新 GRE 数学冲 170 分课程

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欢迎使用新东方在线电子教材

第一章 数学部分简介

1.数学题量及时间

2.数学考什么

3.数学怎么考

1.数学题量及时间

GRE 考试中包含两个或者三个数学部分

每个数学部分中包含 20 道题目

每个数学部分时间为 30 分钟

2.数学考什么

- Arithmetic(算术)
- Algebra(代数)
- Geometry(几何)
- Data analysis(数据分析)

3.数学怎么考

- select one answer choice(单选题)
- select one or more answer choices (不定项选择题)
- Numeric entry questions
- (数字填入题)

3.数学怎么考

- select one answer choice(单选题)

3.数学怎么考

- select one or more answer choices (不定项选择题)

3.数学怎么考

- Numeric entry questions
- (数字填入题)

第二章 arithmetic 算数

- Real number
- Rational number
- Irrational number
- Integer
- fraction

- Integer
- Positive integer
- Negative integer
- Odd integer
- Even integer

690,△70

- If △ represents a single digit in the integer above, which of the following CANNOT be a factor of this integer?

(A)2 (B)3

(C)4 (D)5

(E)7

- The integer *a* is even and the integer *b* is odd. For each of the following integers, indicate whether the integer is even or odd.
- a+2b
- 2a+b
- ab
- a^b
- $(a+b)^2$
- a^2-b^2

- Factor/divisor
- 3 is a factor of 6.
- -3 is a factor of 6.

- Multiple
- 6 is a multiple of 3.
- Divisible
- 6 is divisible by 3.
- Least common multiple
- 45和60
- Postive multiples of 45：45，90，135，180…
- Postive multiples of 60：60，120，180，240…
- Common multiples of 45 and 60:180，360，540…
- Least common multiple: 180
- Greatest common divisor/factor
- 45和60
- Positive factors of 45:1，3，5，9，15，45
- Positive factors of 60：1，2，3，4，5，6，10，12，15，20，30，60
- Common factors：1，3，5，15

- Greatest common factor：15
- n is a positive integer with exactly two different divisors greater than 1 , how many positive factors does n^2 have?

(A)4

(B)5

(C)6

(D)8

(E)9

- Prime number
- 2，3，5，7，11，13，17，19…
- Composite number
- 4，6，8，9，10…
- Prime factor
- Positive factors of 6:1,2,3,6
- Prime factors of 6: 2,3

- Prime factorization
- 6=(2)(3)
- Quotient
- Remainder
- The remainder is 1 when 100 is divided by 3
- If n is an integer greater than 6, which of the following must be divisible by 3?

(A)n(n+5)(n-6)

(B)n(n+2)(n-1)

(C)n(n+3)(n-5)

(D)n(n+4)(n-2)

(E)n(n+1)(n-4)

- A two-digit number, reverse the tens digit and the units digit, which one of the following cannot be the sum of the two numbers?

(A)77

(B)121

(C)181

(D)132

(E)154

- Fraction
- Numerator
- Denominator
- Improper fraction
- Proper fraction
- Mixed number
- Ratio
- Fraction
- Percent

- proportion

- 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

- terminating decimal
- Infinite decimal

- recurring decimal

(circulating decimal、repeating decimal)

Decrease

Increase

There are twice as many girls as boys

- If a person's salary increased from $200 per week to $234 per week, what was the percent increase in the person's salary?
- If an athlete's weight decreased from 160 pounds to 152 pounds, what was the percent decrease in the athlete's weight?
- 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?
- 利润
- Revenue

- Cost
- Profit
- Discount

- Principal
- Simple interest
- Compound interest
- Semiannually
- Quarterly

第三章 algebra 代数

Operations with exponents

- Exponent
- Index
- Power
- Base

Operations with exponents

- $a^m \times a^n = a^{m+n}$
- $a^m \div a^n = a^{m-n}$
- $(a^m)^n = a^{mn}$
- $a^m \times b^m = (a \times b)^m$

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

Operations with exponents

- (A)2^6
- (B)2^{11}
- (C)2^{18}
- (D)2^{24}
- (E)2^{27}

Equations

- 一元二次方程(quadratic equation of one variable)
- $ax^2+bx+c=0$
- 标准根公式
- 十字相乘法

$ax^2+bx+c=(a_1x+c_1)(a_2x+c_2)$

其中 $a=a_1\times a_2$ $c=c_1\times c_2$ $b=a_1\times c_2+c_1\times a_2$

Equations

- 二元一次方程组(linear and quadratic equation)
- 将一个方程中x和y 的关系代入另一个方程
- $(x+y)^2=x^2+2xy+y^2$
- $(x-y)^2=x^2-2xy+y^2$
- $x^2-y^2=(x+y)(x-y)$
- Identity

Equations

- A group can charter a particular aircraft at a fixed total cost. If 36 people charter the aircraft rather than 40 people, then the cost per person is greater by $12. What is the fixed total cost to charter the aircraft?

Inequalities

- 对已有的不等式两边取倒数或负数，不等式可能会改变方向，例如：

- -7 < -3
- 7 > 3 → → (-1/7) > (-1/3)

  1/7 < 1/3
- 绝对值(absolute value)
- |x|恒非负，|x-a| 表示数轴上*x* 到*a* 的距离.

Inequalities

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)$2 \leq 3x+4 \leq 6$

- Solution
- Root
- Zero

- What are the zeros of $f(x)=x^2-5x-6$?

- Number line
- Line segment
- Segment

第四章 geometry 几何

Lines

- 平行线： parallel lines
- 垂直线： perpendicular lines
- 相交线： intersect lines

Lines

- 锐　角：acute angle
- 钝　角：obtuse angle
- 直　角：right angle

Lines

- In the figure above, line m and k are parallel. If s=t+30, then t=
- (A) 30　　(B) 60
- (C) 75　　(D) 80
- (E) 105

Polygons

- 内角和：(n-2)x180°

- 数字前缀

1:uni、mono	6:hex、sex
2:bi、du、di	7:sept、hept
3:tri、ter	8:oct
4:tetra、quad	9:novem、enn
5:penta、quint	10:dec、deka

Polygons

- 正多边形 regular polygon

Triangles and Quadrilaterals

1.三角形的通用性质

- 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.

Triangles and Quadrilaterals

- isosceles triangle等腰三角形
- equilateral triangle 等边三角形
- right triangle直角三角形
- congruent 全等的

Triangles and Quadrilaterals

2.直角三角形的性质

- 勾股定理：

  (直角边 a)^2 + (直角边 b)^2 = (斜边 c)^2

熟悉下列图形

-

Triangles and Quadrilaterals

- Pythagorean theorem
- Hypotenuse
- Leg

Triangles and Quadrilaterals

3. 三角形(triangles)

面积 = 1/2 ×底×高

4. 矩形(rectangles)

面积 = 长×宽

周长 = 2 ×(长+宽)

Triangles and Quadrilaterals

面 积：area

周 长：circumference

perimeter

Triangles and Quadrilaterals

If each side of $\triangle ACD$ above has length 3 and if AB has length 1, what is the area of region $BCDE$?

Circles

1.半径为 r 的圆:

面积 $=\pi r^2$

周长 $=2\pi r$

2.角度为 $x°$的圆弧:

弧长 $= 2\pi r(x/360)$

3.同一段圆弧所对圆心角是圆周角的两倍

Circles

- arc弧

- chord 弦

Circles

- diameter 直径
- diagonal 对角线
- radius 半径
- radii 半径(复数)
- major arc 优弧

Circles

- The relationship between the area A of a circle and its circumference C is given by the formula $A=kC^2$, where k is a constant. What is the value of k?

Solid geometry

1.长方体（Rectangular Solids）：

体积 = 长 × 宽 × 高.

2.正方体（Cubes）：

体积 = 边长^3.

3.圆柱（Cylinders）：

体积 = π× 底面半径^2 × 高.

Solid geometry

Square root

Cube root

Plane rectangular coordinate geometry (平面直角坐标系)

■ 平面直角坐标上两点间距离为：

- 通过两点直线方程为：

- 化简为斜截式：

- 其中，*k* 为斜率（Slope），*b*为*y*轴截距（Intercept).

- 若两直线垂直，其斜率乘积为 −1.

Plane rectangular coordinate geometry (平面直角坐标系)

- For the parabola $y=x^2-4x-12$ in the xy-plane, find the following.

- (a) the x-intercepts

- (b) the y-intercept

第五章 Data analysis

(数据分析)

Work problem

- Working alone at its constant rate, machine A produces k car parts in 10 minutes. Working alone at its constant state, machine B produces k car parts in 15 minutes. How many minutes does it take machines A and B, working simultaneously at their respective constant rates, to produce k car parts?

Sets

- 全　　集: universal set
- 子　　集: subset
- 互斥的: mutually exclusive

  disjoint

Sets

- Let S be the set of all positive integers n such that n2 is a multiple

of both 24 and 108. Which of the following integers are divisors of every integer n in S?

- 12
- 24
- 36
- 72

Permutation combination probability (排列组合和概率)

- ×éºÏ (Combination)£º
-
- ÅÅÁÐ (Permutation)£º
-
-

Permutation combination probability (排列组合和概率)

- 概率 (Probability):

1.等可能事件的概率:

如：7 个白球 5 个红球中，取出 1 个白球的概率

2. 互斥事件的概率:

如：一个骰子掷出奇数的概率.

3.相互独立事件同时发生的概率:

如：一个骰子连续掷出两次奇数的概率.

Permutation combination probability (排列组合和概率)

- A talent contest has 8 contestants. Judges must award prizes for first, second, and third places, with no ties.
- (a) In how many different ways can the judges award the 3 prizes?

- (b) How many different groups of 3 people can get prizes?

Permutation combination probability (排列组合和概率)

- If an integer is randomly selected from all positive 2-digit integers, what is the probability that the integer chosen has
- (a) a 4 in the tens place?
- (b) at least one 4 in the tens place or the units place?
- (c) no 4 in either place?

Permutation combination probability (排列组合和概率)

- Let A, B, C, and D be events for which $P(A \text{ or } B) = 0.6$, $P(A) = 0.2$, $P(C \text{ or } D) = 0.6$, and $P(C) = 0.5$. The events A and B are mutually exclusive, and the events C and D are independent.
- (a) Find $P(B)$

- (b) Find $P(D)$

Descriptive statistics(描述统计学)

- 算术平均数（Average or Arithmetic Mean or Mean)：所有数据之和除以数据个数.
- 中数（Median)：将所有数据从小到大排列，取中间的数或中间两个数的算术平均数.
- 众数（Mode)：一组数据中出现频率最高的数. 一组数据中可能有不止一个众数.
- 极差（Range)：一组数据中最大数与最小数之差.

Descriptive statistics(描述统计学)

- 方差（Variance)：一组数据中每个数与算术平均数之差的平方和的算术平均数.
- 标准方差（Standard Deviation)：方差的平方根.
- Measures of position-----quartiles and percentiles
- Interquartile range= the third quartile minus the first quartile

Descriptive statistics(描述统计学)

- Eight hundred insects were weighed, and the resulting measurements, in milligrams, are summarized in the boxplot

below.

■

■ (a) What are the range, the three quartiles, and the interquartile range of the measurements?

■ (b) If the 80th percentile of the measurements is 130 milligrams, about how many measurements are between 126 milligrams and 130 milligrams?

Descriptive statistics

■ The normal distribution

■ The standard normal distribution

ÕýÌ¬·Ö²¼

Descriptive statistics(ÃèÊöÍ³¼ÆÑ§)

- the random variable X is normally distributed. The values 650 and 850 are at the 60th and 90th percentiles of the distribution of X, respectively.

Quantity A	Quantity B
The value at the 75th Percentile of the distribution of X	750

Descriptive statistics

- A random variable *Y* is normally distributed with a mean of 200 and a standard deviation of 10.

Quantity A	Quantity B
The probability of the event that the value of *Y* is greater than 220	1/6

第二章算数练习题

1. When the integer *n* is divided by 6, the remainder is 3, which of the following is NOT a multiple of 6 ?

A. *n*– 3
B. *n*+ 3
C. 2*n*
D. 3n
E. 4*n*

2. Ifa,b,and c are consecutive odd integers, which expression must be odd? Choose all that apply

I a(b+c)
I (a+b)-c
I abc
I2(c-a)+b
I a+b+c

3. If x and y are different prime numbers, each greater than2, which of the following must be true?
   Choose all that apply

Ix+y doesn't equal 91
IIx-y is an even integer
IIIx/y is not an integer.

4. If *n* and *k* are integers whose product is 400, which of the following statements must be true?

A. $n+k>0$
B. $n \neq k$
C. Either *n* or *k* is a multiple of 10.
D. If *n* is even, then *k* is odd.
E. If *n* is odd, then *k* is even.

5. 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

6. 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

7. 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

8. In a certain game, a large container is filled with red, yellow, green, and blue beads worth, respectively, 7, 5, 3, and 2 points each .A number of beads are then removed from the container. If the product of the point values of the removed beads is 147,000, how many red beads were removed?

A. 5
B. 4
C. 3
D. 2
E. 0

9. Among registered voters in a certain district, the ratio of men to women is 3:5. Of the district currently includes 24,000 registered voters, how many additional men must register to make the ratio 4:5 ?

A. 2,000
B. 3,000
C. 4,000
D. 5,000
E. 6,000

10. A certain fraction is equivalent to $\frac{2}{5}$. If the numerator of the fraction is increased by 4 and the denominator is doubled, the new fraction is equivalent to $\frac{1}{3}$. What is the sum of the numerator and denominator of the original fraction?

A. 21
B. 26
C. 28
D. 35
E. 49

11. 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

12. 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. $\frac{s}{r}$

B. $\frac{r}{4s}$

C. $\frac{s}{4r}$ (c)

D. $\frac{r}{s}$

E. $\frac{4r}{s}$

第三章代数练习题

1. 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

2. $\frac{(8)^2(3)^3(2)^4}{(96)^2}$ = ?

A. 3
B. 6
C. 9
D. 12
E. 18

3. 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

4. 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 $a⊙b = b⊙a$
I $a⊙ 0 = a$
I $(a⊙b) ⊙c = a⊙ (b⊙c)$

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

A. 62
B. 65
C. 67
D. 69
E. 71

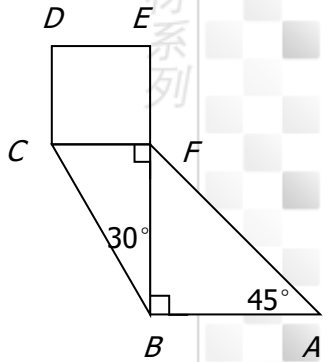
6. In the sequence 1, 2, 4, 8, 16, 32, ... , each term after the first is twice the previous term. What is the sum of the 16^{th}, 17^{th}, and 18^{th} terms in the sequence?

A. 2^{18}
B. $3(2^{17})$
C. $7(2^{16})$
D. $3(2^{16})$
E. $7(2^{15})$

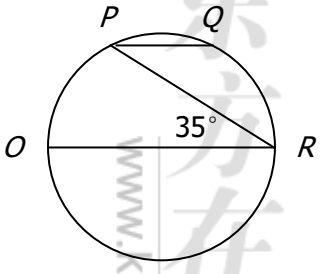
第四章几何练习题

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

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

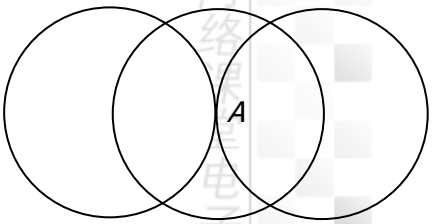


2. In the circle above, *PQ* is parallel to diameter *OR*, and *OR* has length 18. What is the length of minor arc *PQ*?



A. 2π
B. $\frac{9\pi}{4}$
C. $\frac{7\pi}{2}$
D. $\frac{9\pi}{2}$
E. 3π

3. 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?



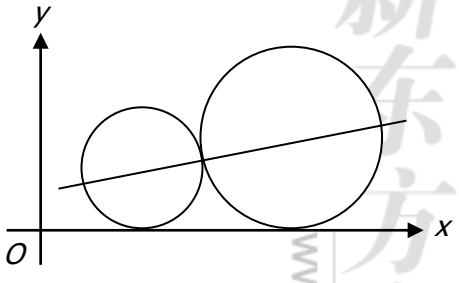
A. $\frac{7\pi}{3}$
B. $\frac{10\pi}{3}$
C. 4π
D. $\frac{14\pi}{3}$
E. 6π

4. 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. 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. $\frac{1}{2}$

第五章数据分析练习题

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

3. 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

4. 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. $\frac{7}{30}$

(c)

D. $\frac{13}{37}$

E. $\frac{35}{26}$

5. 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. 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

7. Which of the following could be the median of the 4 integers listed below?

150 200 250 n

- ☐ 155
- ☐ 175
- ☐ 215
- ☐ 235
- ☐ 255