张鹏
GMAT 数学

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---韦晓亮 智课网（SmartStudy）联合创始人 CEO&CIO

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创始人

翟少成

智课网（SmartStudy）联合创始人，极智批改（SmartPigai）联合创始人。国外考试教学专家，GRE阅读，GMAT阅读，TOEFL口语教学权威。新东方批改网创始人。毕业于南京大学国际商学院。曾获得南京大学国际商学院最高奖学金“曙明奖学金”。在新东方的13年教学生涯中怀着对解密国外考试的浓厚兴趣不断钻研，形成了一套独特的方法论，成功地帮助数十万中国学生在GRE，GMAT和托福中取得高分，飞越重洋实现了自己的留学梦想。

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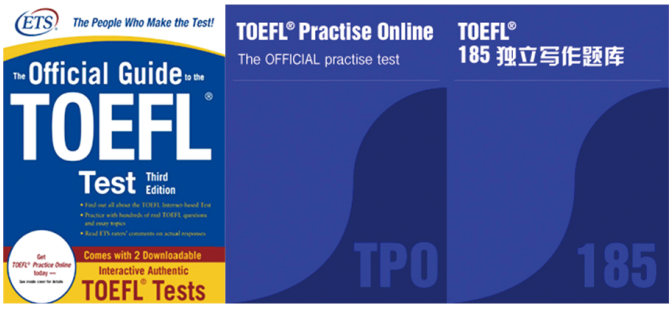

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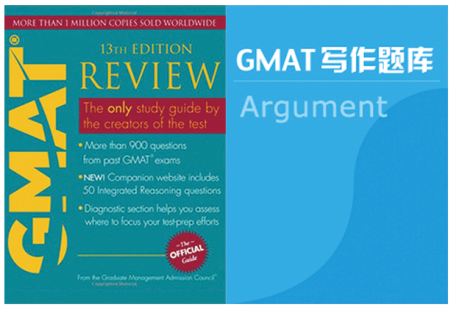
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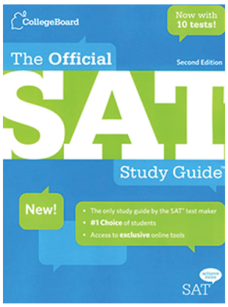
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张鹏GMAT数学

张鹏，智课网（SmartStudy）GRE数学，GMAT数学教学权威。国内GRE数学、GMAT数学、SAT数学首席讲师，教学研究权威，清华大学毕业。讲课思路逻辑清晰，讲解深入透彻，直击要害，并根据考试形势开设了预测分析的数学点题班，深受学生好评。

主讲内容：

GRE数学, GMAT数学

Lecture One
GMAT数学考试介绍

本节课授课要点：

- **考试特点**
- **参考材料**
- **考试流程**
- **新GMAT题库更换规律**
- **如何报名报考试**
- **GMAT数学考分换算**
- **GMAT高分换算**

1.考试特点

在北美主流理科考试当中：

•时间较紧张（每题平均耗时2min）

•计算量大（不允许使用计算器）

•文字应用题目较长（短时间信息筛选能力）

•商科思维（独特的DS题型）

2.参考材料

•Smartstudy“我的个人主页”--下载电子讲义：PDF+Epub

•Smartstudy逐题精讲板块--GMAT逐题精讲

•Smartstudy讲座现场板块

•Smartpigai--专业外教批改每篇作文

•APP（IOS+Android）

3.考试流程

•写作30min

•综合推理30min

•休息8min（自选）

•数学75min

•休息8min（自选）

•语文75min

总计约3.5h-4h

4. 新GMAT题库更换规律

5.如何报名考试

•没有必要过早抢考位（为什么）

-早报名——

优点

缺点

-晚报名——

优点

缺点

-结论

6. GMAT数学考分换算

•75min答完37题

•满分51分（中国学生直接追求满分）

•满分容错如何

7. GMAT高分换算

gmat计分表

score	q47	q48	q49	q50	q51
v22	570	580		600-610	
v23	570-580	590	610	610-620	
v24			610	620-640	640
v25	590	600	610-620	630-640	640-650
v26	600	610	630	640-660	640-650
v27	600-610	610-620	620	640-650	650-660
v28	610-620	630	640	650-660	670-680
v29	640	640	640-650	650-670	650-690
v30	630	640-650	640-660	660-680	680-690
v31		650	660-670	680-700	690-700
v32		660	660-680	680-700	700
v33	660	650-670	680	680-700	700-710
v34	650	660-690	690	700-710	710-720
v35		680	700-710	700-710	710-720
v36	680	680	710	710-720	720-730
v37	680	690	700-710	710-730	730
v38	690	710	710	720-730	730-740
v39		710	710-720	720-740	750
v40	700-710	710	720-730	730-750	750
v41	710	730	740	750-760	750-760
v42	720	730	750	750-770	760-770
v43			740		760-770
v44			750	770	770
v45			760-770	770	780
v46				780	780
v47			760	770	780
v48				780	780
v49	760				
v50					
v51				790	790

数学51 + 语文31~33分 = 700分

Lecture Two
GMAT数学考试题型

本节课授课要点：

- **PS题型——Problem Solving**
- **DS题型——Data Sufficiency**

1.PS题型——Problem Solving

机考，5选1单选题

2. DS题型——Data Sufficiency

2.1 形式

-DS例题

Tom and Jack are in a line to purchase tickets.（题干）

How many people are in the line?（问题）

（1） There are 20 people behind Tom and 20 people in front of Jack.

（2） There are 5 people between Tom and Jack.（条件）

-DS选项

(A) Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.

(B) Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

(C) BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.

(D) EACH statement ALONE is sufficient.

Statement (1) and (2) TOGETHER are NOT sufficient.（固定选项）

2.2 DS答题步骤

从问句切入

问句类型：

•数值计算——特殊疑问句 （吃的啥）

•判断是非——一般疑问句 （吃了吗）

2.2.1 特殊疑问句

•答案

•充分

•不充分

-例题：

1.What is the value of x ?

(1) 3x = 6 唯一解，充分

(2) $x^2 = 4$ 不唯一，不充分

(A) Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.

(B) Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

(C) BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.

(D) EACH statement ALONE is sufficient.

(E) Statement (1) and (2) TOGETHER are NOT sufficient.

答案：A

2.Tom and Jack are in a line to purchase tickets. How many people are in the line?

（1）There are 20 people behind Tom and 20 people in front of Jack.

（2）There are 5 people between Tom and Jack.

(A) Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.

(B) Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

(C) BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.

(D) EACH statement ALONE is sufficient.

(E) Statement (1) and (2) TOGETHER are NOT sufficient.

答案：E

2.2.2 一般疑问句

•答案

•充分

•不充分

-例题：

Is x equal to 1 ?

(1) $x^2 = 1$ 模棱两可，不充分

(2) $x^2 = 4$ 完全否定，充分

(A) Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.

(B) Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

(C) BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.

(D) EACH statement ALONE is sufficient.

(E) Statement (1) and (2) TOGETHER are NOT sufficient.

答案：B

•区别DS题一般疑问句极端问法

There are eight balls in the pocket.（题干）

Question 1: Are all the balls in the pocket red?（袋中所有的球都是红色的吗？）

Question 2: Are there any red balls in the pocket?（袋中有红色的球吗？）

There are eight balls in the pocket.（题干）

Question 1: Are all the balls in the pocket red?

Question 2: Are there any red balls in the pocket?

Statement 1: Three balls are removed; whose colors are brown, green, and red, respectively.

Statement 2: Three balls are removed; whose colors are brown, green, and yellow, respectively.

Statement 3: Three balls are removed; whose colors are red, red, and red, respectively.

2.3 DS题型思路总结

•单独判断

•合并判断——只有在单独判断都不充分的情况下

2.4 DS题型诊断测试

Each person on a committee with 40 members voted for exactly one of 3 candidates, F, G, or H. Did Candidate F receive the most votes from the 40 votes cast?

(1) Candidate F received 11 of the votes.

(2) Candidate H received 14 of the votes.

(A) Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.

(B) Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.

(C) BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.

(D) EACH statement ALONE is sufficient.

(E) Statement (1) and (2) TOGETHER are NOT sufficient.

答案：A

Lecture Three
基本数论

本节课授课要点：

- 奇偶数
- 因数与质因数
- 最大公约数与最小公倍数
- 余数
- 小数、分数与科学计数法
- 比率与比例

1.奇数与偶数 (Odd and Even Numbers)

•例题：

1. If x and y are integers and xy^2 is a positive odd integer, which of the following must be true?

I. xy is positive.

II. xy is odd.

III. x + y is even.

(A) I only

(B) II only

(C) III only

(D) I and II only

(E) II and III only

2. Is x an even integer?

(1)x is the square of an integer.

(2)x is the cube of an integer.

3. If a and b are positive integers such that a –b and a /b are both even integers, which of the following must be an odd integer?

(A) a /2

(B) b /2

(C) (a + b) /2

(D) (a + 2) /2

(E) (b + 2) /2

2.因数与质因数 (Factors and Prime Factors)

•例题：

1. If $y = x + x^{n+1} + x^{n+2} + x^{n+3}$, and if x =–1, and n is the sum of the first 404 prime numbers, then y=

(A) –2

(B) –1

(C) 0

(D) 1

(E) 2

2. If y is the smallest positive integer such that 3,150 multiplied by y is the square of an integer, then y must be

(A) 2

(B) 5

(C) 6

(D) 7

(E) 14

3. If positive integer x is a multiple of 6 and positive integer y is a multiple of 14, is xy a multiple of 105 ?

(1) x is a multiple of 9.

(2) y is a multiple of 25.

4. How many different prime numbers are factors of the positive integer n ?

(1)Four different prime numbers are factors of 2n.

(2)Four different prime numbers are factors of n2.

5. n is a factor of the product of all the odd integers from 99 to 199, inclusive. If n=5k, then the greatest possible value of k is

(A) 10

(B) 12

(C) 13

(D) 15

(E) 20

6. How many factors does 360 have?

(A) 24

(B) 36

(C) 48

(D) 120

(E) 360

3.最大公约数与最小公倍数 (Greatest Common Divisors and Least Common Multiples)

•例题：

1. If n is a positive integer and the greatest common divisor of (n –1)!, (n +1)!, and (n +3)! is 120, then n =

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

2. If M is the least common multiple of 90, 196, and 300, which of the following is NOT a factor of M ?

(A) 600

(B) 700

(C) 900

(D) 2,100

(E) 4,900

3. The greatest common divisor of a and b is 21, and the least common multiple of a and b is 126, where a and b are positive integers, what is the sum of a and b ?

(A) 105

(B) 147

(C) 150

(D) 105 or 147

(E) 105 or 150

4. Three sorts of juices are served at a party. Every 2 guests share a bottle of apple juice, every 3 guests share a bottle of lemon juice, and every 4 guests share a bottle of orange juice. If 65 bottles of juices are drunk off finally, how many guests are at this party?

(A) 12

(B) 24

(C) 36

(D) 48

(E) 60

4.余数 (Remainders)

•例题：

1. When 20 is divided by the positive integer k, the remainder is k – 2, which of the following is a possible value of k ?

(A) 8

(B) 9

(C) 10

(D) 11

(E) 12

2. What is the sum of the remainders when the first 40 positive integers are divided by 6 ?

(A) 96

(B) 100

(C) 120

(D) 132

(E) 136

3. What is the remainder when the positive integer x is divided by 8 ?

(1) When x is divided by 12, the remainder is 5.

(2) When x is divided by 18, the remainder is 11.

4. If n is a positive integer, what is the remainder when $3^{8n+3}+2$ is divided by 5?

(A) 0

(B) 1

(C) 2

(D) 3

(E) 4

5.小数、分数与科学计数法 (Decimals, Fractions, and Scientific Notation)

•识别各位数字名称"7654.321"，其中：

-"7": thousands

-"6": hundreds

-"5": tens

-"4": units (or ones)

-"." : decimal point

-"3": tenths

-"2": hundredths

-"1": thousandths

•例题：

1. 3.2□△6

If □ and △ each represent single digits in the decimal above, what digit does □ represent?

(1) When the decimal is rounded to the nearest tenth, 3.2 is the result.

(2)When the decimal is rounded to the nearest hundredth, 3.24 is the result.

2. If x is 0.abc, where a, b, and c are the tenths, hundredths and thousandths digits of x, respectively, is x greater than 2/3 ?

(1) a+b>14 .

(2) a+c>15.

3. Any decimal that has only a finite number of nonzero digits is a terminating decimal. For example, 24, 0.82, and 5.096 are three terminating decimals. If r and s are positive integers and the ratio is expressed as a decimal, is a terminating decimal?

(1) 90 < r < 100

(2) s = 4

4. Which of the following fractions has a decimal equivalent that is a terminating decimal?

(A) $\frac{10}{189}$

(B) $\frac{15}{196}$

(C) $\frac{16}{225}$

(D) $\frac{25}{144}$

(E) $\frac{39}{128}$

5. Of the following which best approximates $\frac{(0.1667)(0.8333)(0.3333)}{(0.2222)(0.6667)(0.1250)}$

(A) 2.00

(B) 2.40

(C) 2.43

(D) 2.50

(E) 3.43

6. What is the least number of digits (including repetitions) needed to express 10^{100} in decimal notation?

(A) 4

(B) 100

(C) 101

(D) 1,000

(E) 1,001

7. If $10^{50} - 74$ is written as an integer in base decimal notation, what is the sum of the digits in that integer?

(A) 424

(B) 431

(C) 440

(D) 449

(E) 456

6.比率与比例 (Ratios and Proportions)

•the ratio of A to B 表示为 A : B .

•There is twice as much A as B 表示为 A = 2B .

•例题:

1. A certain fraction is equivalent to 2/5 . If the numerator of the fraction is increased by 4 and the denominator is doubled, the new fraction is equivalent to 1/3. What is the sum of the numerator and denominator of the original fraction?

(A) 21

(B) 26

(C) 28

(D) 35

(E) 49

2. If an automobile average 22.5 miles per gallon of gasoline, approximately how many kilometers per liter of gasoline did the automobile average? (1 mile = 1.6 kilometers and 1 gallon = 3.8 liters, both rounded to the nearest tenth.)

(A) 3.7

(B) 9.5

(C) 31.4

(D) 53.4

(E) 136.8

3. A merchant purchased a jacket for $60 and then determined a selling price that equaled the purchase price of the jacket plus a markup that was 25 percent of the selling price. During a sale, the merchant discounted the selling price by 20 percent and sold the jacket. What was the merchant's gross profit on this sale?

(A) $0

(B) $3

(C) $4

(D) $12

(E) $15

4. In a certain formula, p is directly proportional to s and inversely proportional to r. If p = 1 when r = 0.5 and s = 2, what is the value of p in terms of r and s ?

(A) s/r

(B) r/4s

(C) s/4r

(D) r/s

(E) 4r/s

5. A certain quantity is measured on two different scales, the R-scale and the S-scale, that are related linearly. Measurements on the R-scale of 6 and 24 correspond to measurements on the S-scale of 30 and 60, respectively. What measurement on the R-scale corresponds to a measurement of 100 on the S-scale?

(A) 20

(B) 36

(C) 48

(D) 60

(E) 84

Lecture Four
代数计算

本节课授课要点：

- 指数运算
- 解方程
- 不等式
- 符号运算
- 数列

1.指数运算 (Rules of Exponents)

$a^m \times a^n = a^{m+n}$

$a^m \div a^n = a^{m-n}$

$(a^m)^n = a^{mn}$

$a^m \times b^m = (a \times b)^m$

$a^m \div b^m = (a \div b)^m$

•例题：

1. $\dfrac{(8)^2(3)^3(2)^4}{(96)^2} =$

(A) 3

(B) 6

(C) 9

(D) 12

(E) 18

2. If $P = 2^{64}$ and $P^P = 2^k$, then k =

(A) 70

(B) 128

(C) 256

(D) 264

(E) 270

3.The function f is defined for each positive three-digit integer n by f(n) $=2^x3^y5^z$, where x, y and z are the hundreds, tens, and units digits of n, respectively. If m and v are three-digit positive integers such that f(m) = 9f(v), then m – v = ?

(A) 8

(B) 9

(C) 18

(D) 20

(E) 80

2.解方程 (Equations)

•一元二次方程 $ax^2+bx+c=0$

•标准根公式 $x_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

•例题：

1. A square playground has the same area as a rectangular playground that is 30 meters longer but 20 meters narrower. What is the length, in meters, of a side of the square playground?

(A) $10\sqrt{5}$

(B) $10\sqrt{6}$

(C) 25

(D) 50

(E) 60

2. A certain theater has 100 balcony seats. For every $2 increase in the price of a balcony seat above $10, 5 fewer seats will be sold. If all the balcony seats are sold when the price of each seat is $10, which of the following could be the price of a balcony seat if the revenue from the sale of balcony seats is $1,360 ?

(A) $12

(B) $14

(C) $16

(D) $17

(E) $18

3. If the sum of two positive integers is 24 and the difference of their squares is 48, what is the product of the two integers?

(A) 108

(B) 119

(C) 128

(D) 135

(E) 143

4. If $x-\sqrt{10}=x+\sqrt{10}$, then x=

5. What is Steve's annual salary and Maria's annual salary?

(1) The combined total of the annual salaries of Steve and Maria is $80,000.

(2) If Steve were to receive a 10 percent increase in annual salary and Maria an 10 percent increase, their combined annual salaries would be $88,000.

5.不等式

•对已有的不等式两边取倒数或负数，不等号通常要改变方向

•对 $\sqrt[4]{x}$, $\sqrt[3]{x}$, $\sqrt{x}$, x, x^2, x^3, x^4 等函数的性质有一定的认识.

•在 x, x^2, x^3, 几个函数的比较大小中，对x的取值范围要有清醒的分段意识：

•$x<-1$, $-1<x<0$, $0<x<1$, $x>1$

•绝对值：$|x|$ 恒非负

•例题：

1. If $x > 0.9$, which of the following could be the value of x ?

(A) $\sqrt{0.81}$

(B) $\sqrt{0.9}$

(C) (0.9)

(D) (0.9) (0.9)

(E) $1-\sqrt{0.01}$

2. If $x \neq 0$, is $|x| < 1$?

(1) $x^2 < 1$

(2) $|x| < \frac{1}{x}$

3. Which of the following inequalities has a solution set that, when graphed in the number line, is a single line segment of finite length?

(A)$x^4 \geq 16$
(B)$x^3 \leq 27$
(C)$x^2 \geq 16$
(D)$2 \leq |x| \leq 5$
(E)$2 \leq 3x + 4 \leq 6$

6.符号运算

•题目会定义新的算符和运算法则，模仿运算

•例题：

1. For all real numbers v, the operation v* is defined by the equation v* = v – v/3. If (v*)* = 8, then v =

(A)15
(B)18
(C)21
(D)24
(E)27

2. If the operation ⊙ is defined for all integers a and b by a ⊙ b = a + b – ab, which of the following statements must be true for all integers a, b, and c ?

I. a ⊙ b = b ⊙ a

II. a ⊙ 0 = a

III. (a ⊙ b) ⊙ c = a ⊙ (b ⊙ c)

(A) I only
(B) II only
(C)I and II only
(D) I and III only

(E) I, II and III

3. If ⊙ denotes one of two arithmetic operations, addition or multiplication, and if k is an integer, what is the value of 3 ⊙ k ?

(1) 2 ⊙ k = 3

(2) 1 ⊙ 0 = k

7.数列

•等差数列 (Arithmetic Sequence)

•等比数列 (Geometric Sequence)

•例题:

1. How many integers between 234 and 567, inclusive, are the multiples of 5 ?

(A) 62

(B) 65

(C) 67

(D) 69

(E) 71

2. If the sum of 7 consecutive integers is 434, then the greatest of the 7 integers is

(A) 65

(B) 66

(C) 67

(D) 68

(E) 69

3. In the sequence 1, 2, 4, 8, 16, 32, ... , each term after the first is twice the previous term. What is the sum of the 16th, 17th, and 18th terms in the sequence?

(A)2^{18}

(B)$3(2^{17})$

(C)$7(2^{16})$

(D)$3(2^{16})$

(E)$7(2^{15})$

4. In a certain sequence, the first term is 1, and each successive term is 1 more than the reciprocal of the term that immediately precedes it. What is the fifth term of the sequence?

(A) $\frac{3}{5}$

(B) $\frac{5}{8}$

(C) $\frac{8}{5}$

(D) $\frac{5}{3}$

(E) $\frac{9}{2}$

5. The sequence $a_1, a_2, \ldots a_n, \ldots$ is such that $a_n = a_{n-1} - a_{n-2}$ for all positive integers n > 2. If $a_1 = -1$ and $a_2 = 1$, what is the sum of the first 1000 terms in the sequence?

(A) 0

(B) 3

(C) 750

(D) 1000

(E) 3000

Lecture Five
初等几何

本节课授课要点：

- 三角形与四边形
- 平行线
- 圆
- 立体几何
- 直角坐标系

1.三角形与四边形 (Triangles and Quadrilaterals)

•三角形的某些性质：

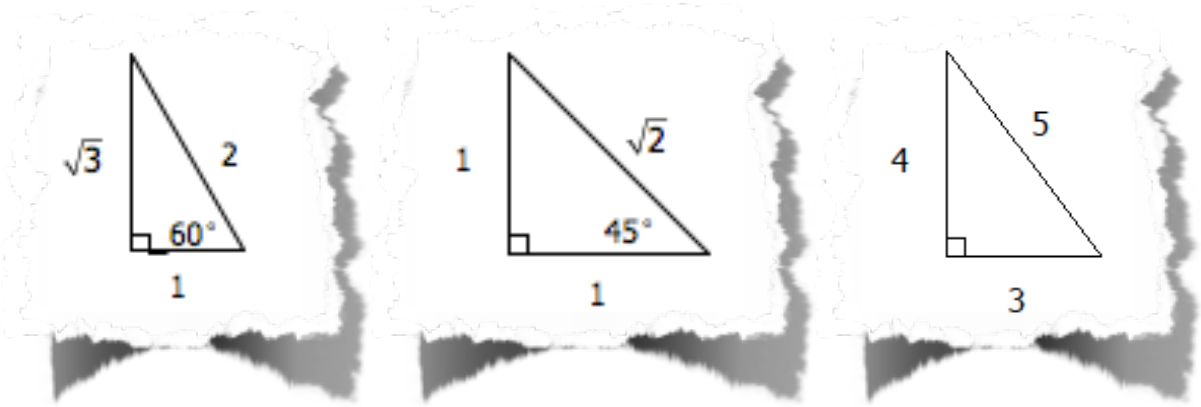
-三角形内角和为180°

-三角形两边之和大于第三边，两边之差小于第三边.

-三角形中，较大角的对边也较大.

•勾股定理：$a^2+b^2=c^2$ (直角边a, 直角边b, 斜边c)

要对以下形状的直角三角形要特别熟悉：



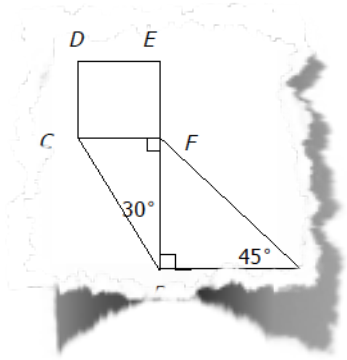
•三角形： 面积 = 底 × 高

•矩形 (Rectangles)： 面积 = 长 × 宽; 周长 = 2 × (长 + 宽)

•正方形 (Squares)： 面积 = 边长2; 周长 = 4 × 边长

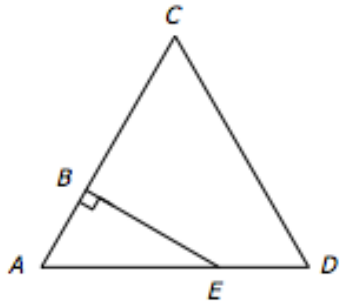
例题：

1. In the figure above, square CDEF has area 4. What is the area of △ABF ?



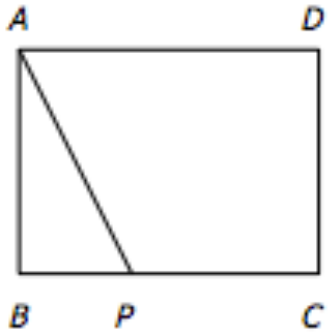
(A)$2\sqrt{2}$
(B)$2\sqrt{2}$
(C)4
(D)$3\sqrt{3}$
(E)6

2. If each side of △ACD above has length 3 and if AB has length 1, what is the area of region BCDE ?



(A)$\frac{9}{4}$
(B)$\frac{7}{4}\sqrt{3}$
(C)$\frac{9}{4}\sqrt{3}$
(D)$\frac{7}{2}\sqrt{3}$
(E)$6+\sqrt{3}$

3. In the rectangle above, AB = 6, AD = 8. If point P is selected from segment BC at random, what is the probability that the length of segment AP is less than ?



(A) $\frac{3}{8}$

(B) $\frac{\sqrt{19}}{8}$

(C) $\frac{3}{5}$

(D) $\frac{3}{4}$

(E) $\frac{3}{8}\sqrt{5}$

4. A ladder 25 feet long is leaning against a wall that is perpendicular to level ground. The bottom of the ladder is 7 feet from the base of the wall. If the top of the ladder slips down 4 feet, how many feet will the bottom of the ladder slip?

(A) 4

(B) 5

(C) 8

(D) 9

(E) 15

5. Is quadrilateral Q a square?

(1) The sides of Q have the same length.

(2) The diagonals of Q have the same length.

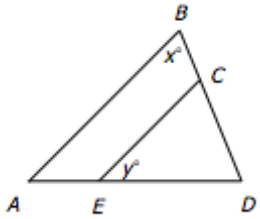
2.平行线 (Parallel lines)

平行线 (Parallel lines)

两直线平行——同位角相等/内错角相等/同旁内角互补

例题：

1. In the figure above, if AB // CE, CE = DE, and y = 45, then x =



(A) 45

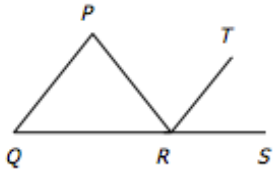
(B) 60

(C) 67.5

(D) 112.5

(E) 135

2. In the figure above, QRS is a straight line and line TR bisects ∠PRS. Is it true that lines TR and PQ are parallel?



(1) PQ = PR

(2) QR = PR

3.圆 (Circles)

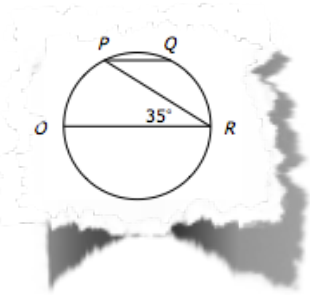
•半径为 r 的圆： 面积 = πr^2 ; 周长 = $2\pi r$

•角度为 x°的圆弧： 弧长 = $2\pi r \frac{x}{360}$

•同一段圆弧所对圆心角是圆周角的两倍

•例题：

1. In the circle above, PQ is parallel to diameter OR, and OR has length 18. What is the length of minor arc PQ ?



(A)2π

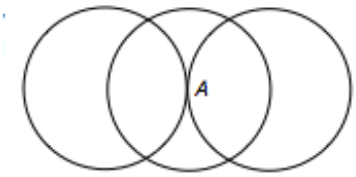
(B)$\frac{9}{4}\pi$

(C)$\frac{7}{2}\pi$

(D)$\frac{9}{2}\pi$

(E)3π

2. In the figure above, A is the point of tangency for two circles and also the center of the third circle. If the radii of three circles are 1, what is the external perimeter of the figure?



(A)$\frac{7}{3}\pi$

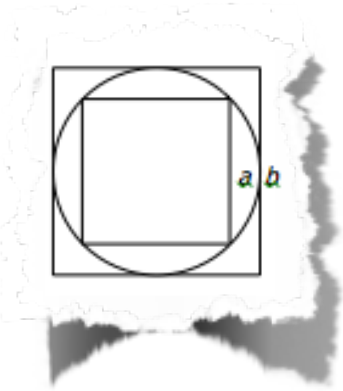
(B)$\frac{10}{3}\pi$

(C)4π

(D)$\frac{14}{3}\pi$

(E)6π

3. In the figure above, a circle is inscribed in a square with side b and a square with side a is inscribed in the circle. What is the area of the square with side b ?



(1) a = 4.

(2) The radius of the circle is $2\sqrt{2}$.

4.立体几何

•长方体 (Rectangular Solids)： 体积 = 长 × 宽 × 高

•正方体 (Cubes)： 体积 = 边长的立方

•圆柱 (Cylinders)： 体积 = 圆周率 × 底面半径的平方 × 高

•例题：

1. What is the volume of a certain rectangular solid?

(1) Two adjacent faces of the solid have areas 15 and 24, respectively.

(2) Each of two opposite faces of the solid has area 40.

2. A grocer is storing small cereal boxes in large cartons that measure 25 inches by 42 inches by 60 inches. If the measurement of each small cereal box is 7 inches by 6 inches by 5 inches, then what is the maximum number of small cereal boxes that can be placed in each large carton?

(A) 25

(B) 210

(C) 252

(D) 300

(E) 420

3. The inside dimensions of a rectangular wooden box are 6 inches 8 inches by 10 inches. A cylindrical canister is to be placed inside the box so that it stands upright when the closed box rests on one of its six faces. Of all such canisters that could be used, what is the radius, in inches, of the one that has maximum volume?

(A) 3

(B) 4

(C) 5

(D) 6

(E) 8

5.平面直角坐标几何 (Plane Rectangular Coordinate Geometry)

•平面直角坐标上两点间距离为：$\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$

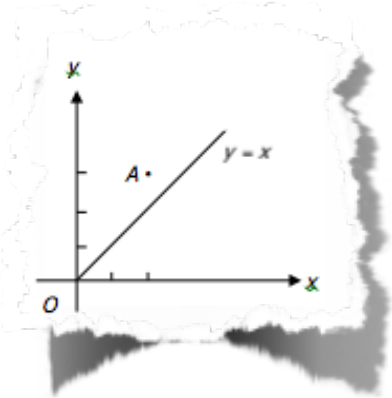
•斜截式：y = kx + b 其中，k 为斜率 (Slope) , b为y轴截距 (Intercept)

$$k=\frac{y_2-y_1}{x_2-x_1}$$

若两直线垂直，其斜率乘积为 –1

例题：

1. In the rectangular coordinate system above, the line is perpendicular bisector of segment AB (not shown), and the x-axis is the perpendicular bisector of segment BC (not shown). If the coordinates of point A are (2, 3), what are the coordinates of point C ?



(A) (–3, –2)

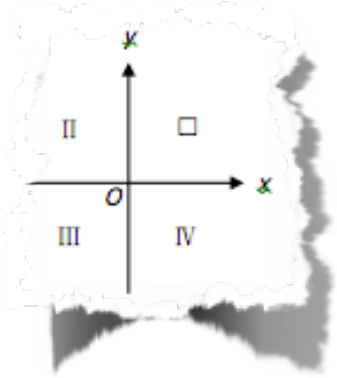
(B) (–3, 2)

(C) (2, –3)

(D) (3, –2)

(E) (2, 3)

2. In the rectangular coordinate system shown above, does the line k (not shown) intersect quadrant I?



(1) The x-intercept of k is negative.

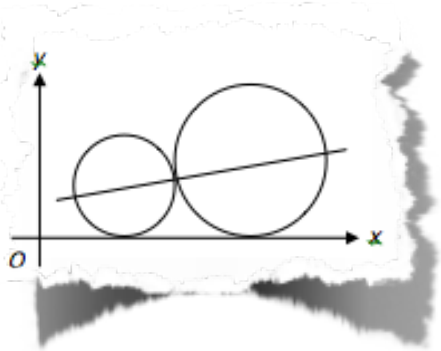
(2) The slope of k is positive.

3. In the xy-plane, does the point (4, 12) lie on line k ?

(1) The point (1, 7) lies on line k.

(2) The point (–2, 2) lies on line k.

4. In the rectangular coordinate system above, both of two tangent circles are tangent to the x-axis. If the radii of the two circles are 4 and 6, respectively, what is the slope of the line on which two centers lie?



(A) $\frac{1}{2\sqrt{6}}$

(B) $\frac{1}{3\sqrt{2}}$

(C) $\frac{1}{3}$

(D) $\frac{1}{\sqrt{5}}$

(E) $\frac{1}{2}$

5. An isosceles triangle lies on the rectangular coordinate plane, the coordinates of point A are (0, 0), and the coordinates of point B are(3, 1), point C could lie at one of 6 positions such that (1, 3), (–1, 3), (–3, 1), (–1, –3), (1, –3), (3, –1). How many lengths of side BC are possible?

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

Lecture Six
文字应用题

本节课授课要点：

- 工作问题
- 利息问题
- 集合问题（文氏图）
- 集合问题（表格法）
- 排列组合问题
- 概率问题
- 描述统计学

1.工作问题

1. A small water pump would take 3 hours to fill an empty tank. A larger pump would take 2 hours to fill the same tank. How many hours would it take both pumps, working at their respective constant rates, to fill the empty tank if they began pumping at the same time?

(A) 1

(B) 1.2

(C) 1.5

(D) 1.8

(E) 2

2. Six machines, each working at the same constant rate, together can complete a certain job in 12 days. How many additional machines, each working at the same constant rate, will be needed to complete the job in 8 days?

(A) 3

(B) 4

(C) 6

(D) 8

(E) 9

2.利息问题

1. Mary invested $14,000 for 3 years in a certificate of deposit paying 9.25% simple annual interest. How many more interest would Mary have received if the interest rate on this certificate had been 9.75% simple annual interest?

(A) $21

(B) $210

(C) $420

(D) $2,100

(E) $4,200

2. A 2-year certificate of deposit is purchased for k dollars. If the certificate earns interest at an annual rate of 6 percent compounded quarterly, which of the following represents the value, in dollars, of the certificate at the end of the 2 years?

(A)1.06^2k

(B)1.06^8k

(C)1.015^2k

(D)1.015^8k

(E)1.03^4k

3.集合问题（文氏题）

1. All trainees in a certain aviator training program must take both a written test and a flight test. If 70 percent of the trainees passed the written test, and 80 percent of the trainees passed the flight test, what percent of the trainees passed both tests?

(1) 10 percent of the trainees did not pass either test.

(2) 20 percent of the trainees passed only the flight test.

2. In a marketing survey for products some people were asked which of the products, if any, they use. Of the people surveyed, a total of 400 use A, a total of 400 use B, a total of 450 use C, a total of 200 use A and B simultaneously, a total of 175 use B and C simultaneously, a total of 200 use C and A simultaneously, a total of 75 use A, B, and C simultaneously, and a total of 200 use none of the products. How many people were surveyed?

(A) 950

(B) 975

(C) 1,000

(D) 1,025

(E) 1,050

3. How many integers between 1 and 100, inclusive, can be divided by none of 2, 3, and 5 ?

(A) 24

(B) 26

(C) 28

(D) 30

(E) 32

4. In a certain class, 10 students can play the piano, 14 students can play the violin, 11 students can play the flute. If 3 students can play exactly three instruments, 20 students can play exactly one instrument, how many students can play exactly two instruments?

(A) 3

(B) 6

(C) 9

(D) 12

(E) 18

5. A group of 15 people could speak Spanish, German, or French. $\frac{1}{3}$ of the group can speak Spanish, $\frac{2}{5}$ of the group can speak German, and $\frac{2}{3}$ of the group can speak French. If only one people can speak exactly three languages, how many people can speak exactly two languages?

(A) 3

(B) 4

(C) 5

(D) 6

(E) 7

4.集合问题（表格法）

1. A shipment of banners contains banners of two different shapes, triangular and square, and two different colors, red and green. In a particular shipment 26% of the banners are square and 35% of the banners are red. If 60% of the red banners in the shipment are square, what is the ratio of red triangular banners to green triangular banners?

(A) $\frac{7}{50}$

(B) $\frac{3}{13}$

(C) $\frac{7}{30}$

(D) $\frac{13}{37}$

(E) $\frac{35}{26}$

2. One-fifth of the light switches produced by a certain factory are defective. Four-fifths of the defective switches are rejected and $\frac{1}{20}$ of the nondefective switches are rejected by mistake. If all the switches not rejected are sold, what percent of the switches sold by the factory are defective?

(A) 4%

(B) 5%

(C) 6.25%

(D) 11%

(E)16%

5.排列组合问题

1.晚会上有5个不同的唱歌节目和3个不同的舞蹈节目，问：分别按以下要求各可排出几种不同的节目单?

（1）3个舞蹈节目排在一起;

（2）3个舞蹈节目彼此隔开;

（3）3个舞蹈节目先后顺序一定.

2. In a meeting of 3 representatives from each of 6 different companies, each person shook hands with every person not from his or her own company. If the representatives did not shake hands with people from their own company, how many handshakes took place?

(A) 45

(B) 135

(C) 144

(D) 270

(E) 288

3. In how many distinguishable ways can the 7 letters in the word MINIMUM be arranged, if all the letters are used each time?

(A) 7

(B) 42

(C) 420

(D) 840

(E) 5040

6.概率问题

1.一只袋中装有5只乒乓球，其中3只白色，2只红色．现从袋中取球2次，每次1只，取出后不再放回. 试求：

（1）2只球都是白色的概率；

（2）2只球颜色不同的概率；

（3）至少有1只白球的概率.

2. From a group of 3 boys and 3 girls, 4 children are to be randomly selected. What is the probability that equal numbers of boys and girls will be selected?

(A) $\frac{1}{10}$

(B) $\frac{4}{9}$

(C) $\frac{1}{2}$

(D) $\frac{3}{5}$

(E) $\frac{2}{3}$

3. Six cards numbered from 1 to 6 are placed in an empty bowl. First one card is drawn and then put back into the bowl; then a second card is drawn. If the cards are drawn at random and if the sum of the numbers on the cards is 8, what is the probability that one of the two cards drawn is numbered 5 ?

(A) $\frac{1}{6}$

(B) $\frac{1}{5}$

(C) $\frac{1}{3}$

(D) $\frac{2}{5}$

(E) $\frac{2}{3}$

4. 2把钥匙，放到有5把钥匙的钥匙链中，相邻的概率为多少 (分直线和环形)?

5. 3个打字员为4家公司服务，每家公司各有1份文件录入，问每个打字员都收到文件的概率?

6. What is the probability that events A and B both occur?

(1) The probability that event A occurs is 0.8.

(2) The probability that event B occurs is 0.6.

7.描述统计学

1. The 10 households on a certain street have household incomes that range from $34,000 to $150,000 and an average (arithmetic mean) household income of $60,000. If the household with the highest income and the one with the lowest income are excluded, what is the average household income for the remaining 8 households?

(A) $41,600

(B) $47,000

(C) $52,000

(D) $61,000

(E) $75,000

2. For the positive numbers n, n + 1, n + 2, n + 4 and n + 8, the mean is how much greater than the median?

(A) 0

(B) 1

(C) n + 1

(D) n + 2

(E) n + 3

3. The least and greatest numbers in a list of 7 real numbers are 2 and 20, respectively. The median of the list is 6, and the number 3 occurs most often in the list. Which of the following could be the average of the numbers in the list?

I. 7

II. 8.5

III. 10

(A) I only

(B) I and II only

(C) I and III only

(D) II and III only

(E) I, II and III

4. The standard deviation of four numbers a, b, c, and d is M, then the standard deviation of which of the following MUST be M ?

(A) $\sqrt{a^2}, \sqrt{b^2}, \sqrt{c^2}, \sqrt{d^2}$

(B) a^2, b^2, c^2, d^2

(C) $2a, 2b, 2c, 2d$

(D) $a+2, b+2, c+2, d+2$

(E) $a+2, b-2, a+2, d-2$

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课程理念

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SmartStudy 智能学习管理中心，根据学生学习目标对学习行为进行搜索与定位，计算出学生的备考 SWOT 分析，精细诊断“输入-输出”过程中疏漏、薄弱环节点，结合专家评估自动给用户匹配非常精准合适的专家课程与逐题精讲，挖掘学员潜在每一分潜力。为学员提供真正“个性化”、“结果导向”的教学解决方案，实现智能学习管理。

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四轮解题 全面提升独立解题能力

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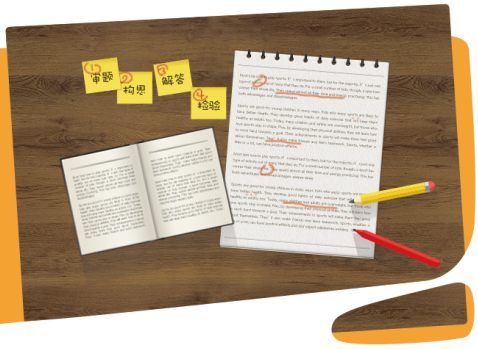
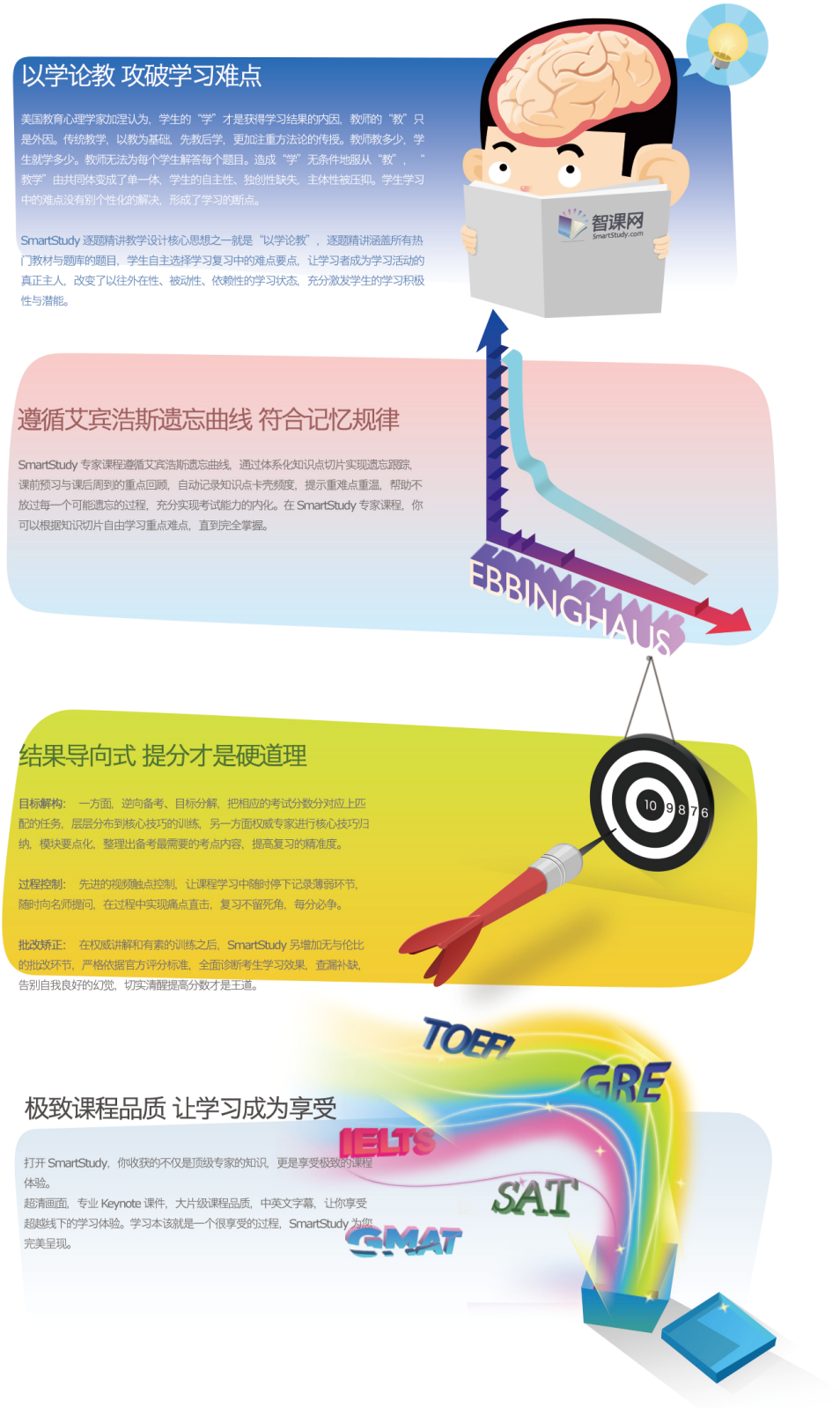


课程理念


以学论教 攻破学习难点
美国教育心理学家加涅认为，学生的“学”才是获得学习结果的内因，教师的“教”只是外因。传统教学，以教为基础，先教后学，更加注重方法论的传授。教师教多少，学生就学多少。教师无法为每个学生解答每个题目。造成“学”无条件地服从“教”，“教学”由共同体变成了单一体，学生的自主性、独创性缺失，主体性被压抑。学生学习中的难点没有别个性化的解决，形成了学习的断点。
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