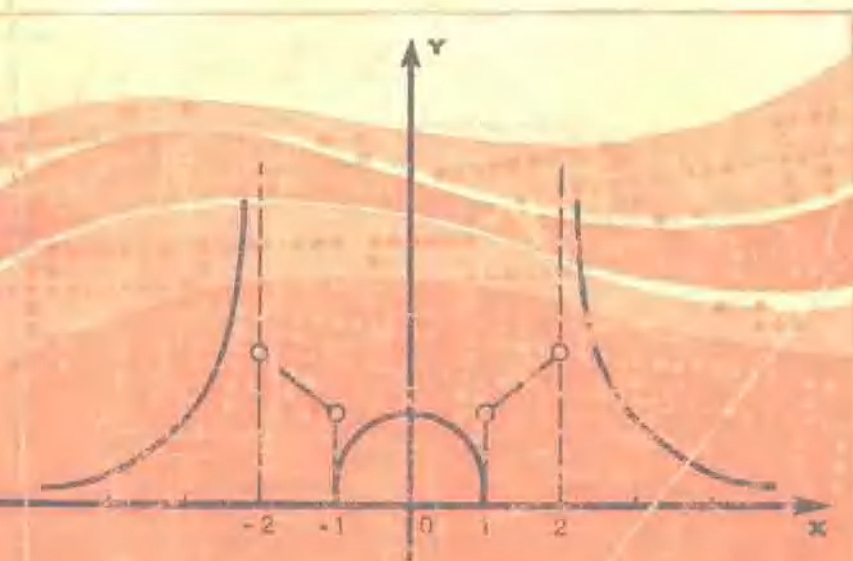


专业英语文选

数学专业英语文选

上册



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数 学 专 业 英 语 文 选

上 册

南京大学外文系公共英语教研室编

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前 言

为了响应党中央、华主席的伟大号召,实现我国四个现代化,特编辑本书,供有关同志提高阅读数学专业英语书刊的能力。

本书可供具有一定英语水平的数学专业学生和数学工作者阅读。

全书分上、下两册,每册各 30 课。内容由浅入深,以利读者循序渐进地阅读。每课课文后附有词汇、词组、注释,书末附有译文,便于读者自学时参考。

本书材料选自近代英美原著。专业内容较为广泛,包括初等、中等、高等数学各个方面。语言现象较为丰富多样,包括数学专业英语的各种句型结构及常用词汇。

本书在编写过程中,承蒙南京大学数学系周伯燠教授等同志指导与帮助,谨在此表示衷心的感谢。

由于编者的专业知识和语言水平的限制,本书一定还存在有不少缺点和错误,请读者提出宝贵的意见,以便修改和提高。

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1. MATHEMATICS COMES FROM PRACTICE

Engels said, "Like all other science, mathematics arose out of the needs of men." From the very^① beginning, mathematics was the direct or indirect attempt to satisfy a definite need in production.

In his social practice, man began to feel the need of counting things and calculating the volume of a container. From this early need came the concepts of number and shape.^② Then, geometry developed out of problems of measuring land, and trigonometry came from problems of surveying. To make calculation simpler,^③ man learned to use symbols too, and algebra came into being as a result.

In elementary mathematics, we deal with constants only. With the rapid development of industry in 17th century, calculating with^④ constants could no longer satisfy the needs of production. Many new problems in production called for a solution. To solve these problems, man began studying variable quantities and motion. This leap from constants to variable quantities brought about a new branch of mathematics — calculus.

In a word, mathematics comes from man's social practice. In studying mathematics,^⑤ we must combine theory with practice. We must make mathematics serve^⑥ socialist revolution and socialist construction of our country.

词 汇

mathematics [mæθi'mætiiks] *n.* 数学

Engels ['eŋgəls] 恩格斯(人名)

arise [ə'raiz] *v.i.* 兴起; 出现

(*arose* [ə'rəuz], *arisen* [ə'rɪzn])

need [ni:d] *n.* & *v.i.* 需要

direct [di'rekt] *a.* 径直的, 直接的

indirect [indi'rekt] *a.* 间接的

attempt [ə'tempt] *n.* 企图

satisfy ['sætɪsfaɪ] *v.i.* 满足, 使(人)满意

definite ['defɪnɪt] *a.* 明确的, 确定的

social ['səʊʃəl] *a.* 社会的

feel [fi:l] *v.i.* 觉得, 感到
(*felt* [felt], *felt*)

count [kaunt] *v.i.* 数, 计算

calculate ['kælkjuleɪt] *v.i.* 计算

volume ['vɒlju(:)m] *n.* 体积; 容量

container [kən'teɪnə] *n.* 容器

concept ['kɒnsept] *n.* 概念

number ['nʌmbə] *n.* 数; 数字; 号码

shape [ʃeɪp] *n.* 形状

geometry [dʒi'ɒmɪtri] *n.* 几何学

problem ['prɒbləm] *n.* 问题

land [lænd] *n.* 土地

trigonometry [triɡə'nɒmɪtri] *n.* 三

词 组

out of 从……当中

(to) come into being 形成; 产生

as a result 结果

(to) deal with 谈论; 涉及

no longer 不再

角法, 三角学

survey [sə:'veɪ] *v.i.* 测量

calculation [ˌkælkju'leɪʃən] *n.* 计算

symbol ['sɪmbəl] *n.* 记号; 符号

algebra ['ældʒɪbrə] *n.* 代数学

result [rɪ'zʌlt] *n.* 结果; *v.i.* 由……产生; 来自

elementary [eli'mentəri] *a.* 初等的; 基本的

deal [di:l] *v.i.* 处理; 分派
(*dealt* [delt], *dealt*)

constant ['kɒnstənt] *a.* 不变的; *n.* 常量

century ['sentʃuri] *n.* 世纪

solution [sə'lu:ʃən] *n.* 解答; 解决

variable ['veəriəbl] *a.* 可变的; *n.* 变量

quantity ['kwɒntəti] *n.* 量, 数量

motion ['məʊʃən] *n.* 运动

leap [li:p] *n.* 跳跃, 跃进

branch [brɑ:ntʃ] *n.* 部门; 分支; 分科

calculus ['kælkjʊləs] *n.* 微积分(学)

combine [kəm'beɪn] *v.i.* 使结合; 合并

theory ['θiəri] *n.* 理论

组

(to) call for 需要

(to) bring about 引起; 发生

in a word 总而言之

(to) combine ... with 使……与……结合; 化合

注 释

- ① **From the very beginning, ...**
very 在这里为形容词,与名词连用,强调名词。
此部分译为:从一开始,……
- ② **From this early need came the concepts of number and shape.**
本句为倒装句。不倒装时应为:
The concepts of number and shape came from this early need.
From this early need 倒装在句首,表示强调 this early need; 并承接上句意思。
- ③ **To make calculation simpler** 是不定式短语,作目的状语。
make 作为“使得”来翻译时,除了有宾语外,还要有宾语补足语。
此部分译为:为了使计算更为简单。
- ④ **With the rapid development of industry in 17th century, calculating with constants ...**
第一个 with 译为:随着…
第二个 with 译为:用…
- ⑤ **In studying mathematics, ...**
译为:在研究数学时, …
in 表示过程。
- ⑥ **We must ... of our country.**
本句中 serve 为不定式,作 make 的宾语补足语。
... make mathematics serve ..., 译为:使数学为……服务。
不定式前一般都有不定式符号“to”,但在 let, make, see, hear, watch, notice, feel 等少数一些动词后,作宾语补足语时,要省去不定式符号“to”。

2. LANGUAGE OF MATHEMATICS

The language of mathematics is a language of signs and symbols. It is the same throughout the world.

Some of the best known symbols of mathematics are the Arabic numerals 1,2,3,4,5,6,7,8,9,0, the signs of addition "+", subtraction "-", multiplication "×", division "÷", and equality "=".

Arabic numerals are used because of their great convenience. In the number III, three I's^① are used, and each has a different meaning. The I on the extreme right stands for the number one, the one in the second column from the right stands for the number ten, and the I in the third column stands for the number one hundred.

If we want to write the symbol for three tens, we put a 3 into the second column from the right. But we will not recognize it as a second column; we should write something down in the first column. Thus, it becomes necessary to think of three tens plus no ones, and to introduce a symbol to represent the absence of ones.^② We use the symbol 0 for this purpose and call it zero. Zero plus any number gives that number again, and zero times any number gives zero.

词 汇

sign [sain] *n.* 记号; 符号

处

throughout [θru: 'aʊt] *prep.* 全; 到

best [best] *ad.* (well 的最高级) 最

最; 最好
known [nəʊn] *a.* 大家知道的; 已知的
Arabic [æ'rəbɪk] *a.* 阿拉伯的
numeral ['nju:mərəl] *n.* 数字
addition [ə'dɪʃən] *n.* 加, 加法
subtraction [səb'trækʃən] *n.* 减, 减法
multiplication [ˌmʌltɪplɪ'keɪʃən] *n.* 乘, 乘法
division [dɪ'vɪʒən] *n.* 除, 除法
equality [i:(t)'kwɒləti] *n.* 等号
use [ju:z] *v.t.* 用
convenience [kən'vi:niəns] *n.* 方便
each [i:tʃ] *pro.* 各, 每

meaning ['mi:nɪŋ] *n.* 意义
extreme [ɪks'tri:m] *a.* 极端
right [raɪt] *n.* 右面; *a.* 右面的
column ['kɒləm] *n.* 行
recognize [ˌrekəɡnaɪz] *v.t.* 认出
something ['sʌmθɪŋ] *n.* 某物; 某事
thus [ðʌs] *ad.* 于是, 因此
plus [plʌs] *prep.* 加, 加上
introduce [ˌɪntroʊ'dju:s] *v.t.* 采用; 介绍
represent [ˌreprɪ'zent] *v.t.* 代表
absence [ˈæbsəns] *n.* 无, 缺
zero ['ziərəʊ] *n.* 零
times [taɪmz] *prep.* 乘

词 组

because of 因为
(to) stand for 代表

(to) think of 想

注 释

① In the number III, three I's are used, ...

I's 表示数字 1 的复数形式。

省略号 “...” 可以用来构成做名词用的某些字母、数字、甚至标点符号的复数。如:

He drops his h's. 他常吞掉 h 音。

Count to ten by 2's. 请用 2 做单位, 数到十。

Don't use too many !'s. 不要用这么多的! (惊叹号)号。

② Thus, it ... of ones.

it 为先行代词, 是本句的形式主语。

to think ..., and to introduce ... ones. 为两个并列的不定式短语, 作为本句的真正主语。

to represent the absence of ones 为另一不定式短语, 是 to introduce ... 的目的状语。

3. MEASUREMENT

In the development of the physical sciences, we observed a rapid increase in scientific achievements after man began basing his conclusions upon experimental facts instead of upon inference. ① Experimentation, however, ② shows a quantitative study of some aspect of nature, and the important part of such a study is the measurement of the things with which it deals. ③ Measuring any quantity means comparing it with an accepted unit as a standard, and finding out how many times larger or smaller it is than the standard unit. ④ The length of an object is measured by finding how many times longer it is than some standard unit of length. For example, if this book were taken as a standard, and laid end to end five times along a desk surface, we know that the desk is 5 book-lengths long. ⑤ If this book is laid down end to end five times and it does not quite reach the other end of the desk, we say that its length is a little over 5 books. In scientific work this "little over" part is not accurate enough. To be more accurate, we must measure what fractional part of the book the desk exceeds 5 book-lengths. ⑥ If we measure the desk to be $\frac{1}{5}$ of a book longer than the 5 book-lengths, we say its length as $5\frac{1}{5}$ or 5.2 book-lengths. ⑦ A more accurate measurement could be made by subdividing the book into ten equal parts. We would measure the desk to be a little more than 5.2 books long. Again we would have to

measure the fractional part of the subdivision by which the desk is longer than 5.2 book-lengths. If we found the fractional part as $1/2$ a subdivision, we would write down a length of 5.25 books. The last measurement is obviously far more accurate than those^③ for the larger units. The greater the accuracy needed, the smaller the subdivision must be.^④

The weight of an object is similarly determined by finding how much heavier it is than some accepted standard weight unit. For example, if a piece of copper is four times as heavy as a standard pound,^⑤ its weight is 4 pounds. Also, the smaller the subdivisions we have for the standard weight, the more accurate the weighing can be made.

词 汇

measurement ['meʒəmənt] *n.* 度量, 测量
 physical ['fɪzɪkəl] *a.* 物理学(上)的; 有形的; 身体的
 observe [əb'zɜ:v] *v.t.* 观察; 注意到
 rapid ['ræpɪd] *a.* 快的, 急的
 increase ['ɪnkri:s] *n.* 增进, 增加
 scientific [ˌsaɪən'tɪfɪk] *a.* 科学的
 achievement [ə'tʃi:vmənt] *n.* 完成; 成就
 base [beɪs] *v.t.* 把基础放在; *n.* 底
 upon [ə'pɒn] *prep.* = on
 conclusion [kənkl'u:ʒən] *n.* 结束; 结论
 experimental [eks,perɪ'mentl] *a.* 实验的; 经验的
 fact [fækt] *n.* 事实

instead [ɪns'ted] *ad.* 代替
 inference [ɪn'fərəns] *n.* 推论, 推理
 experimentation [eks,perɪmen'teɪʃən] *n.* 实验(工作); 实验法
 however [haʊ'evə] *conj.* 但是, 然而; *ad.* 无论……也……
 quantitative ['kwɒntɪteɪv] *a.* 量的, 定量的
 aspect ['æspekt] *n.* 方面; 样子
 nature ['neɪtʃə] *n.* 自然; 本性
 compare [kəm'peə] *v.t.* 比较; 对照
 accept [ək'sept] *v.t.* 接受
 unit ['ju:nɪt] *n.* 单位
 standard ['stændəd] *n.* 标准
 length [leŋθ] *n.* 长度
 example [ɪg'zɑ:mpəl] *n.* 例如
 surface ['sɜ:fɪs] *n.* 面, 表面

lay [lei] *v.t.* 放
(*laid* [leid], *laid*)
reach [ri:tʃ] *v.t.* 达到
accurate [ˈækjʊrɪt] *a.* 准确; 精密
enough [ɪˈnʌf] *a.* 足够的; *ad.* 足够
fractional [ˈfrækʃənl] *a.* 分数的; 小数的
exceed [ɪkˈsi:d] *v.t.* 超过, 胜过
subdivide [ˈsʌbdɪˈvaɪd] *v.t.* 细分; 再分
equal [ˈi:kwəl] *a.* 相等的; *v.t.* 等于
subdivision [ˈsʌbdɪvɪʒən] *n.* 细分;

再分
obviously [ˈɒbvɪəsli] *ad.* 显然
accuracy [ˈækjʊrəsi] *n.* 正确, 精确
weight [weɪt] *n.* 重量
object [ˈɒbdʒɪkt] *n.* 事物; 对象
similarly [ˈsɪmələli] *ad.* 同样地; 相似地
determine [dɪˈtɜ:mɪn] *v.t.* 决定; 决心
heavy [ˈhevi] *a.* 重的, 繁重的
piece [pi:s] *n.* 块; 斤; 件
copper [ˈkɒpə] *n.* 铜
pound [paʊnd] *n.* 磅

词 组

(*to*) **base ... upon (on)** 把基础放在……上; 以……为根据
instead of 代替……; 而不是……
(*to*) **compare ... with** 比较, 对照
(*to*) **find out** 找出; 求出

for example 例如
end to end 末端对末端, 一端一端地
a little 少许, 一点
far + 比较级 ……得多

注 释

- ① ... after man began ... instead of upon inference.
 本句中 *after* 为连接词, 连接一个时间状语从句。
 两个 *upon* 并列。
- ② Experimentation, however, shows ...
 本句 *however* 为连接词, 译为然而……
 它可位于句首、句中。如在句首, 一般说来, 后面有逗号“,”; 如在句中, 前后各用一逗号。
however 还可作副词, 但其后面紧跟一形容词, 此时译为: 无论……。
 如: …… *however great* ... 无论多么大; …… *however small* ... 无论多么小。
- ③ ... with which it deals.
 为定语从句, 修饰其前面的名词 *things*, *deal with* 连用。

④ Measuring any quantity ... than the standard unit.

本句为主从复合句。

自 Measuring ... 到 and finding out 为主句。

动名词短语 Measuring any quantity 为主语。

means 相当于联系动词。

comparing it ... and finding out 为两个并列的动名词短语，作表语。

as a standard 为介词短语，说明 an accepted unit.

how many times larger ... it is than ... unit 是由连接副词 how 引导的名词从句，作动名词 finding 的宾语。

此宾语从句中的主语，谓语动词 it is 倒装在表语…… larger or smaller 的后面。

than 为连接词，引导一省略比较状语从句。主语为 the standard unit. 联系动词 is 和表语 large or small 省略。

⑤ For example, if this book were taken ..., and laid ... a desk surface, we know that ... long.

本句为主从复合句。

本句的特点是：自 if ... 至 surface 条件状语从句中，谓语动词为虚拟(假设)语气，表示与事实不符，或不大可能发生的事。

而自 we know 至句末中的谓语动词则为陈述语气。we know 为主语从句。

连接词 that 引导名词从句，作 know 的宾语。

as a standard 为介词短语，作主语补足语。

理科(科技)中这类词组很多。如：

to find ... as ... 求出……为……；发现……为……

to define ... as ... 把……定义为……

to consider ... as ... 把……认为是……

⑥ To be more accurate, ...

为不定式短语，作目的状语。放在句首，表示强调。

⑦ If we measure ... 5 book-lengths, ...

不定式短语 to be 1/5 ... 为宾语补足语。

⑧ those 为指示代词，代替前面提到的 measurement，以免重复。

⑨ The greater ..., the smaller ... must be.

本句为：The + 形容词(或副词)比较级……(从句)，+ the + 形容词(或副词)比较级……(主句)的句型结构。

译为：愈(越)……愈(越)……。

先译从句,后译主句。

因为语气强,所以形成倒装句。

⑩ ... as heavy as ...

第一个 as 为副词,修饰作为表语的形容词 heavy。

第二个 as 为连接词,引导一省略比较状语从句。主语为 a standard pound。

联系动词 is 和表语 heavy 均省略。

as heavy as ... 译为如……一样重。

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4. THE CIRCLE-MEASUREMENTS BY THE ANCIENT CHINESE MATHEMATICIANS

We already know that the ancient Chinese employed for π the value 3, or that they counted the circumference of a circle compared with diameter as 3 to 1.^① The value of π was used in China as early at least as in the 12th century B.C. But the Chinese did not in any way remain satisfied with this rough value of π . Ever since then great efforts have been made to improve its accuracy and brilliant achievements obtained.^②

Among the earliest Chinese circle-squarers mention must be made of Chang Hung in the first place. Chang was a famous scholar of the Han Dynasty. Chang's calculation of the circle, however, has been lost, although his value of π is given in a commentary on the "Arithmetic in Nine Sections" in the form that the ratio of the square of the circular circumference to that^③ of the perimeter of the circumscribed square is 5 to 8. This is equivalent to taking π at $\sqrt{10}$.

In the period of the Three Kingdoms there lived another mathematician Liu Hui, in whose^④ commentaries on the "Arithmetic in Nine Sections" we find the particulars of his quadrature of the circle.

Liu Hui starts, in his measurement of the circle, with a hexagon inscribed in a circle the diameter of which^⑤ is taken as two feet. Each side of the hexagon is equal to