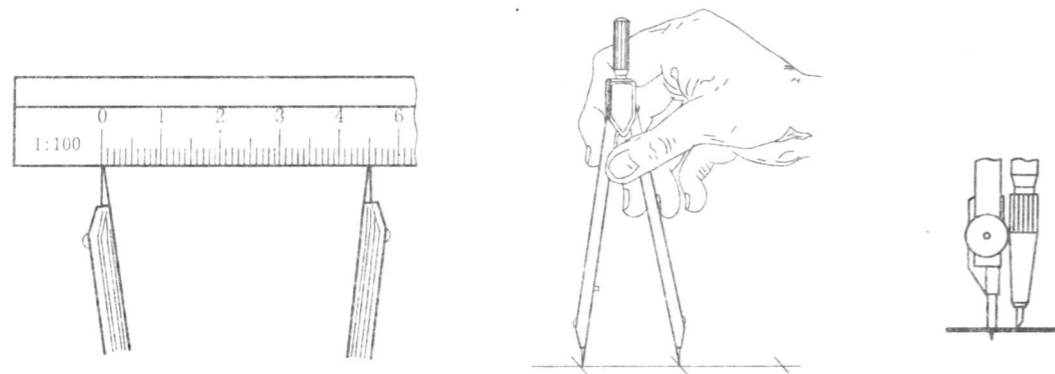
a) The use of drawing board and T-square 图板及丁字尺的应用



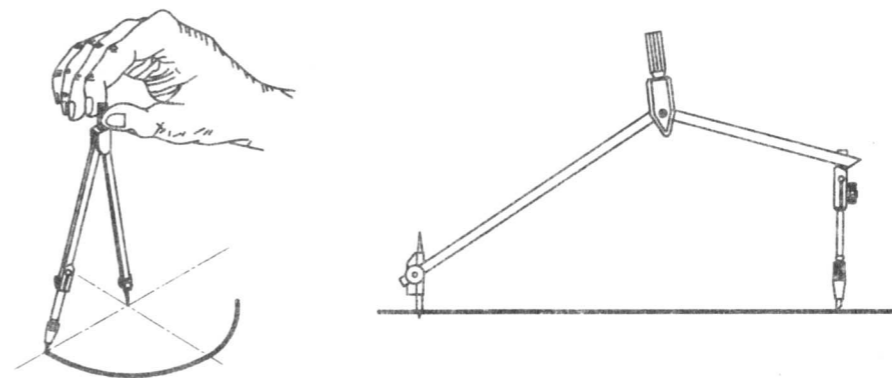
b) The use of two triangles 两块三角板的配合应用



c) Pencil sharpening 铅笔的削法



d) The use of dividers 分规的使用方法



e) The use of compass 圆规的使用方法

Fig. 1 Drawing tools 绘图工具

Class

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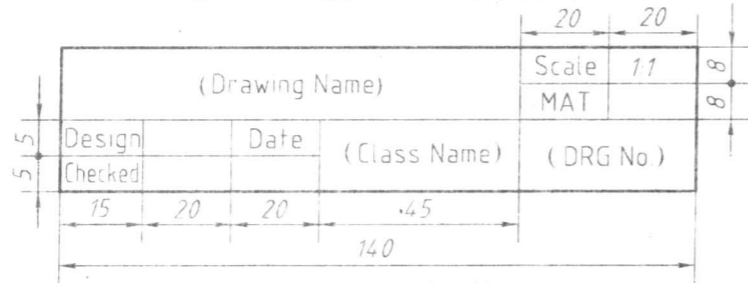
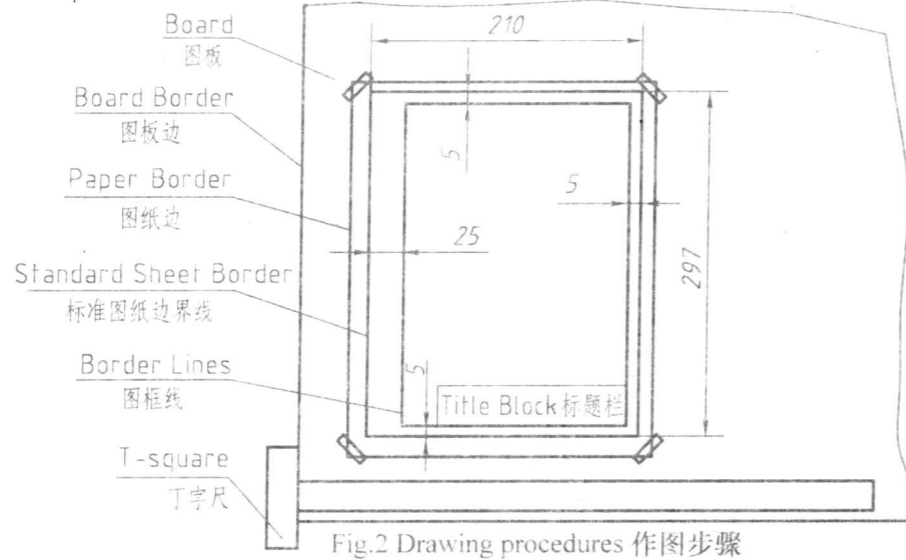
Name

2. Drawing procedures 作图步骤

(1) Place the drawing sheet on the lower left of the board with gummed tape (seen in Fig. 2), then draw the boundary and title block on the lower right corner of the sheet according to the national standard (seen in Fig. 3). 将图纸用透明胶带固定在图板左下方(见图2),然后按标准幅面画出边框线和图框线,并在图框的右下角画一标题栏(见图3).

(2) Draw the rough sketches using thin continuous lines and then finish them using thick continuous lines. In order to improve efficiency, you had better thicken curved lines first and straight lines later, and draw the same line styles at the same time. 先用细实线打好底稿,然后加深。加深时线型应按先曲后直的顺序进行,为了提高工作效率,对于同一类线型可一起完成。

(3) Dimension, lettering and check the drawing. 标注尺寸,书写文字,最后对全图进行校核。



3. Exercise explanations 作业说明

(1) The workbook has been reduced because of plate - making. Finish your drawing with A4 sheet following the given scale. 本作业纸印刷制版时已经缩小,作业时要使用4号图纸,按要求的比例作图。

(2) The dimension figure should be written with the height of 3.5mm. 尺寸数字用3.5号字书写。

(3) The letterings in the title block are as follows: DRG name and DRG No. 10mm, Class name 7mm and the rest 5mm. 标题栏内的字体大小规定如下:图名和图号用10号字,班级名用7号字,其余用5号字。

(4) All exercises should be done using pencils. 作业全部用铅笔做。

Technical drawing showing a mechanical part with dimensions: $\phi 22$, $\phi 10$, 15, 30, 100, R12, R5, R8, R10, R4, R38, 30°, 27, 15°, R25, R28, R10, R8, $\phi 30$.

基本手法			比例	1:1
			材料	
制图	日期	(班级名)	01	
审核				

Class

Stu No.

Name

1. Chinese character exercises. 汉字练习。

字体端正 笔画清楚 间隔均匀 排列

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整齐长仿宋体 技术制图 姓名班级

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国家标准零件比例 专业装配公差 螺栓齿轮

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2. Letter and number exercises. 字母和数字练习。

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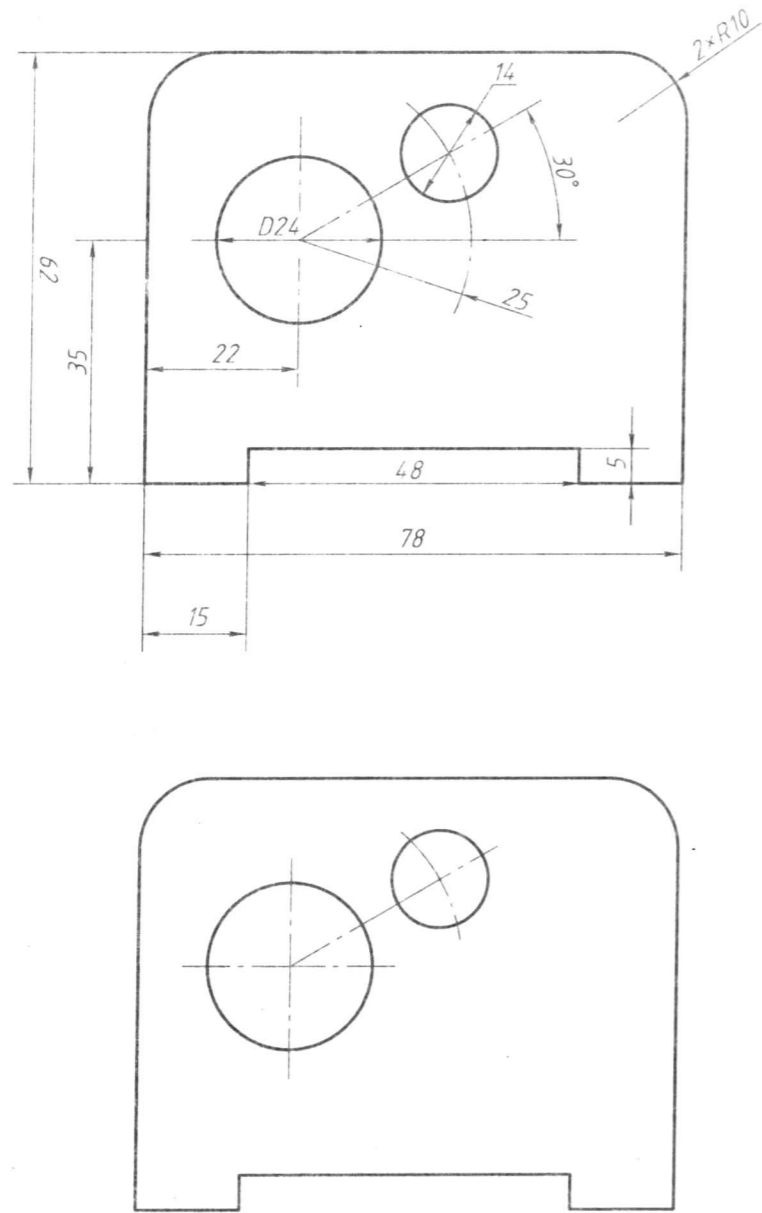
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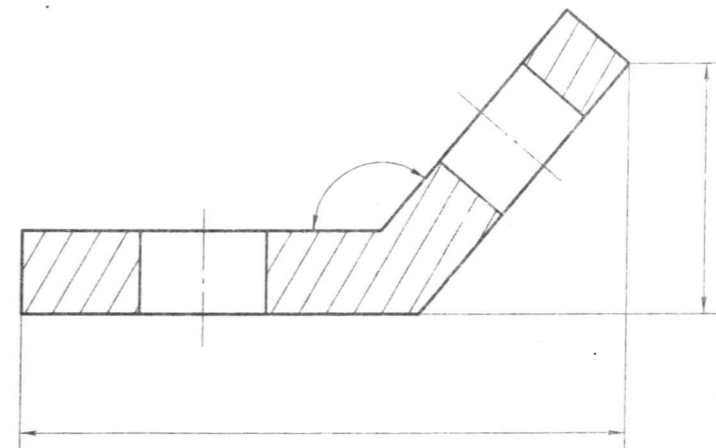
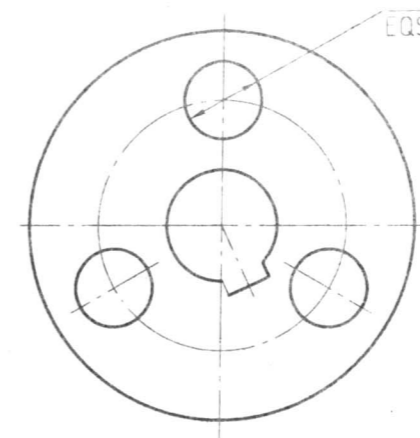
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1-3 Dimensioning exercises 尺寸标注练习

1. Analyze dimensioning errors and correct them. 分析尺寸标注的错误，在下图中进行正确的标注。



2. Dimension (obtain sizes by measuring the drawing and retain the integer). 将下列图形进行尺寸标注 (尺寸数值由图中按 1:1 量取整数)。



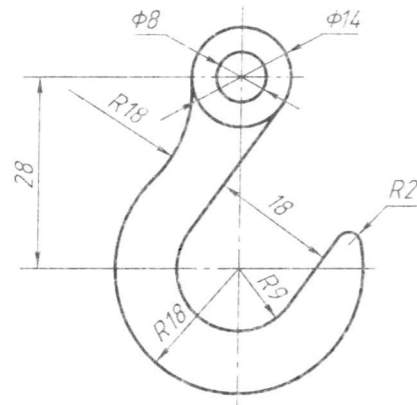
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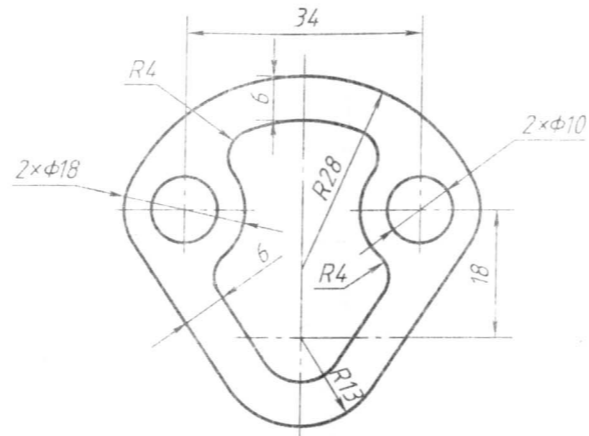
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1-4 Complete 2D objects using Inventor software 用 Inventor 软件绘制平面图形

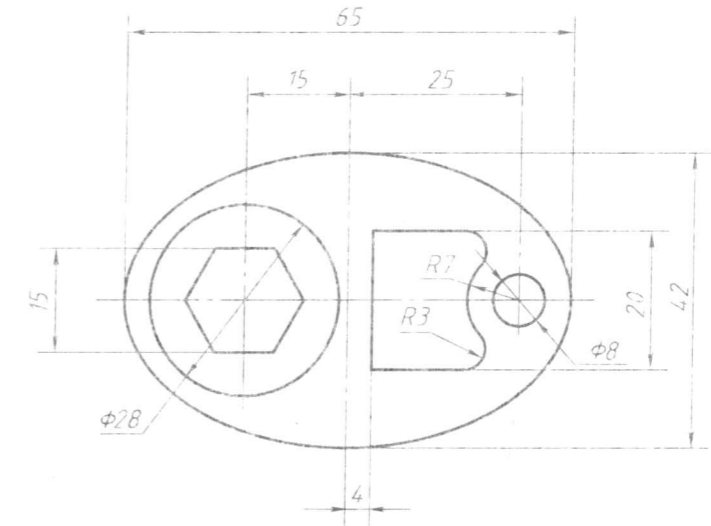
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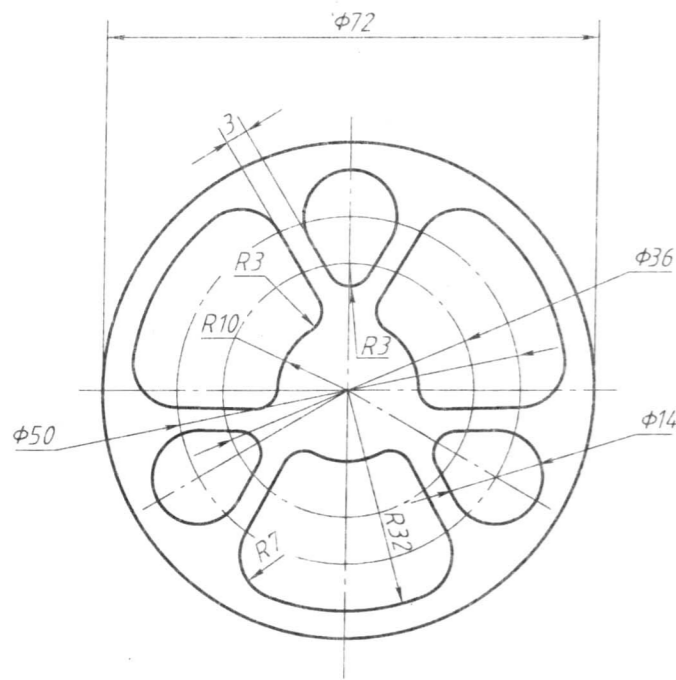
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3.

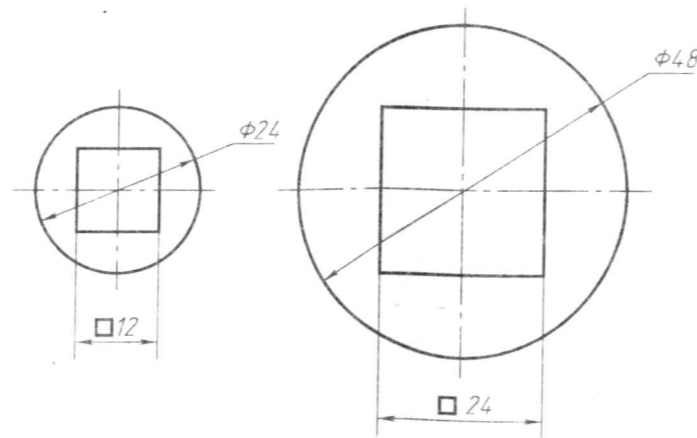


4.

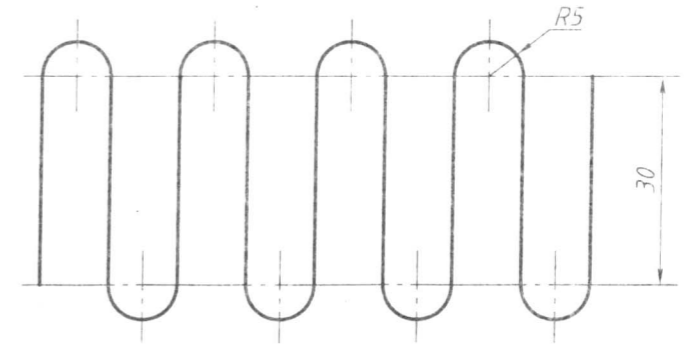


5. Create the following drawings with size variance and structure line when the diameter of circle changes. 应用尺寸变量和构造线构造下列图形, 使得当直径变化时:

- (1) The side length of square equals the radius of circle. 正方形的边长等于圆的半径。
- (2) The center of square is that of circle. 正方形的中心在圆心上。
- (3) The center of circle is fixed. 圆心的位置不变 (圆心固定)。

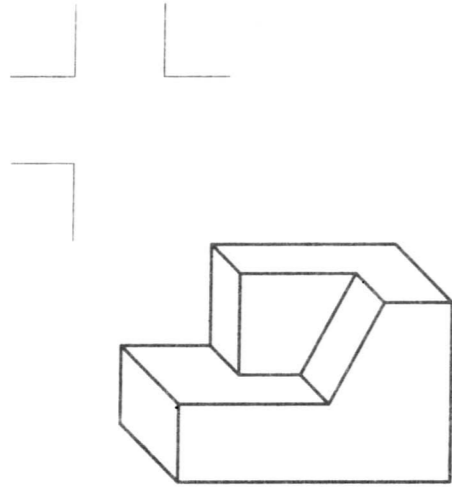


6. Create the following drawing controlled by only two sizes using structure line, geometric constraint and size constraint. 利用“构造线”功能和几何约束、尺寸约束将图形构造成只用两个尺寸控制大小的图形。

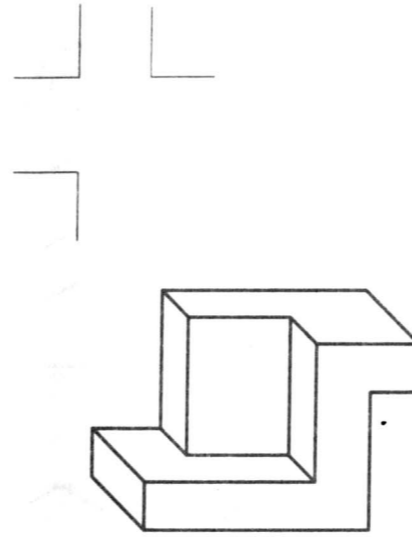


2-1 Draw three views according to the cabinet axonometric projection 由斜二等轴测图画三视图

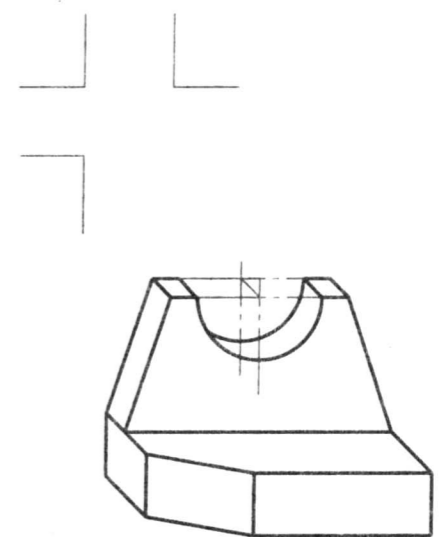
1.



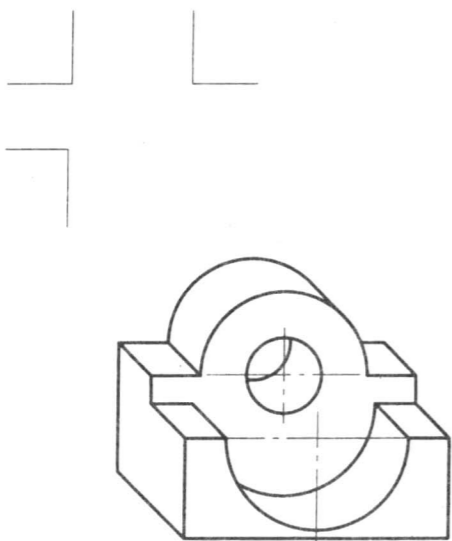
2.



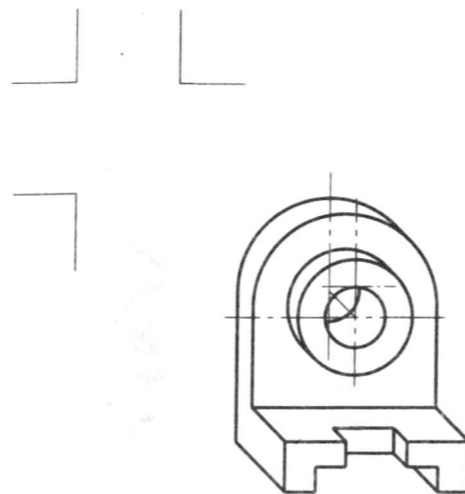
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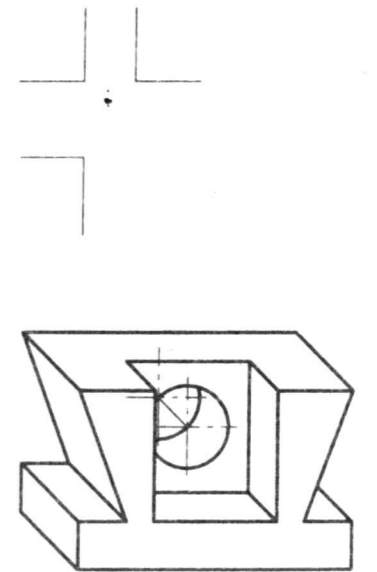
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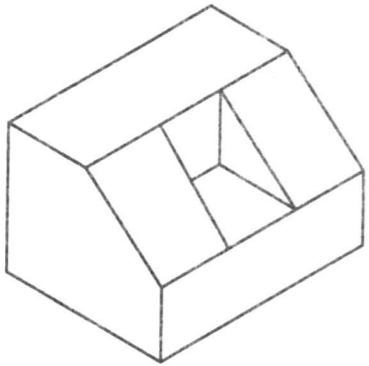
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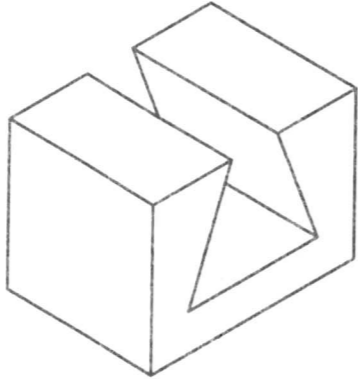
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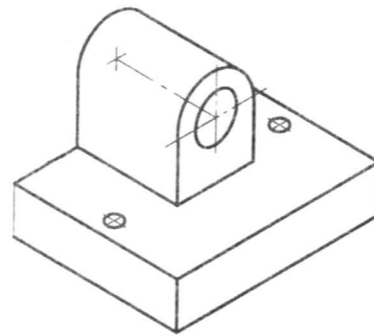
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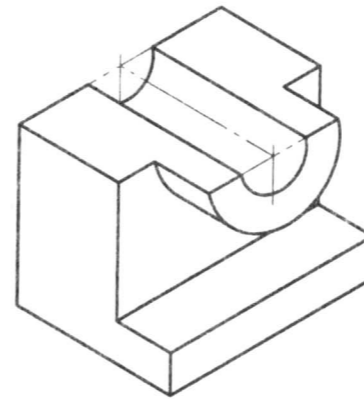
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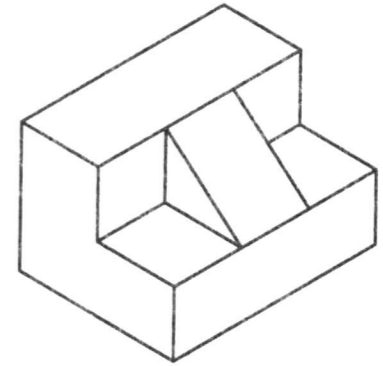
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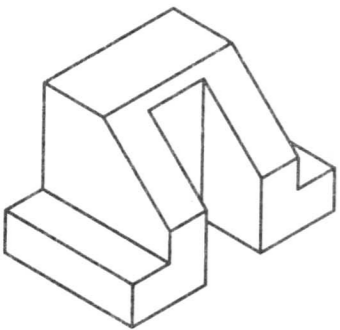
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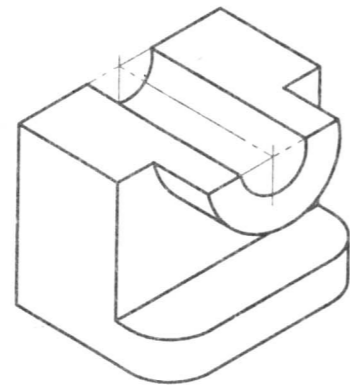
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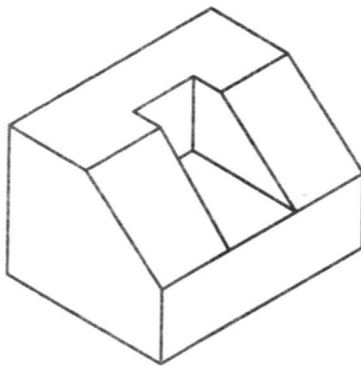
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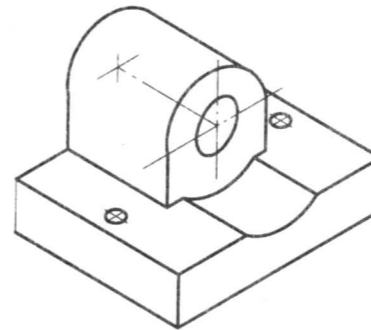
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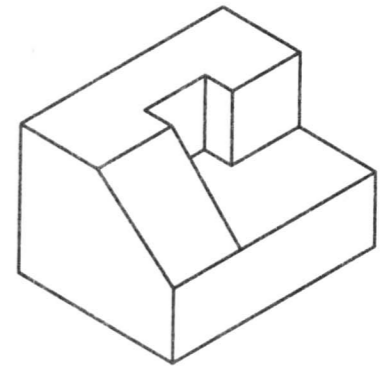
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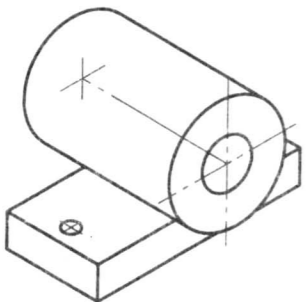
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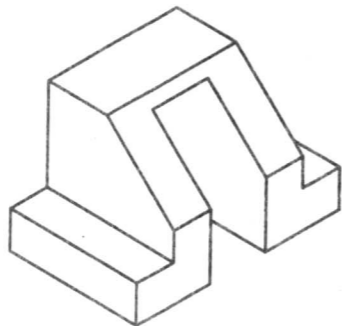
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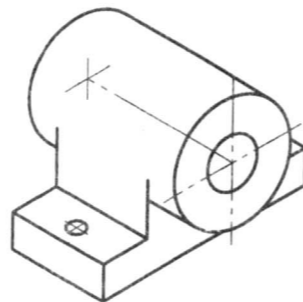
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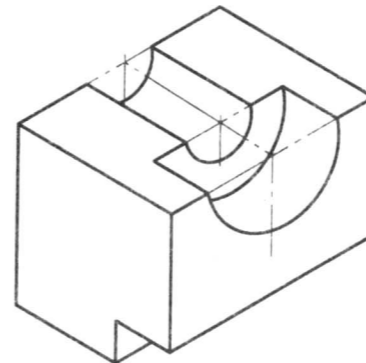
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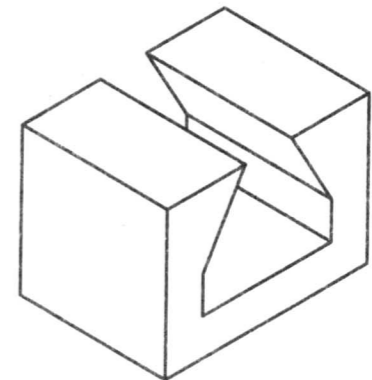
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N



O

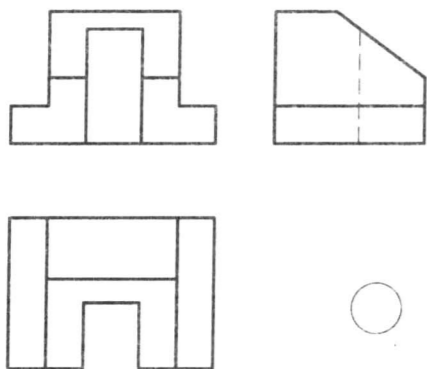


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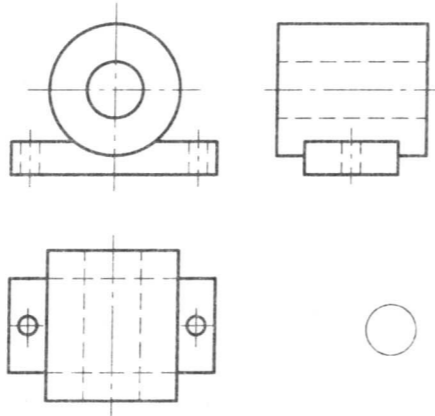
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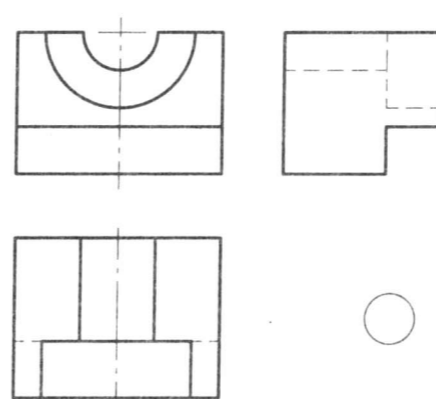
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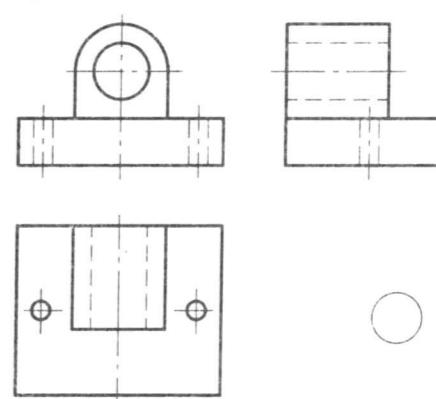
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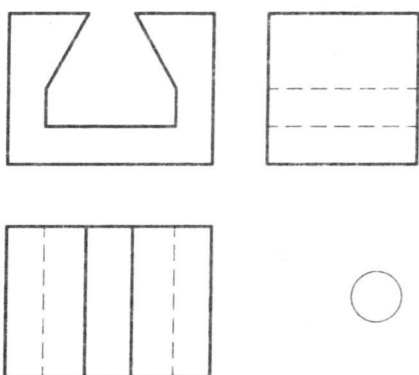
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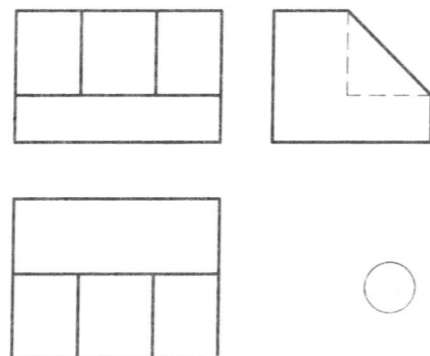
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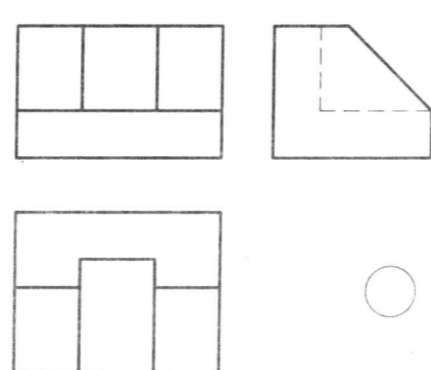
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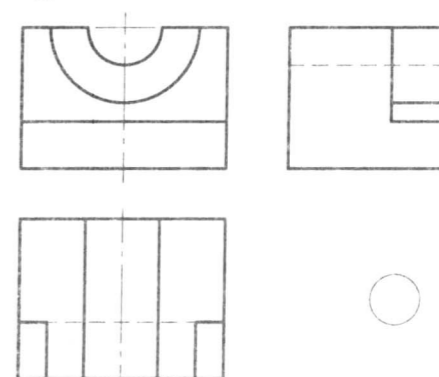
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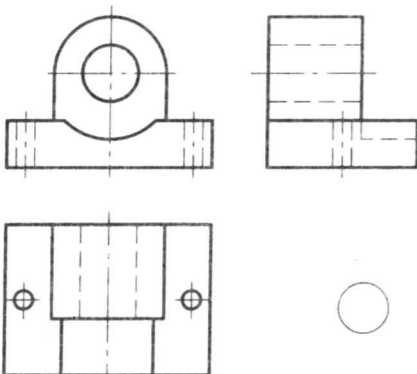
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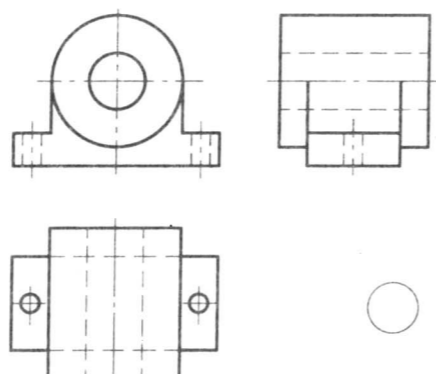
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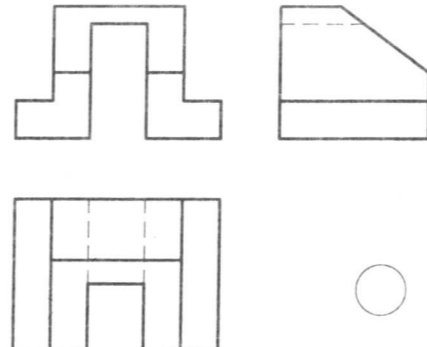
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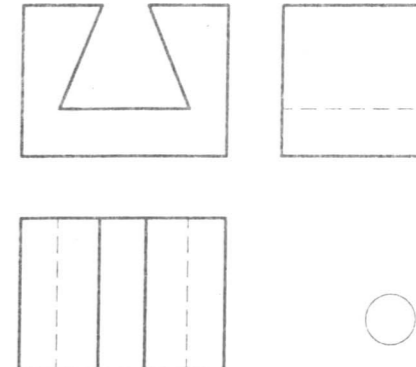
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11.



12.



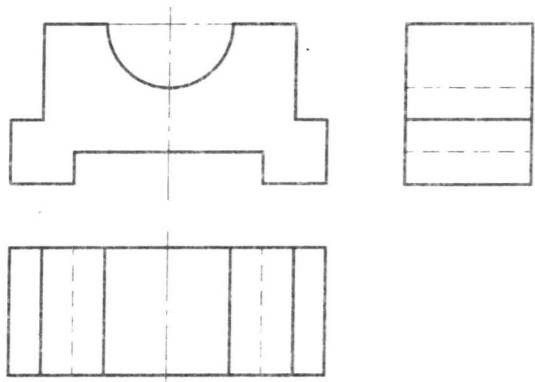
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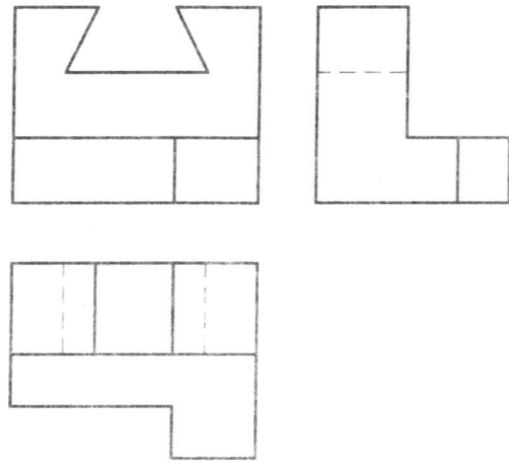
Name

2-3 Draw cabinet axonometric projections according to three views 由三视图画斜二等轴测图

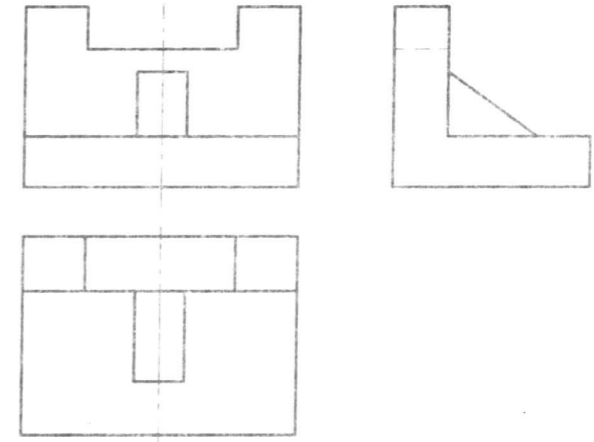
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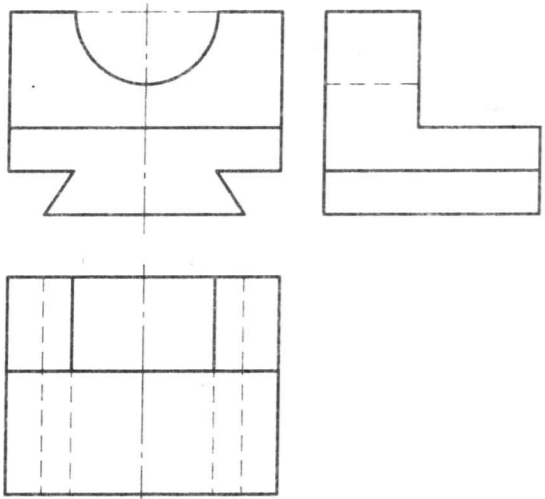
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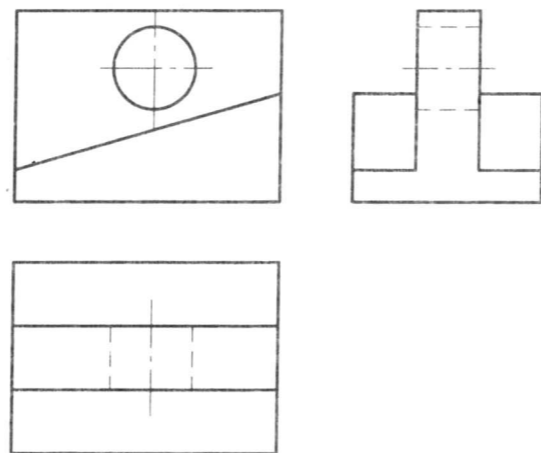
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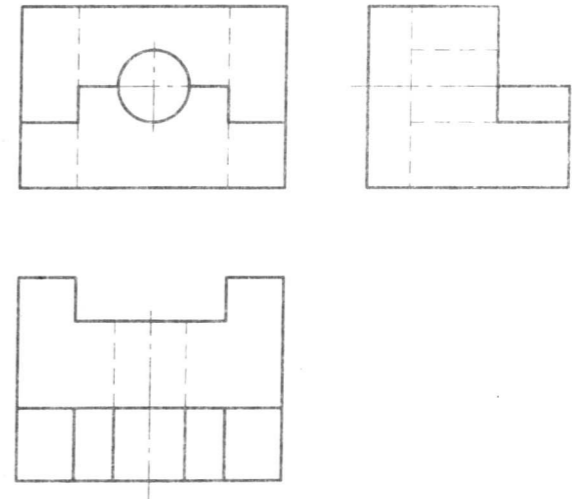
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5.



6.

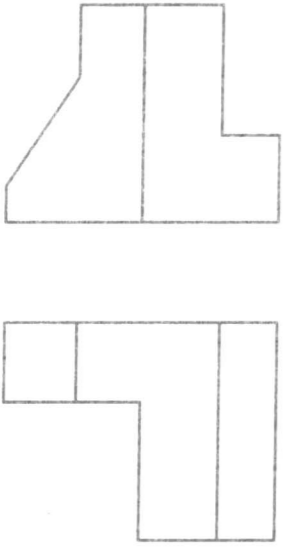


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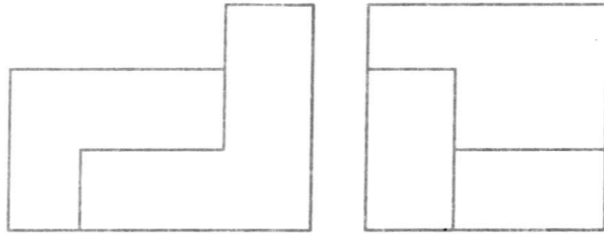
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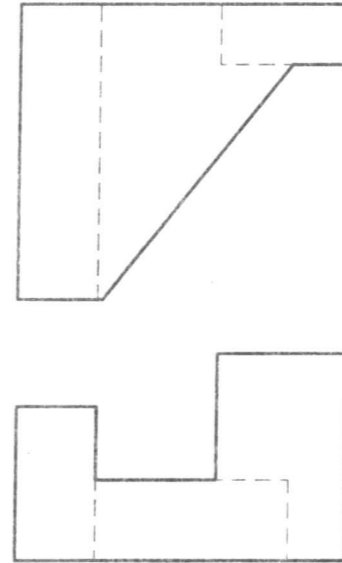
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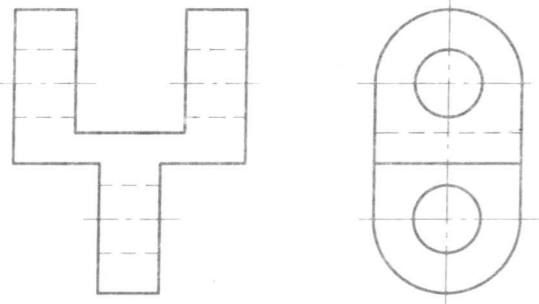
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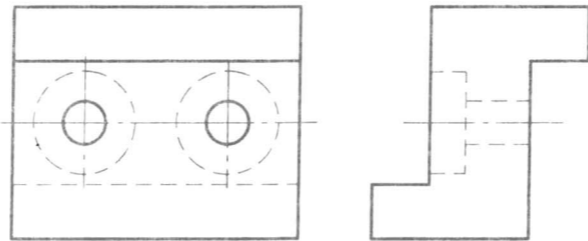
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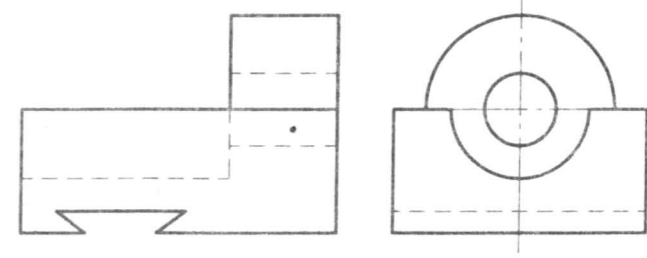
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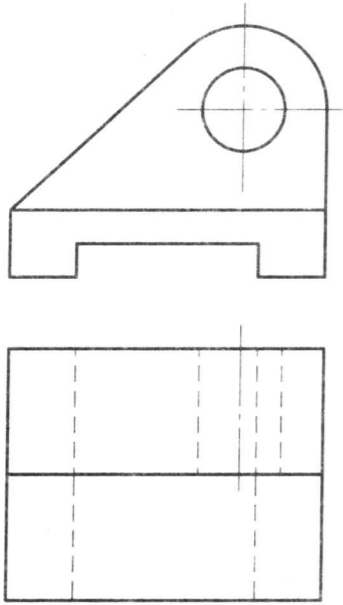
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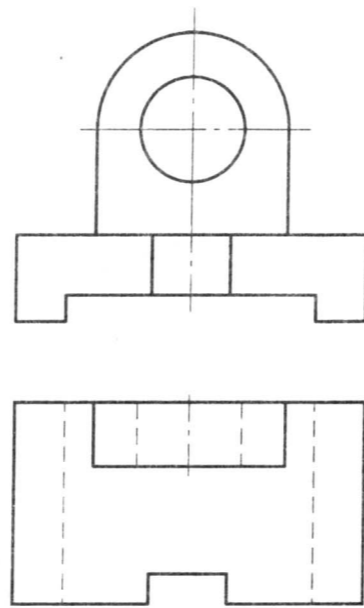
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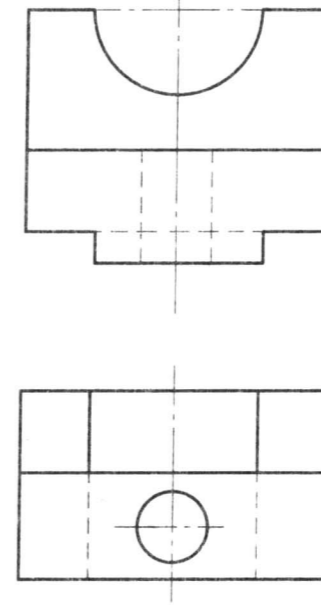
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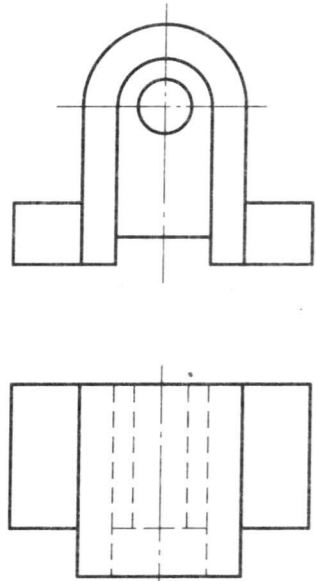
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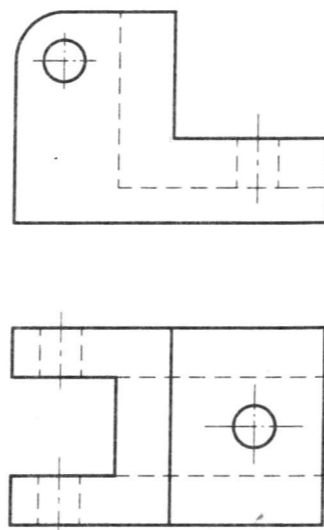
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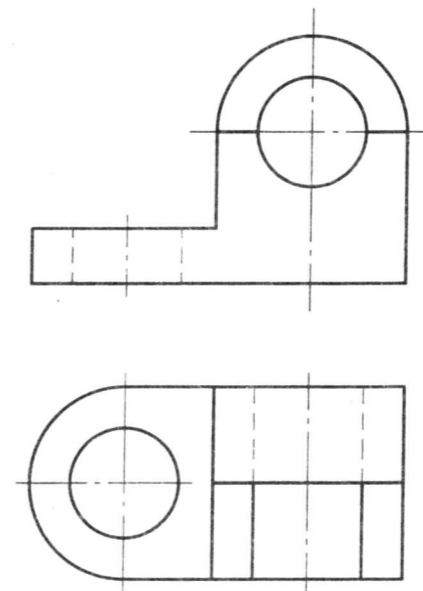
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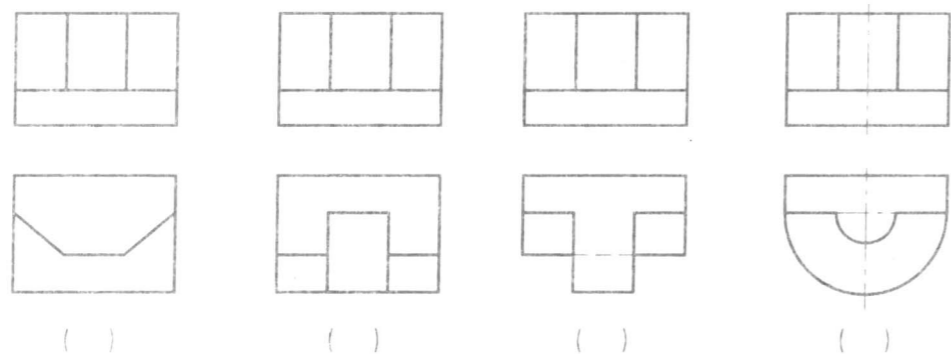
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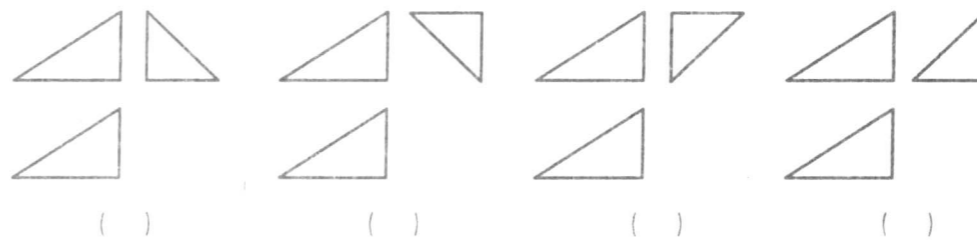
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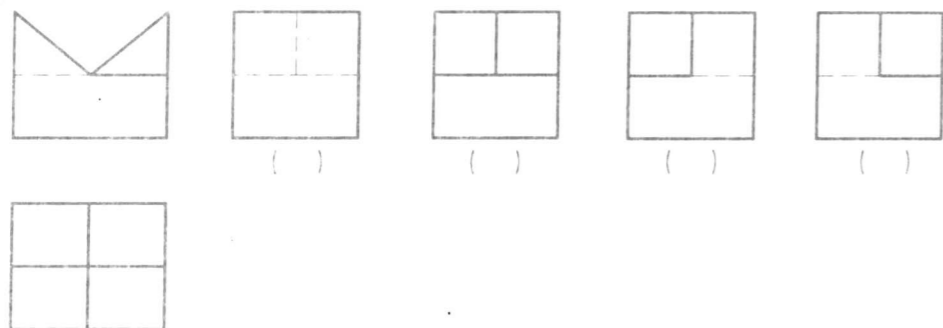
1. Select the correct group of projections. 选择正确的一组视图 (一)。



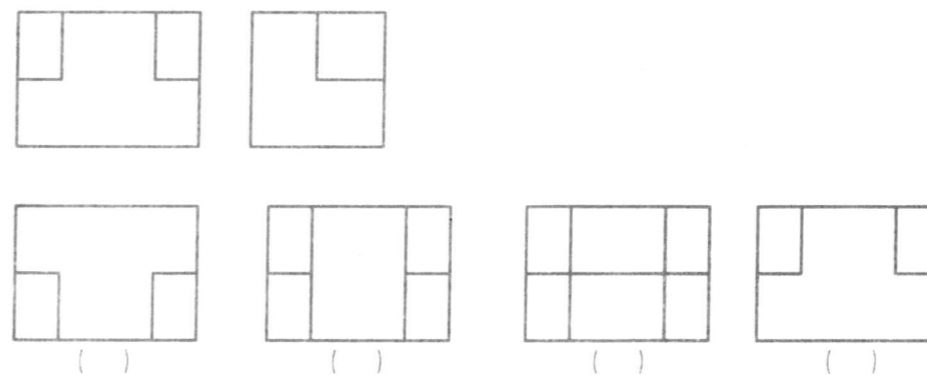
2. Select the correct group of projections. 选择正确的一组视图 (二)。



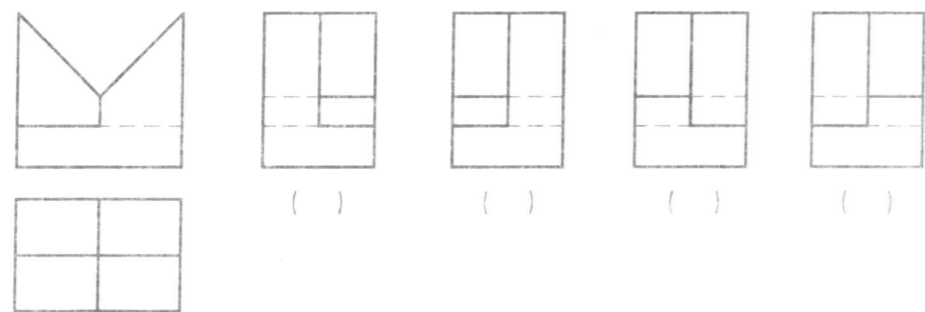
3. Select the correct side view. 选择正确的左视图 (一)。



4. Select the correct top view. 选择正确的俯视图。



5. Select the correct side view. 选择正确的左视图 (二)。



6. Select the correct side view. 选择正确的左视图 (三)。

