普通高等工科教育机电类规划教材
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JIXIE GONGCHENG ZHITU JICHU XITIJI

机械工程制图基础习题集

第3版

陈平　万静　主编

机械工业出版社
CHINA MACHINE PRESS

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机 械 工 程 制 图 基 础 习 题 集

第 3 版

EXERCISE BOOK of MECHANICAL ENGINEERING DRAWING FUNDAMENT (THIRD EDITION)

主　编　陈　平　万　静
副主编　许　倩　陈　华
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机 械 工 业 出 版 社

本书是《机械工程制图基础（第3版）》（万静　陈平主编）的配套用书。

本书在保留第2版风格、改正错误、整合内容、完善体系的基础上修订而成，删减了不必要的简单题型，以突出重点教学内容，新增了徒手草绘和组合体方案表达的练习题，使题目类型更具多样性。

本书主要内容包括：制图基本知识与技能，投影基础，点、直线、平面的投影，立体的投影，组合体，机件表达方法，标准件与常用件，零件图，装配图等，其编排顺序与万静、陈平主编的《机械工程制图基础（第3版）》（机械工业出版社出版）基本一致。

本书采用中英双语编写，有利于在掌握制图相关知识的同时，掌握相关专业英语词汇。

本书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。

The book is a supporting material of Mechanical Engineering Drawing Fundament (third edition) edited by Wan Jing.

The book was revised on the basis of keeping the second edition style, correcting mistakes, integrating contents and perfecting the system. The book cut unnecessary simple exercises to emphasize the key points of teaching materials, added exercises about freehand sketching and expression of composite solids to enhance the diversity of exercise types.

The text covers the basic knowledge and skills of drawing, basis of projection, projections of points, lines and planes, projection of solids, composite solids, representation methods of parts, standard parts and commonly used parts, detail drawings, assembly drawings and so on. The arrangement order of the book is accordance with that of the third edition of Mechanical Engineering Drawing Fundament (editor – in – chief, Wan Jing).

This book is written in both Chinese and English. It is helpful for us to master the relevant knowledge of drawing and English vocabulary.

The book can be used as a textbook for engineering college and university (closely related to mechanical engineering or non – mechanical subjects). It is also available for teachers and students of other schools majored in related subjects as well as autodidacts.

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前　言

本书自第 2 版 2012 年成功发行以来，受到读者好评。本次修订包括更新国标、纠正错误、整合内容等。本书主要特点如下：

1. 贯彻执行最新《技术制图》、《机械制图》国家标准。
2. 采用中英文对照形式，便于开展双语教学的师生选用。
3. 进一步加强 Inventor 软件三维建模练习。
4. 新增了综合性要求更高的练习题。
5. 新增了徒手绘图练习题，训练学生的徒手绘图能力；新增了组合体方案表达练习题，培养学生的分析表达能力。

参与编写本书的有陈平、万静、陈华、杨皓、许倩、杨光辉、樊百林、李晓武。本书由陈平和万静统稿。

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。本书的编写和出版得到了北京科技大学“十二五”教材建设经费的资助。

编者

Foreword

This book has been well received by readers since its release in the second edition in 2012. The revision include the update of national standards, correcting errors, integration of content. The main peculiarity of the book is as follows:

1. Adopt the newly Technical Drawing standard and the Mechanical Drawing Standard.
2. Write in Chinese – English to provide a favorable condition for bilingual education.
3. Further enhance the 3D modeling exercises by using Inventor software.
4. Add some exercises in relation to higher comprehensive demand for students.
5. Add freehand sketching and composite solids expressing exercises in relation to freehand practicing and expressing ability cultivation for students.

The book was edited by Chen Ping, Wan Jing, Chen Hua, Yang Hao, Xu Qian, Yang Guanghui, Fan Bailin and Li Xiaowu. It was unified by Chen Ping and Wan Jing.

Due to the limited level of editors, deficiencies and errors in the book is inevitable, please readers criticized.

The editors would like to thank the Twelfth Five – Year Teaching Material Construction Foundation of University of Science and Technology, Beijing.

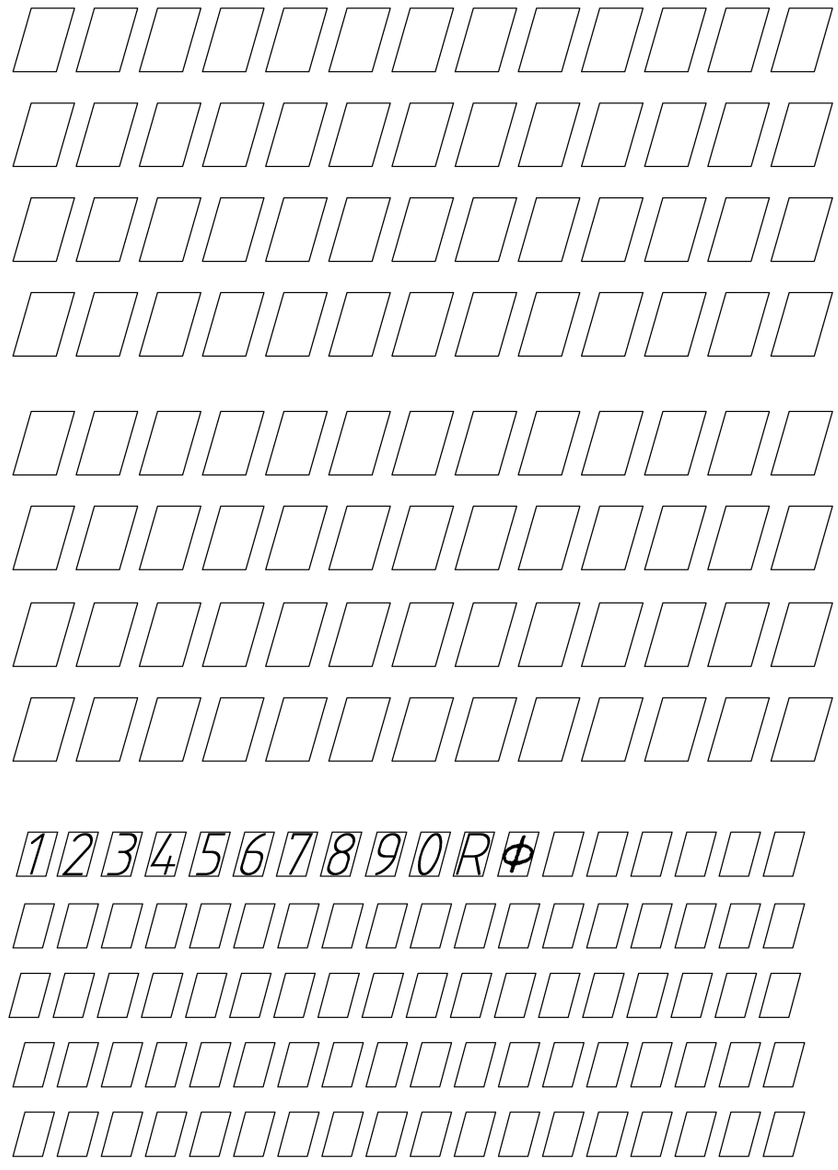
Editor

Table of Contents　目　录

1-1 Font exercises（using HB pencil）　字体练习（要求用 HB 铅笔书写）

1. Chinese character exercises.　汉字练习。

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



Class　　Stu No.　　Name

1-2　Dimensioning exercises　尺寸标注练习

1. Analyze dimension errors in the Fig. 1 and correct them in the Fig. 2.　分析图 1 中尺寸标注的错误，在图 2 中正确标注。

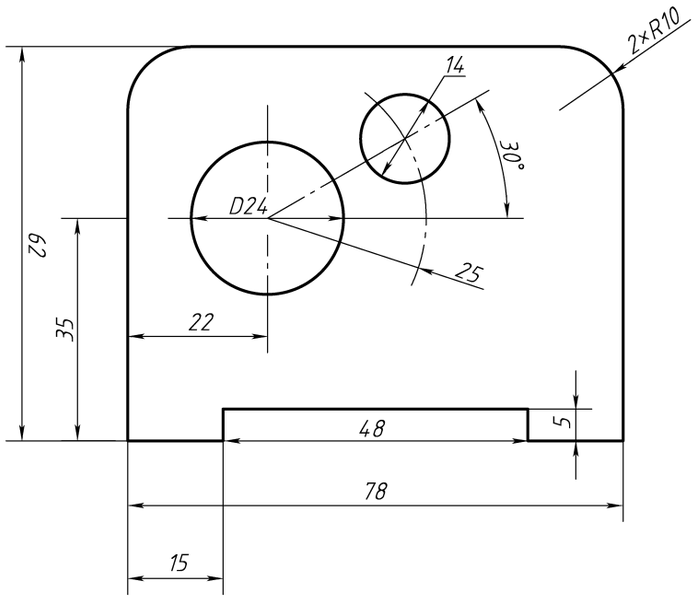


Fig. 1

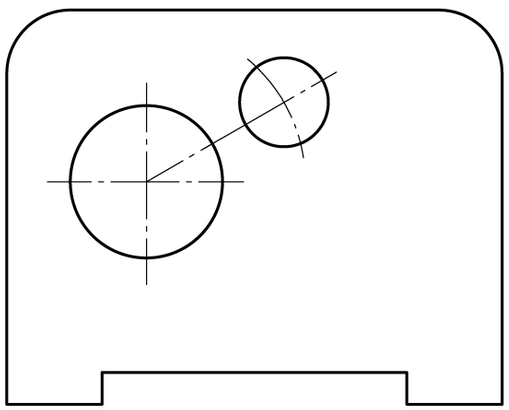
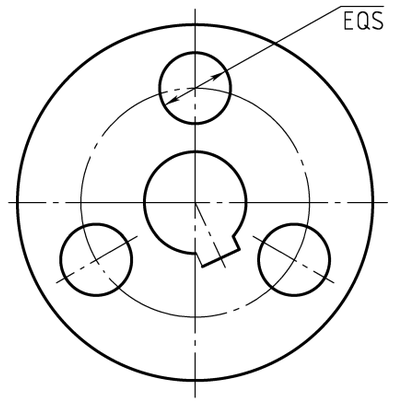
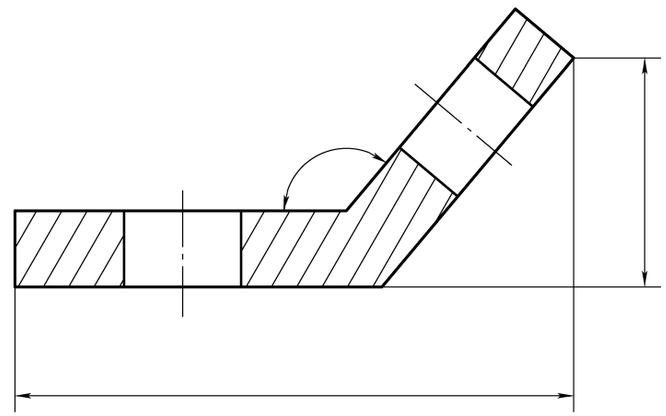


Fig. 2

2. Dimension（obtain sizes by measuring the drawing and retain the integer）.　将下列图形进行尺寸标注（尺寸数值从图中量取并取整）。





Class　　**Stu No.**　　**Name**

1-3　Drawing exercises with drawing tools　绘图工具作图练习

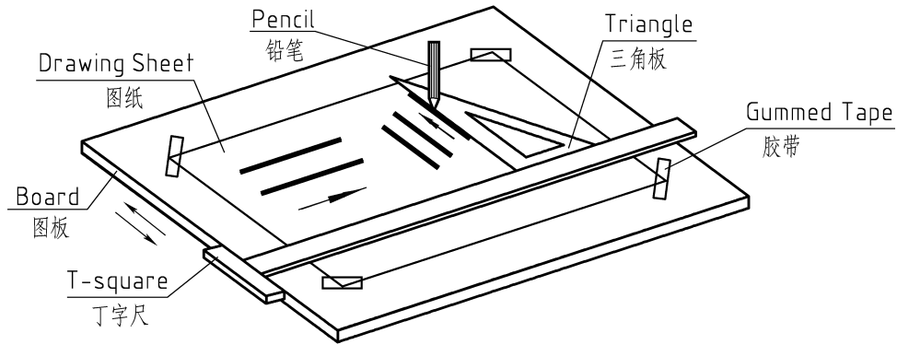
1. Requirements　要求

（1）Master the ability of the proper usage of common drawing tools（seen in Fig. 3）.　掌握常用绘图工具的使用方法（见图 3）。

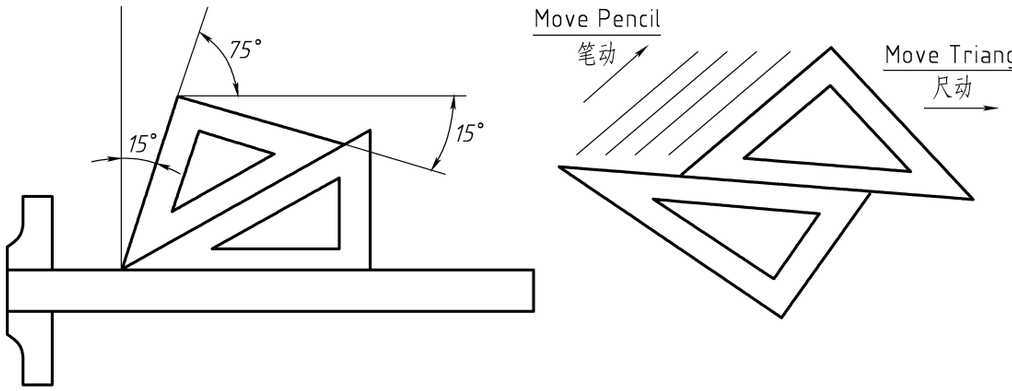
（2）Be familiar with the national standards on“Mechanical drawings”about sheet, line style, scale, lettering and dimension.　熟悉《机械制图》国家标准关于图纸幅面、图线、比例、字体、尺寸注法的规定。

（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。

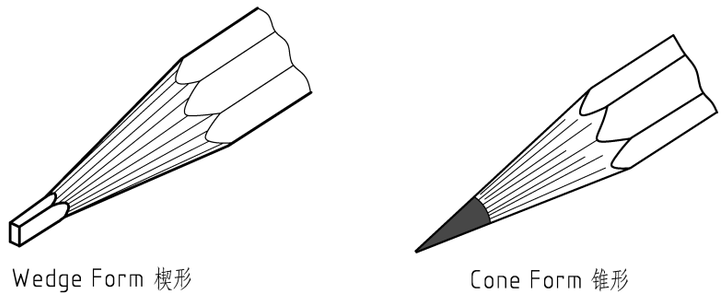
（4）Keep a serious, responsible and meticulous attitude. Each drawing should be produced with appropriate layout, beautiful lines, tidy lettering and clean drawing.　严肃认真，一丝不苟。布图匀称，图线美观，字体工整，图面整洁，养成良好的画图习惯。



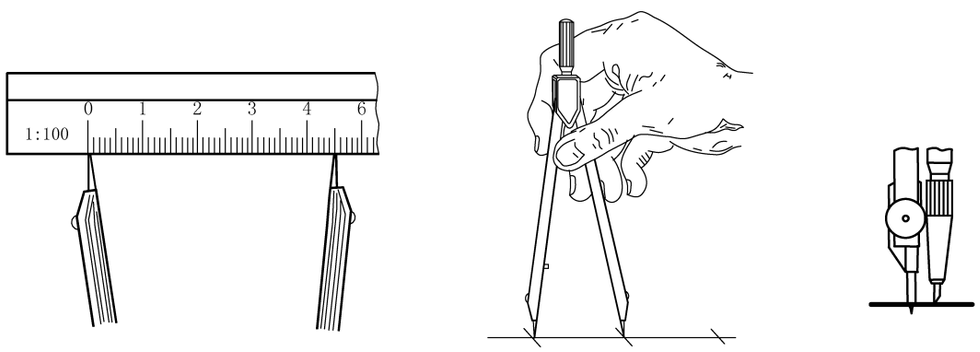
a）The use of drawing board and T－square　图板及丁字尺的应用



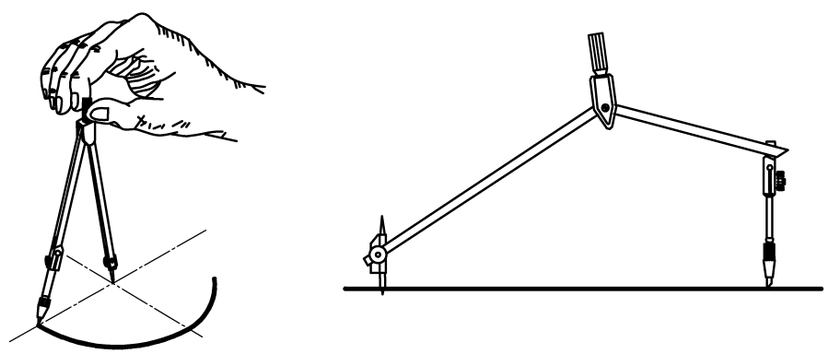
b）The use of two triangles　两块三角板的配合应用



c）Pencil sharpening　铅笔的削法



d）The use of divider　分规的使用方法



e）The use of compass　圆规的使用方法

Fig. 3　Drawing tools　绘图工具

Class　　Stu No.　　Name

1-3　Drawing exercises with drawing tools　绘图工具作图练习（续）

2. Drawing procedures　作图步骤

（1）Place the drawing sheet on the lower left of the board with gummed tape（Fig. 4），then draw the boundary and title block on the lower right corner of the sheet according to the national standard（Fig. 5）.　将图纸用透明胶带固定在图板左下方（图 4），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（图 5）.

（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。

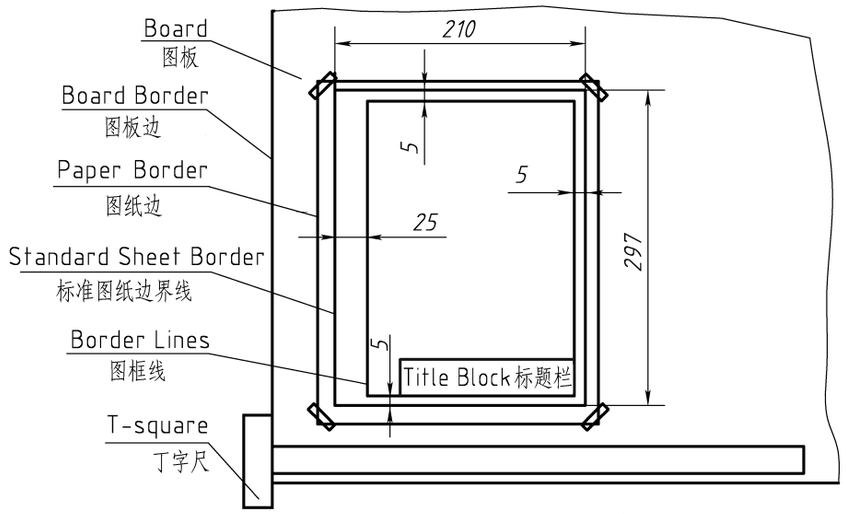


Fig. 4　Place the drawing sheet　放置图纸

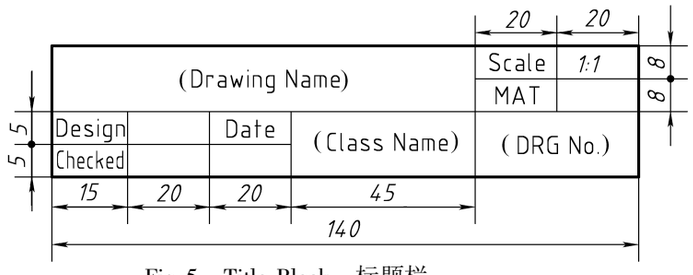


Fig. 5　Title Block　标题栏

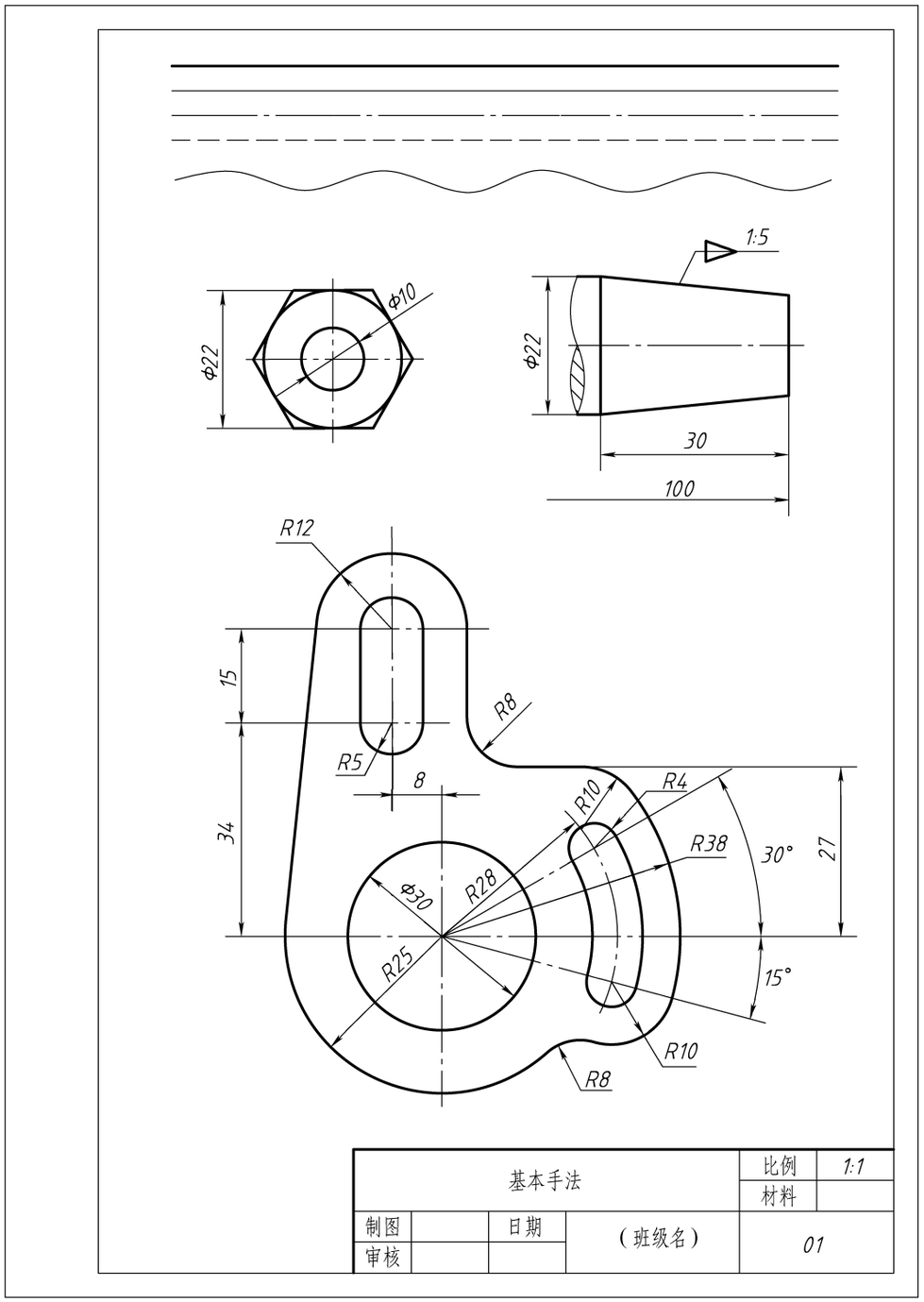
3. Exercise explanations　作业说明

（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，作业时要用 A4 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。

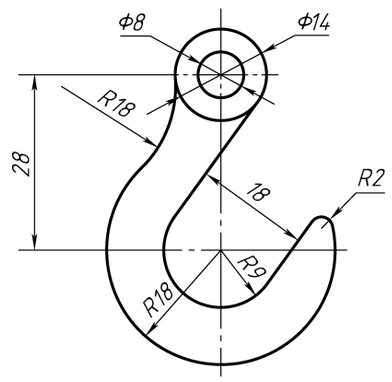
（4）All exercises should be done using pencils.　作业全部用铅笔做。



Class　　**Stu No.**　　**Name**

1-4　Drawing exercises with Inventor software　Inventor 软件作图练习

1.



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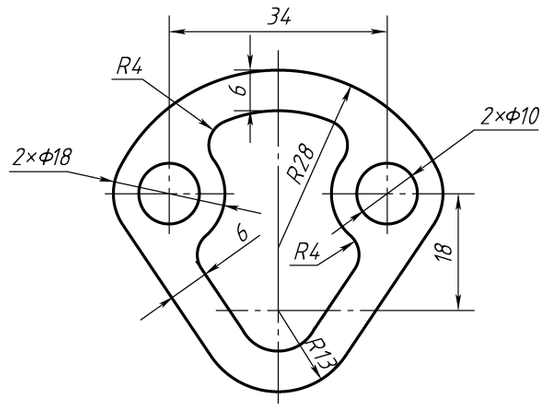

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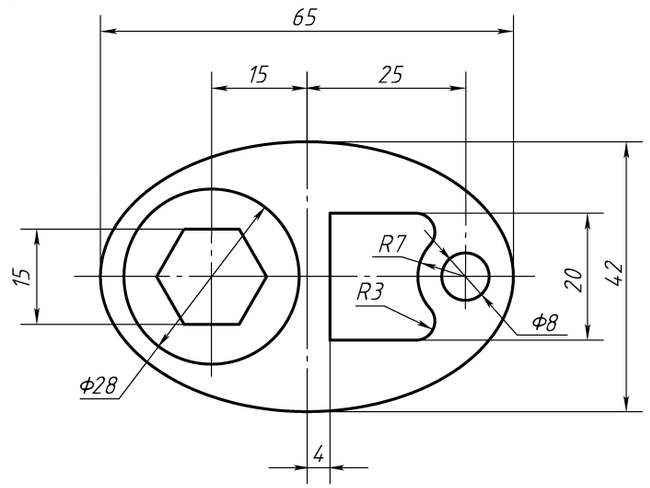

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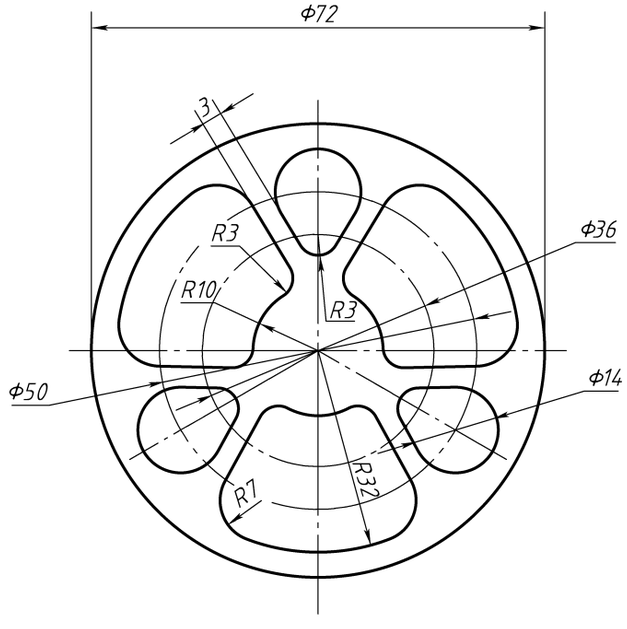
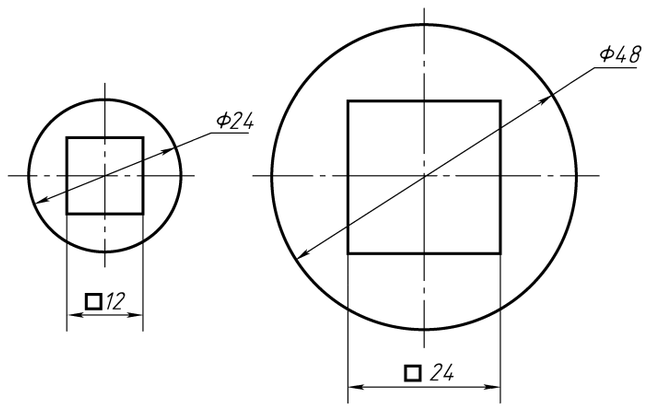


5. Create the following drawings with size variance and structure line when the diameter of circle changes.　应用尺寸变量和构造线构造下列图形，使得当直径变化时：

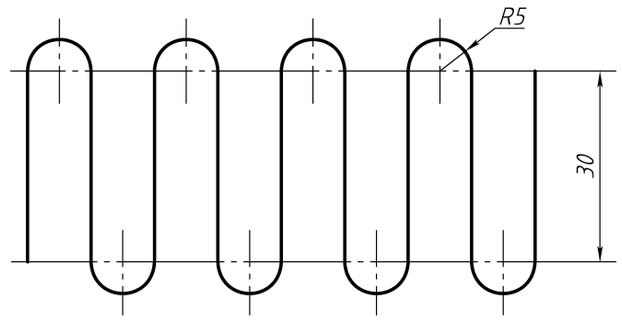
（1）The side length of square equals the radius of circle.　正方形的边长等于圆的半径。

（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）。

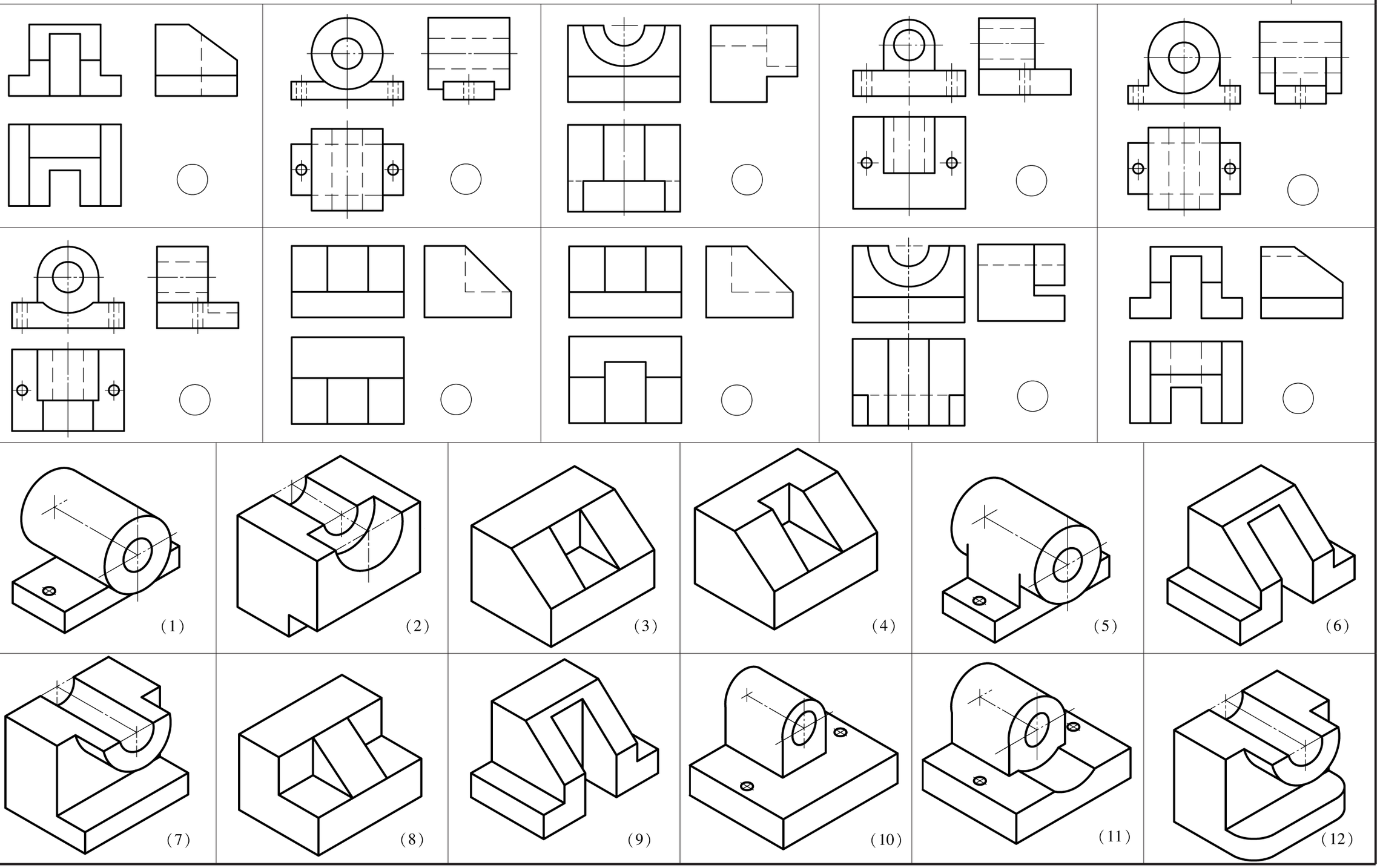


6. Create the following drawing controlled by only two sizes using structure line, geometric constraint and size constraint.　利用构造线和几何约束、尺寸约束将图形构造成只用两个尺寸控制大小的图形。



Class　　Stu No.　　Name

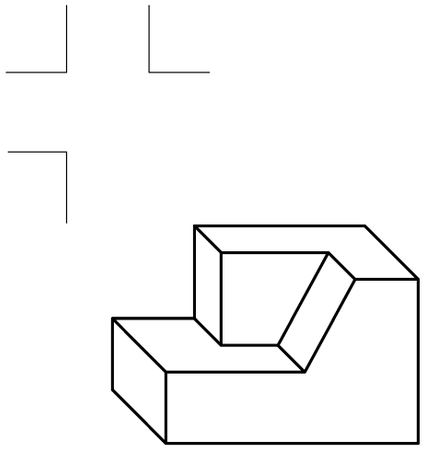
2-1　Match pictorial drawings with three views　记物寻图（并在圆圈内填上相应轴测图的编号）　**6**



Class　　**Stu No.**　　**Name**

2-2　Draw three views according to the cabinet axonometric projections　由斜二测图画三视图

1.



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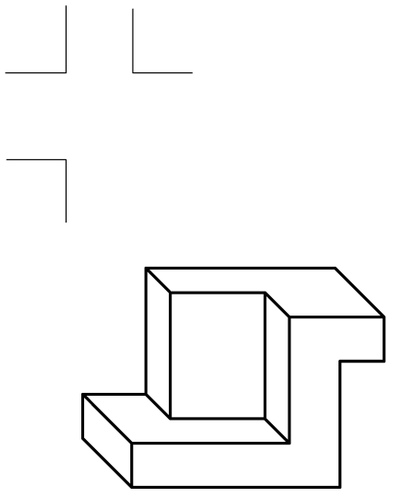

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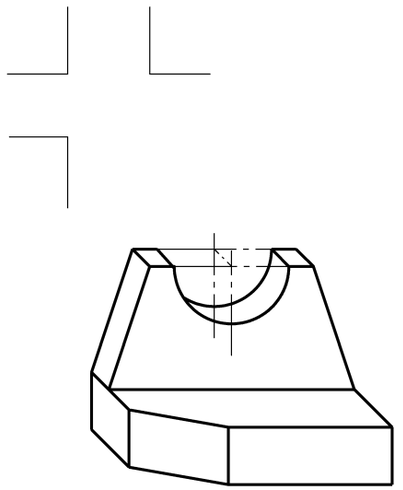

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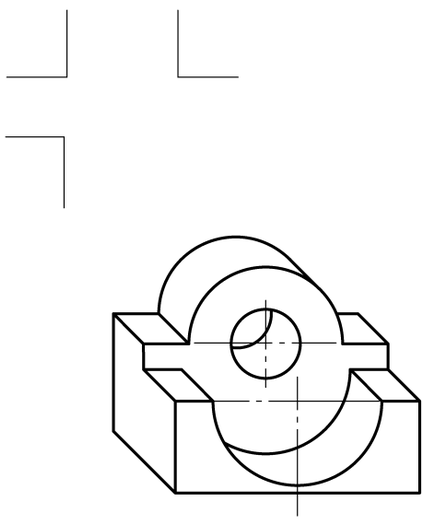

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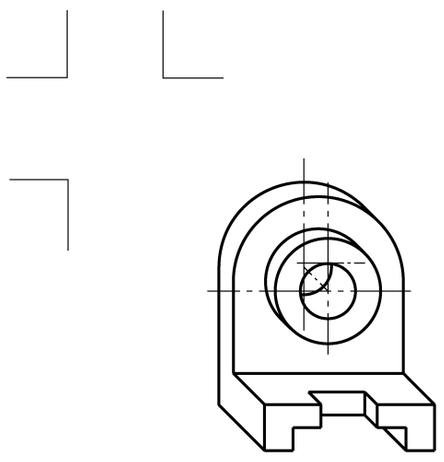

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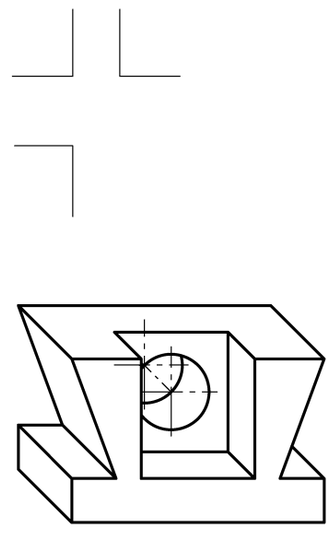
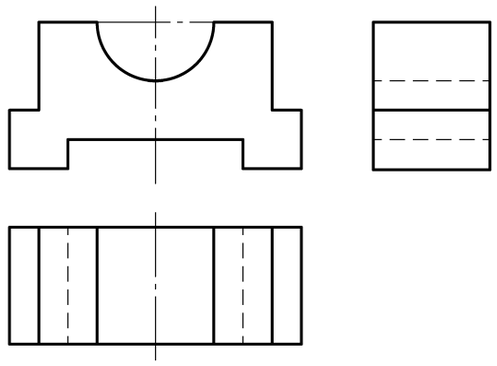


Class　　**Stu No.**　　**Name**

2-3　Draw cabinet axonometric projections according to three views　由三视图画斜二测图

1.



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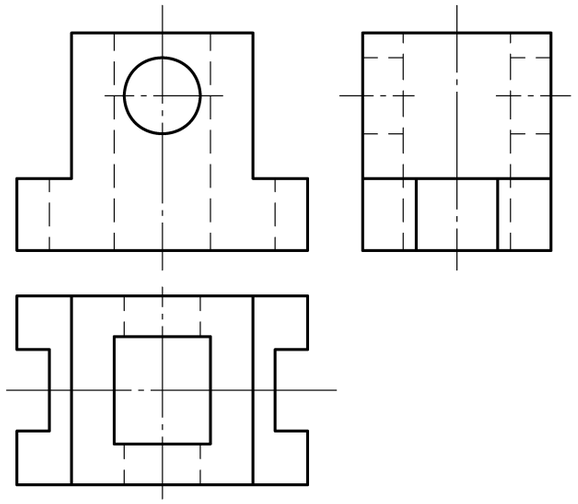

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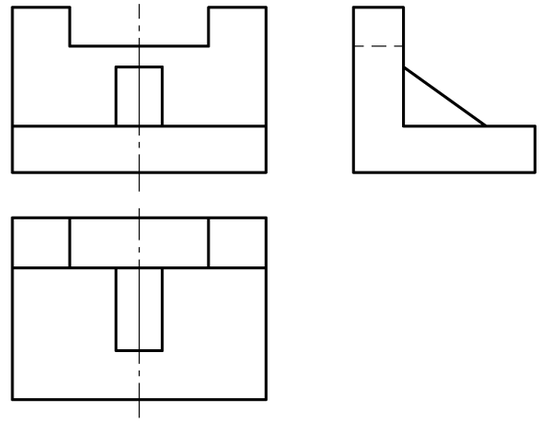

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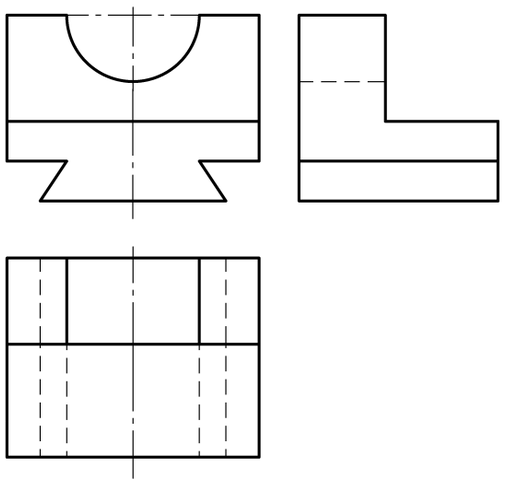
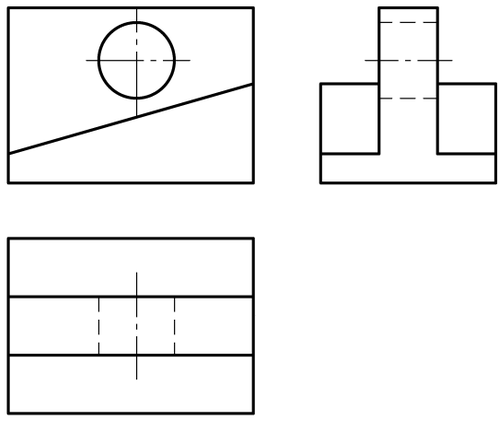
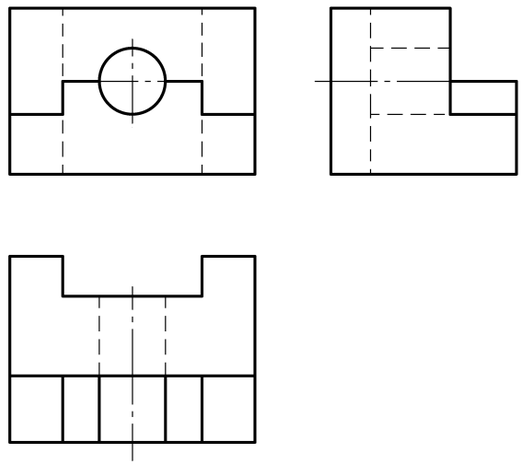


5.



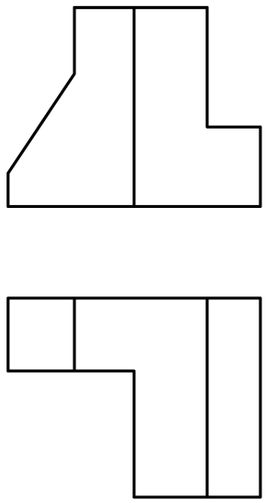
6.



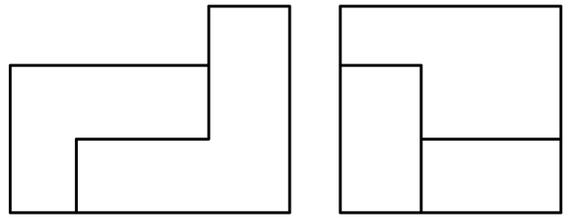
Class　　**Stu No.**　　**Name**

2-4 Draw the third view according to the given two views 已知两视图补画第三视图

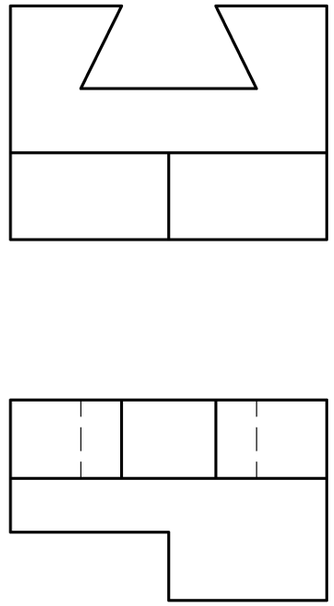
1.



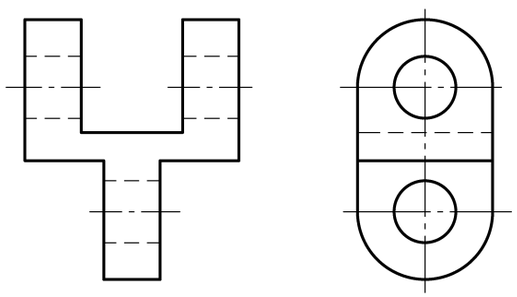
2.



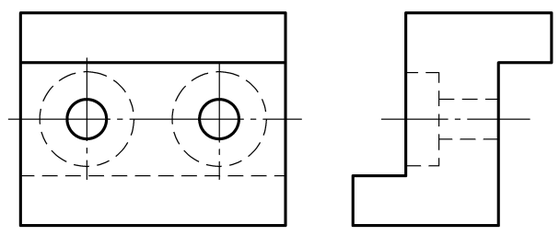
3.



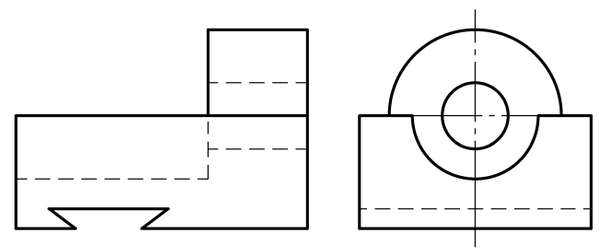
4.



5.



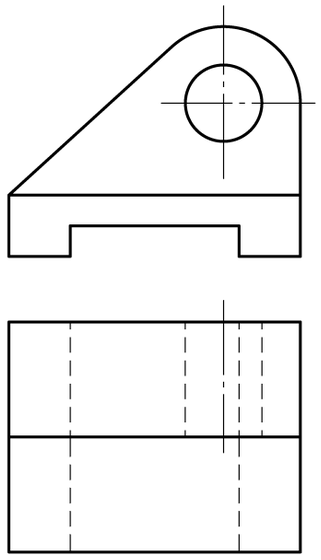
6.



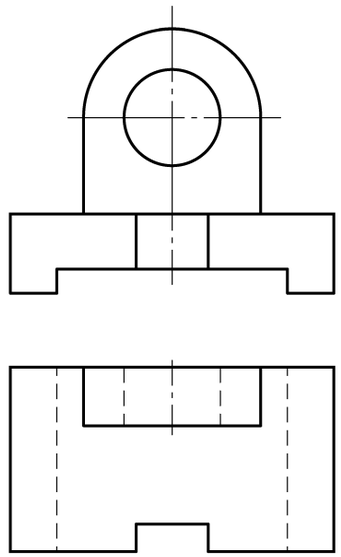
Class Stu No. Name

2-4 Draw the third view according to the given two views 已知两视图补画第三视图（续）

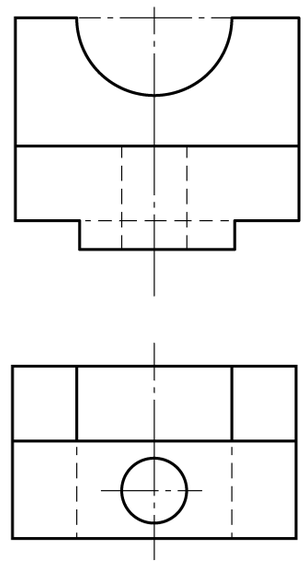
7.



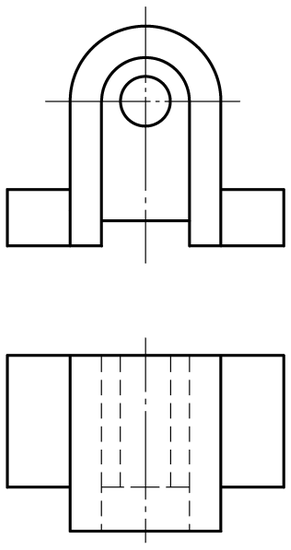
8.



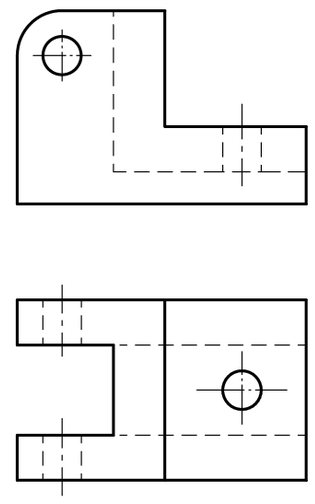
9.



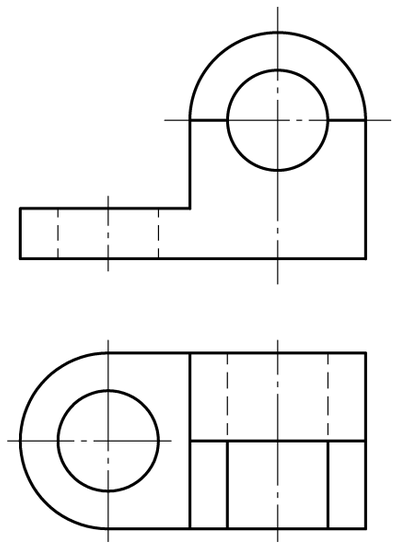
10.



11.



12.

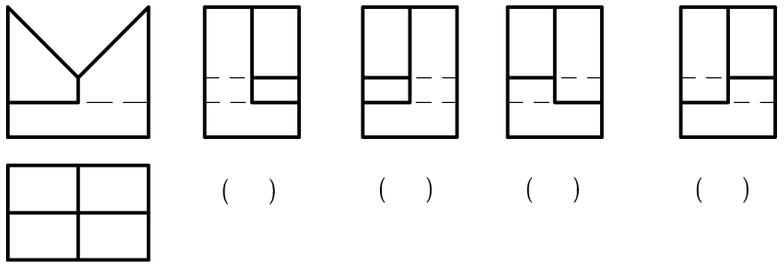


Class Stu No. Name

2-5　Choices 选择（mark "✓" in the brackets）

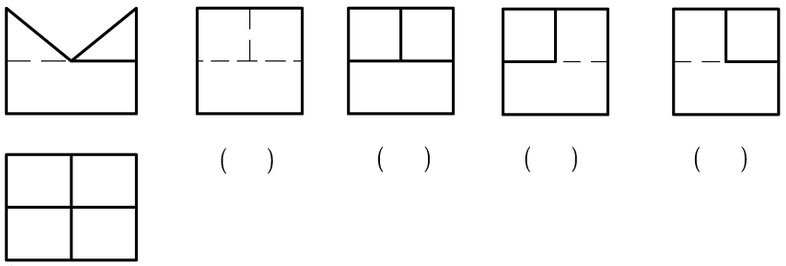
1. Select the correct side view. 选择正确的左视图。

(1)



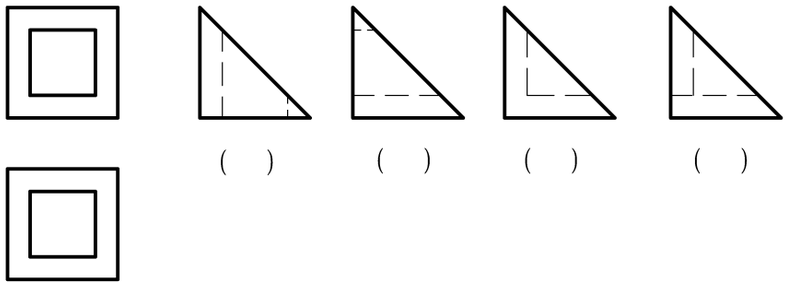
(　)　(　)　(　)　(　)

(2)



(　)　(　)　(　)　(　)

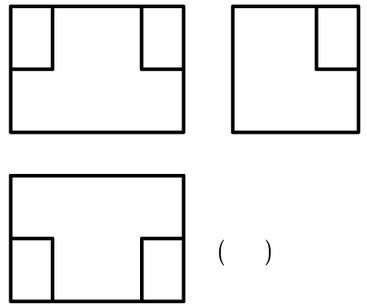
(3)



(　)　(　)　(　)　(　)

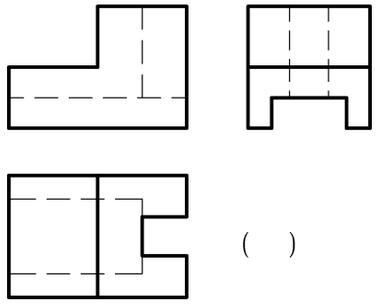
2. Select the correct top view. 选择正确的俯视图。

(1)



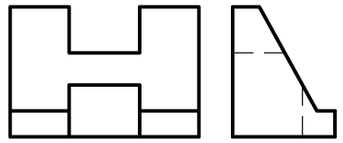
(　)　(　)　(　)

(2)



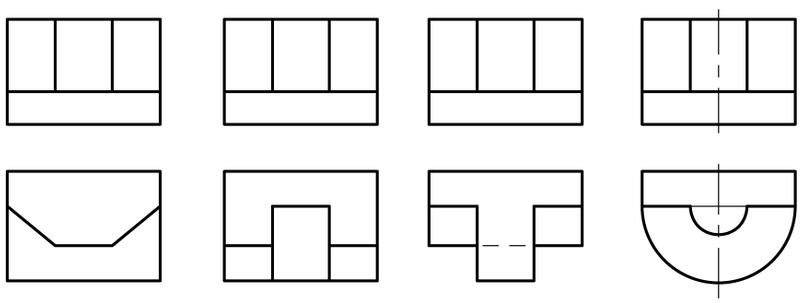
(　)　(　)　(　)

(3)



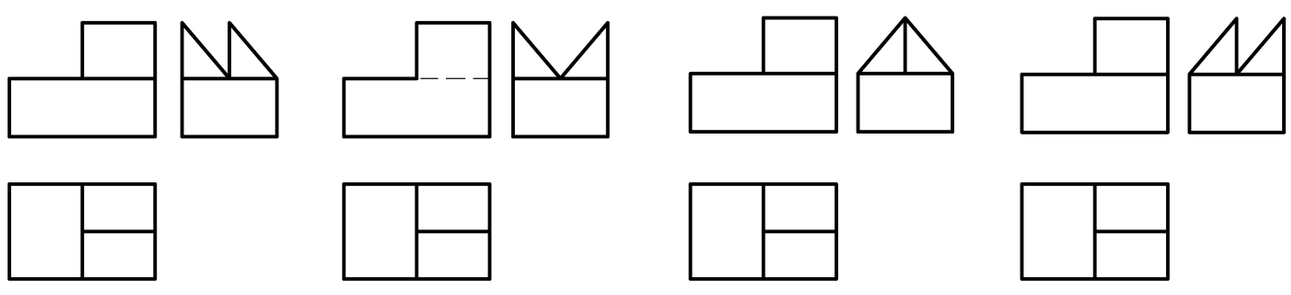
(　)　(　)　(　)

3. Select the correct two – view drawings. 选择正确的两视图。



(　)　(　)　(　)　(　)

4. Select the correct three – view drawings. 选择正确的三视图。

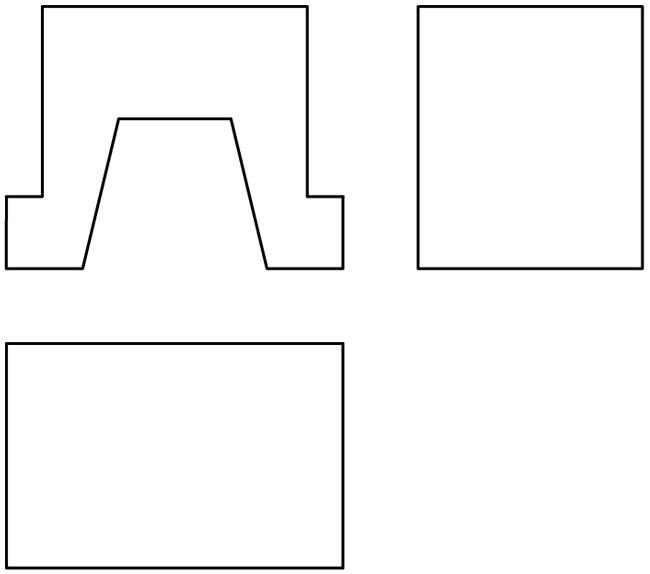


(　)　(　)　(　)　(　)

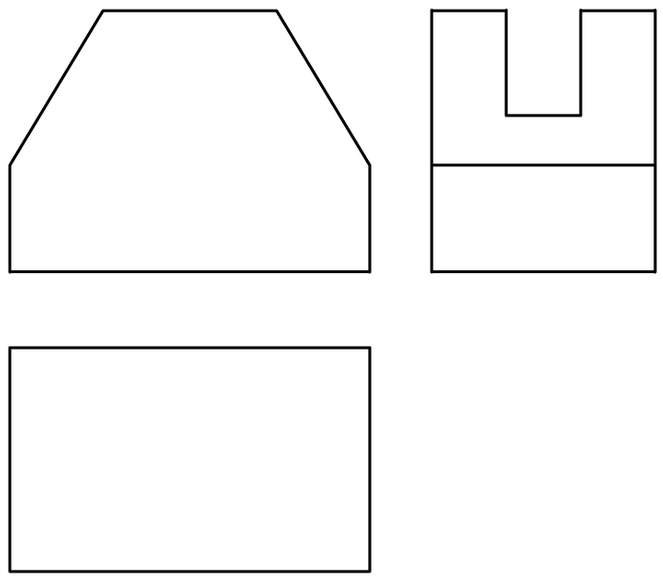
Class　　**Stu No.**　　**Name**

2-6 Add missing details 补画所缺图线

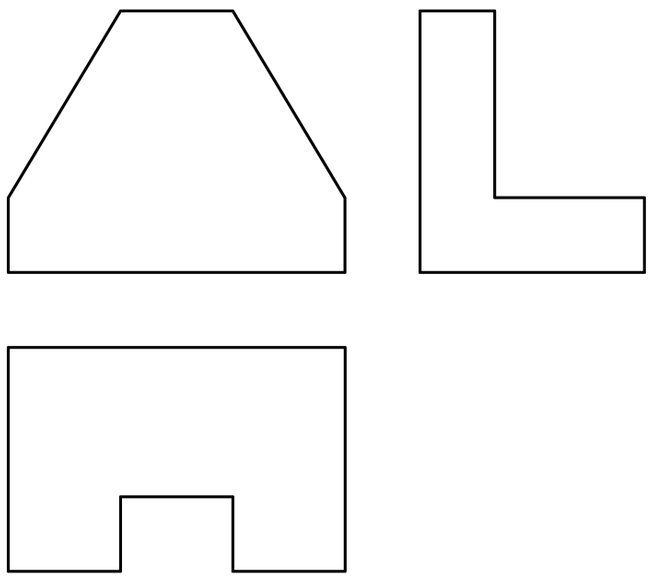
1.



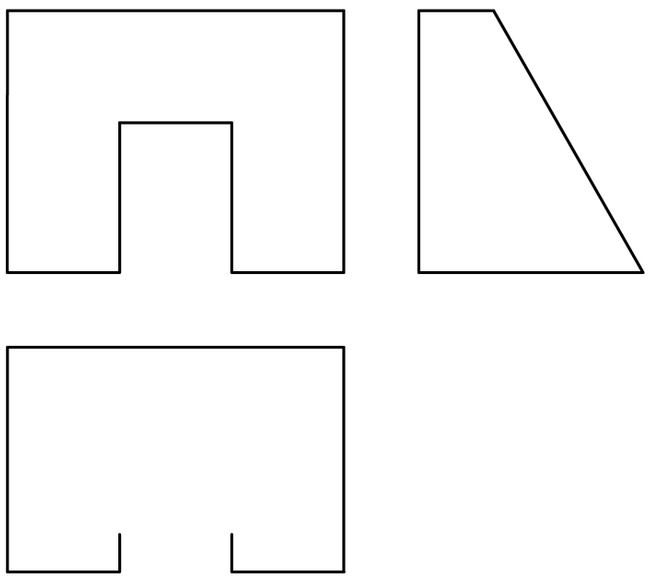
2.



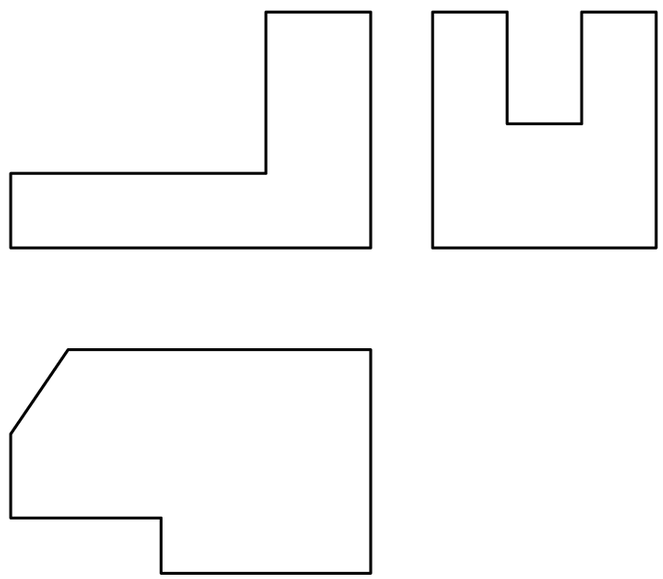
3.



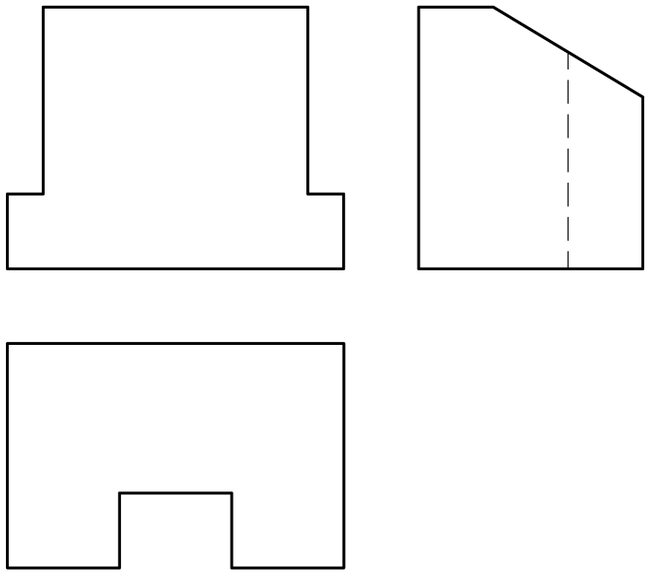
4.



5.



6.



Class Stu No. Name