数学分册

目录

一. 数学简介

1. 考试时间

Format of the GMAT® Exam

	Questions	Timing
Analytical Writing Analysis of an Argument	1	30 min.
Integrated Reasoning Multi-Source Reasoning Table Analysis Graphics Interpretation Two-Part Analysis	12	30 min.
Optional break		
Quantitative Problem Solving Data Sufficiency	37	75 min.
Optional break		
Verbal Reading Comprehension Critical Reasoning Sentence Correction	41	75 min.
	Total Time:	210 min.

2. 考试题型

2.1 Problem Solving: 19 道题

2.2 Data Sufficiency: 18 道题

3. 题型分析

3.1 Problem Solving

When $\frac{1}{10}$ percent of 5,000 is subtracted from $\frac{1}{10}$ of 5,000, the difference is

(A) 0
(B) 50
(C) 450
(D) 495
(E) 500

3.2Data Sufficiency :

Is x equal to 1?

(1) x^2=1
(2) x^2=4

(A) Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked
(B) Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked
(C) Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone
(D) Each statement alone is sufficient to answer the question
(E) Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements

(A) (1)单独充分，但是(2)单独不充分
(B) (2)单独充分，但是(1)单独不充分
(C) (1)(2)在一起充分，但是(1)(2)分别单独不充分
(D) (1)(2)分别单独充分
(E) (1)(2)在一起也不充分

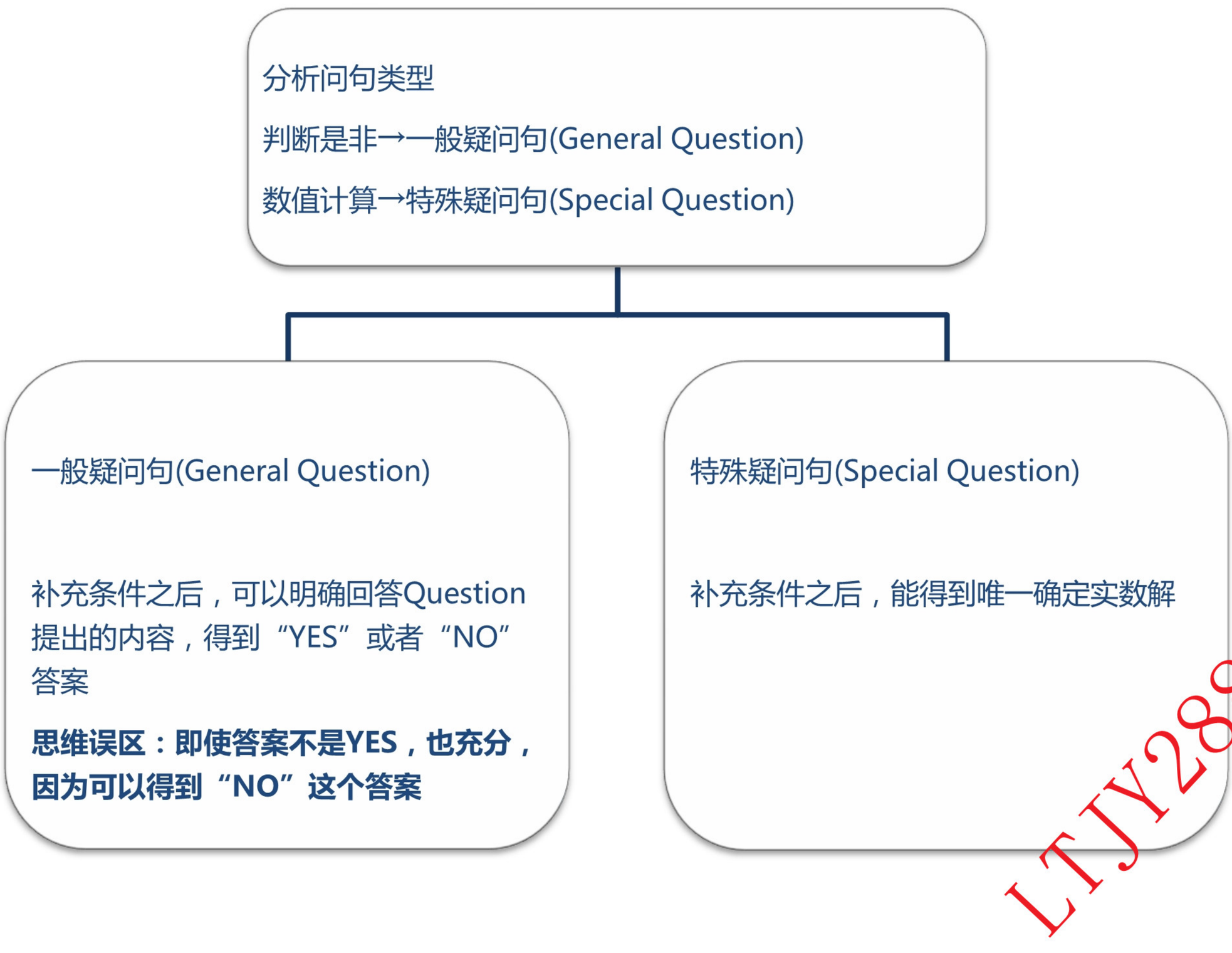
4. DS 答题方法

4.1 DS 答题思路：

按照 Problem Solving 常规题型继续思考，**牢记**：

- 当分析 Statement (1) 时，不要预测 Statement (2)；
- 当分析 Statement (2) 时，确信忘记 Statement (1)；

4.2 DS 答题步骤：



二. 数学考点：

1. 算数(Arithmetic)

1. 奇数与偶数 (Odd and Even Numbers)
2. 质数、合数、因数与质因数 (Prime, Composite Numbers, Factors, and Prime Factors)
3. 整除、商和余数(Divisible, Quotient, and Remainders)
4. 比率，比例与百分数 (Ratios, Proportions, and Percents)
5. 幂与根 (Powers and Roots)
6. 小数、分数与科学计数法(Decimals, Fractions and Scientific Notation)

2. 代数(Algebra)

7. 解方程 (Equations)
8. 不等式 (Inequalities)
9. 绝对值 (Absolute Values)
10. 数列 (Sequences)

3. 几何 (Geometry)

11. 直线和角（ Lines and Angles)
12. 三角形(Triangles)
13. 四边形与多边形 (Quadrilaterals and Polygons)
14. 圆 (Circles)
15. 长方体与圆柱体 (Rectangular Solids and Cylinders)
16. 平面直角坐标系(Coordinate Plane)

4. 文字应用题 (Word Problems)

17. 速率问题 (Rate Problems)
18. 工作问题 (Work Problems)
19. 混合问题 (Mixture Problems)
20. 利率问题 (Interest Problems)
21. 集合 (Sets)
22. 组合、排列与概率 (Combination, Permutation and Probability)
23. 描述统计学 (Descriptive Statistics)

三. 数学知识点

1. 算数 (Arithmetic)

1.1 奇数与偶数 (Odd and Even Numbers)

- 整数 (Integers)：像-2，-1，0，1，2 这样的数称为整数
- 零和正整数 (Positive Integers) 统称为自然数，负整数 (Negative Integers) 称为非零自然数，正整数、零与负整数构成整数系
- 所有能被 2 整除的数都是偶数，0 是偶数，负数也有奇偶性
- 偶数 = 偶数 + 偶数 或 奇数 + 奇数，偶数 = 偶数×偶数 或 奇数×偶数
- 奇数 = 奇数 + 偶数
- 多个整数之和为奇数→奇数个奇数
  多个整数之和为偶数→偶数个奇数
  多个整数之积为奇数→全部是奇数
  多个整数之积为偶数→至少一个是偶数

1) If n is an integer, is n even?
   (1) $n^2 - 1$ is an odd integer
   (2) 3n+4 is an odd integer

2) If x, y, and z are positive integers, is x - y odd?
   (1) $x = z^2$
   (2) $y=(z-l)^2$

1.2 质数、合数、因数与质因数（Prime, Composite Numbers, Factors, and Prime Factors)

- 质数（Prime Numbers）又称素数，指一个大于 1 的自然数，如果除了 1 和它自身外，不能被其他自然数整除的数；否则称为合数（Composite Numbers)
- 质数和合数的概念只适用于正整数
- 数字 1 既不是质数也不是合数
- 大于 2 的质数都是奇数，数字 2 是质数中唯一的偶数
- 100 以内的质数 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
- 任何一个大于 2 的偶数都可以表示为两个质数的和
- 假如整数 n 除以 m，结果是无余数(Remainder)的整数，那么我们称 m 就是 n 的因子(Divisor/Factor)。反过来说，我们称 n 为 m 的倍数(Multiple)
- 因数和质因数的概念只适用于正整数
- 分解质因数：将一个合数写成质数相乘的形式
- 任何一个大于 1 的正整数，无论是质数还是合数都可以表示为质数因子相乘的形式
- 任何一个正整数的因数个数 ≥ 其质因数个数
- 一个完全平方数的因数个数必然为奇数；若一个自然数有偶数个因数，则它一定不是完全平方数
- 质因子与因数关系：若 $n=a^xb^yc^z$(a, b, c 为质数)，那么 n 的因子个数为(x+1)(y+1)(z+1)

3) The sum of prime numbers that are greater than 60 but less than 70 is

(A) 67
(B) 128
(C) 191
(D) 197
(E) 260

4) How many factors does the number 252 have?

(A) 12
(B) 14
(C) 15
(D) 18
(E) 19

1.3 整除、商和余数(Divisible, Quotient, and Remainders)

- 余数(Remainders)指指整数除法中被除数未被除尽部分。
- 若整数 a 除以非零整数 b，商为整数，且余数为零， 我们就说 a 能被 b 整除。
- 一些整除性质：

  能否被 5 整除，只要看它的最后一位

  能否被 4 整除，三位数以上的整数，只要看它的后两位(如果后两位能被 4 整除，该整数能被 4 整除)

  能否被 8 整除，四位数以上的整数，只要看它的后三位(如果后三位能被 8 整除，该整数能被 8 整除)

  能否被 3 整除，取决于各位之和能否被 3 整除

  能否被 9 整除，取决于各位之和能否被 9 整除

5) A school administrator will assign each student in a group of n students to one of m classrooms. If 3 < m< 13< n, is it possible to assign each of the n students to one of the m classrooms so that each classroom has the same number of students assigned to it?

   (1) It is possible to assign each of 3n students to one of m classrooms so that each classroom has the same number of students assigned to it.

   (2) It is possible to assign each of 13n students to one of m classrooms so that each classroom has the same number of students assigned to it.

6) If n is an integer greater than 6, which of the following must be divisible by 3?

   (A) n(n+ l)(n-4)

   (B) n(n+2)(n-l)

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

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

   (E) n(n+5)(n-6)

7) When positive integer x is divided by integer y, the reminder is 9. If x/y=96.12, what is the value of y?

   (A) 96

   (B) 75

   (C) 48

   (D) 25

   (E) 12

8) If k is an integer such that 56 < k < 66, what is the value of k?

   (1) If k were divided by 2, the remainder would be 1.

   (2) If k + 1 were divided by 3, the remainder would be 0.

1.4 比率，比例与百分数（Ratios, Proportions, and Percents)

- 比率(Ratio)：即比值，两数相比所得的值
- 比例(Proportion)：数学上，表示两个比值相等的式子叫做比例。在一个比例中，两个外项的积等于两个内项的积，叫做比例的基本性质
- 表示两个比值相等的式子叫做比例，如 3:4=9:12、7:9=21:27
- 比例有四个项，分别是两个内项和两个外项；在 7:9=21:27 中，其中 7 与 27 叫做比例的外项，9 与 21 叫做比例的内项。
- 百分比，又称百分率、百分数(符号为%)是一种表达比例，比率或分数数值的方法，使用 100 作为分母。举例如 1%，即代表百分之一，或 1/100 或 0.01，而 82%，即代表百分之八十二，或 82/100 或 0.82。
  - ✧ 百分比可以大于 100%
- 利润(Profit)=总收益(Total Revenue)-总成本(Total Costs)
- 销售净利率(Profit Margin)是净利润占销售收入的百分比。
- 折扣(Discount)
  - ✧ 20% Discount=8 折

9) A factory has 500 workers, 15 percent of whom are women. If 50 additional workers are to be hired and all of the present workers remain, how many of the additional workers must be women in order to raise the percent of women employees to 20 percent?

(A) 3
(B) 10
(C) 25
(D) 30
(E) 35

10) If m > 0 and x is m percent of y, then, in terms of m, y is what percent of x?

(A) 100m
(B) $\frac{1}{100m}$
(C) $\frac{1}{m}$
(D) $\frac{10}{m}$
(E) $\frac{10,000}{m}$

1.5 幂与根 (Powers and Roots)

- 求 n 个相同因数乘积的运算，叫做乘方，乘方的结果叫做幂(Powers)
- 求一个数的方根的运算，叫做开放，是乘方逆运算，开放的结果叫做根(Roots)
- 正整数 n 次幂的尾数循环特征：
  - 尾数为 2： 2，4，8，6
  - 尾数为 3： 3，9，7，1
  - 尾数为 4： 4，6
  - 尾数为 5 或 6： 自身循环
  - 尾数为 7： 7，9，3，1
  - 尾数为 8： 8，4，2，6
- 指数 (Exponents)的性质：
  - $x^r \times x^s = x^{(r+s)}$, $\frac{x^r}{x^s} = x^{(r-s)}$
  - $(x^r)(y^r) = (xy)^r$
  - $(\frac{x}{y})^r = \frac{x^r}{x^r}$
  - $(x^r)^s = x^{rs} = (x^s)^r$
  - $x^{-r} = \frac{1}{x^r}$
  - $x^0 = 1$
  - $x^{\frac{r}{s}} = (x^{\frac{1}{s}})^r = (x^r)^{\frac{1}{s}} = \sqrt[s]{x^r}$

11) If n = $(33)^{43} + (43)^{33}$, what is the units digit of n?

(A) 0
(B) 2
(C) 4
(D) 6
(E) 8

12) If x is an integer, is $9^x + 9^{-x} = b$?

(1) $3^x + 3^{-x} = \sqrt{b+2}$
(2) $x > 0$

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

- 约分是分式约分，把一个分数的分子、分母同时除以公因数(Common Factors)，分式的值不变，这个过程叫约分，约分的依据：分数的基本性质
- 求一个数的方根的运算，叫做开放，是乘方逆运算，开放的结果叫做根(Roots)
- 分数的加减：通分
  根据分数(式)的基本性质，把几个异分母分数(式)化成与原来分数(式)相等的同分母的分数(式)的过程，叫做通分
- 分数的除法：乘以除数的倒数(Reciprocal)
- 带分数(Mixed Numbers)：带分数是假分数的另外一种形式。非零整数与真分数相加(负整数时与真分数相减)所成的分数(或真分数与假分数相加减化简后的数)，一般读作几又几分之几，假分数的倒数一定不大于一
- 科学计数法(Scientific Notation)：将一个数字表示成 a×10 的 n 次幂的形式，其中 1≤|a|<10，n 为整数，这种记数方法叫科学记数法。例如 920000 可以表示为 9.2×10^5，读作 9.2 乘 10 的 5 次方

13) $\frac{0.99999999}{1.0001}-\frac{0.99999991}{1.0003}=$

(A) 10^{-8}
(B) $3(10^{-8})$
(C) $3(10^{-4})$
(D) $2(10^{-4})$
(E) 10^{-4}

14) If $t=\frac{1}{2^3\times5^7}$ is expressed as a terminating decimal, how many nonzero digits will d have?

(A) One
(B) Two
(C) Three
(D) Seven
(E) Ten

2. 代数（Algebra)

2.1 解方程（Equations)

- 二元一次方程求解：

  十字相乘法

  x　　-5

  2x　　3

- 二次方程求根公式(Quadratic Formula)

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

15) If 4 is one solution of the equation x^2 + 3x + k= 10, where k is a constant, what is the other solution?

(A) -7

(B) -4

(C) -3

(D) 1

(E) 6

16)

$$\begin{cases} x-4=z \\ y-x=8 \\ 8-z=t \end{cases}$$

For the system of equations given, what is the value of z?

(1) x = 7

(2) t = 5

17) If r and s are the roots of the equation $x^2 + bx + c = 0$, where b and c are constants, is rs< 0?

(1) b<0

(2) c<0

2.2 不等式 (Inequalities)

- 不等式计算：
  两边同时乘以负数，不等号方向需改变
  两边同时取倒数，不等号方向也要改变
- 当 x 在分母时解不等式，需要分类讨论，两种情况

18) M is the sum of the reciprocals of the consecutive integers from 201 to 300, inclusive. Which of the following is true?

(A) $\frac{1}{3}< M <\frac{1}{2}$

(B) $\frac{1}{5}< M <\frac{1}{3}$

(C) $\frac{1}{7}< M <\frac{1}{5}$

(D) $\frac{1}{9}< M <\frac{1}{7}$

(E) $\frac{1}{12}< M <\frac{1}{9}$

19) If x and y are integers, what is the value of x + y?

(1) $3<\frac{x+y}{2}<4$

(2) $2<x<y<5$

2.3 绝对值 (Absolute Value)

- 绝对值(Absolute Value)：在数轴(Number Line)上，表示一个数的点到原点的距离叫做这个数的绝对值，绝对值用“| |”来表示
- 绝对值的不等式展开：分类讨论

20) If y is an integer, then the least possible value of |23 - 5y| is

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

2.4 数列 (Sequences)

- 等差数列 (Arithmetic Sequence)

  第 n 项：$a_n = a_1 + (n-1)d$

  前 n 项之和：$S_n = \frac{n(a_1+a_n)}{2} = na_1 + \frac{n(n-1)d}{2}$

- 等比数列 (Geometric Sequence)

  第 n 项：$a_n = a_1 q^{n-1}$

  前 n 项之和：$S_n = \frac{a_1(1-q^n)}{1-q} (q \neq 1)$

  当 $|q<1|$时，n 趋于无穷大，前 n 项之和$S_\infty = \frac{a_1}{1-q}$

21) In the first week of the year, Nancy saved $1. In each of the next 51 weeks, she saved $1 more than she had saved in the previous week. What was the total amount that Nancy saved during the 52 weeks?

(A) $1,326
(B) $1,352
(C) $1,378
(D) $2,652
(E) $2,756

3. 几何（Geometry)

3.1 直线和角（ Lines and Angles)

- 平行线(Parallel Lines)：在同一平面内不相交的两条直线叫做平行线
- 平行线公理及推论：经过直线外一点，有一条而且只有一条直线和这条直线平行，平行于同一条直线的两条直线平行
- 两直线平行，内错角相等，同位角相等

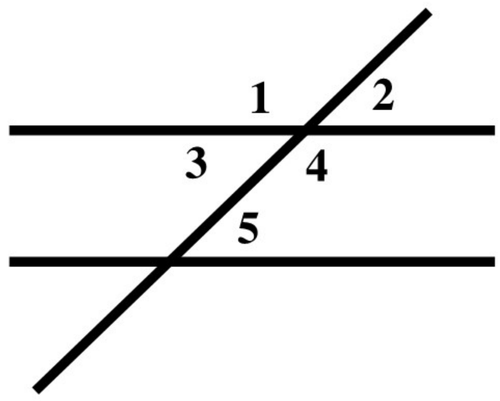
  ∠1&∠2: 互补角(Supplementary Angles)

  ∠2&∠3: 对顶角(Vertical Angles)

  ∠3&∠5: 内错角(Alternate Interior Angles)

  ∠2&∠5: 同位角(Corresponding Angles)

  ∠4&∠5: 同旁内角(Interior Angles on the same side)



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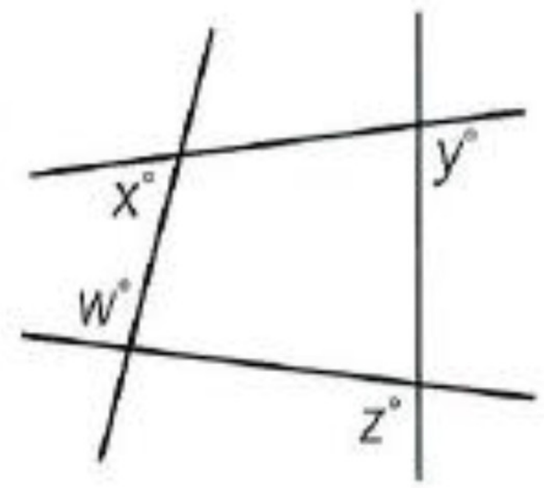


What is the value of x + y in the figure above?

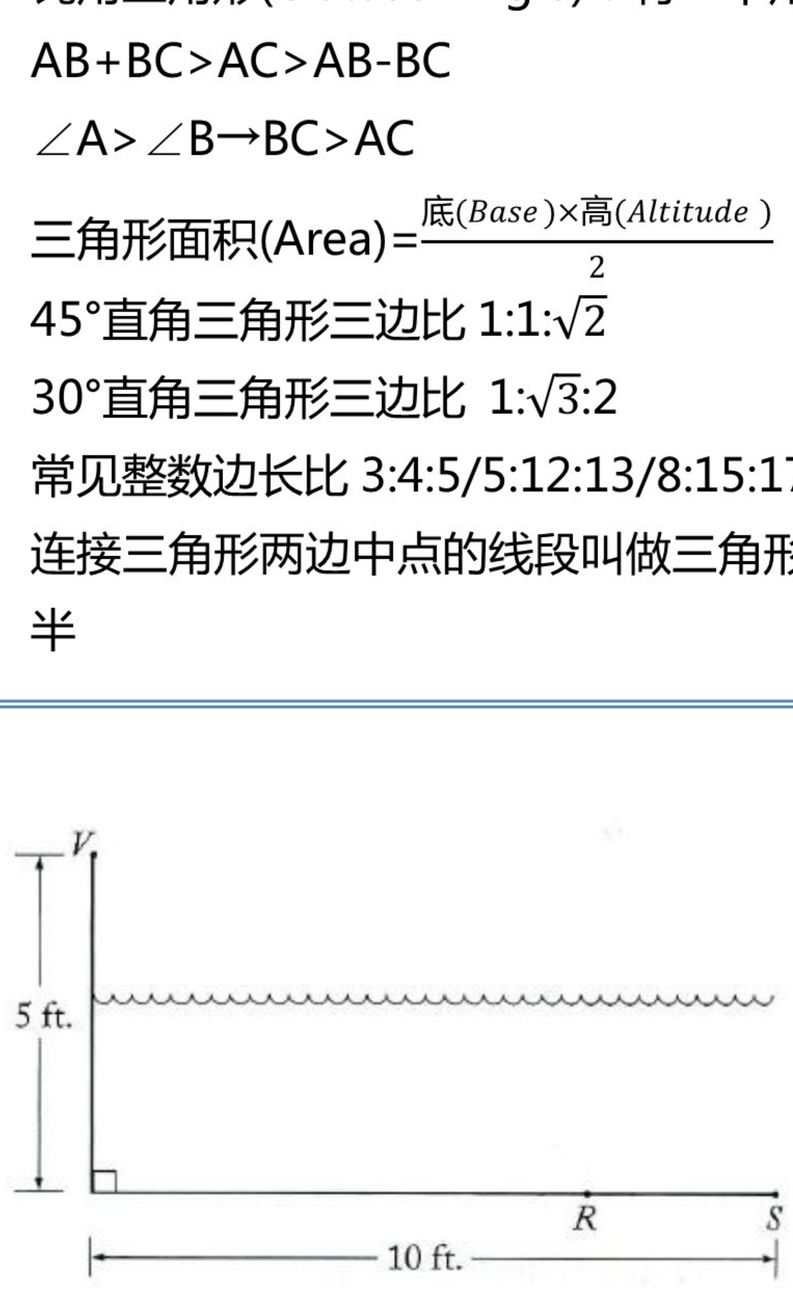
(1) w = 95

(2) z = 125

3.2 三角形（Triangles)

- 由不在同一直线上的三条线段(Line Segments)，首尾顺次相接所得到的几何图形叫做三角形(Triangle)，符号为△
- 锐角三角形(Acute Angle)：三个角都小于 90 度，$AB^2+BC^2>AC^2$
  直角三角形(Pythagorean Triangles) :可记作Rt△。其中一个角必须等于90度，$AB^2+BC^2=AC^2$
  钝角三角形(Obtuse Angle)：有一个角大于 90 度，$AB^2+BC^2<AC^2$
- AB+BC>AC>AB-BC
- ∠A>∠B→BC>AC
- 三角形面积(Area)=$\frac{底(Base)\times高(Altitude)}{2}$
- 45°直角三角形三边比 1:1:$\sqrt{2}$
- 30°直角三角形三边比 1:$\sqrt{3}$:2
- 常见整数边长比 3:4:5/5:12:13/8:15:17/7:24:25
- 连接三角形两边中点的线段叫做三角形的中位线，三角形的中位线平行于第三边并且等于它的一半

23)



In the figure above, V represents an observation point at one end of a pool. From V, an object that is actually located on the bottom of the pool at point R appears to be at point S. If VR = 10 feet, what is the distance RS, in feet, between the actual position and the perceived position of the object?

(A) $10-5\sqrt{3}$
(B) $10-5\sqrt{2}$
(C) 2
(D) $2\frac{1}{2}$
(E) 4

3.3 四边形与多边形(Quadrilaterals and Polygons)

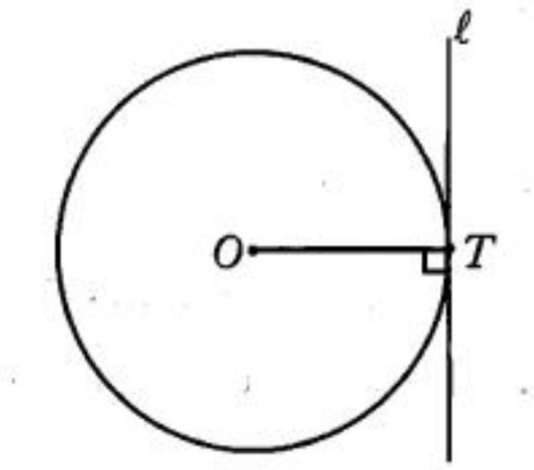
- 两组对边分别平行的四边形称为平行四边形(Parallelogram)
- 平行四边形对角线(Diagonals)相互平分 The two diagonals of a parallelogram bisect each other
- 平行四边形面积(Area)=底(Base) × 高(Altitude)
- 一个角是直角的平行四边形是矩形(Rectangular)/对角线相等的平行四边形是矩形
- 当周长(Perimeter)确定时，面积最大的矩形是正方形/当面积确定时，周长最长的矩形是正方形
- 有一组邻边相等的平行四边形是菱形(Rhombus)
- 菱形面积(Area)=$\frac{\text{DiagonalAC} \times \text{DiagonalBD}}{2}$
- 梯形(Trapezium)是指只有一组对边平行的四边形，平行的两边叫做梯形的底边
- 梯形面积(Area)=$\frac{\text{The sum of the lengths of the bases} \times \text{The height}}{2}$
- 多边形(Polygons)内角和：(n-2) ×180

24) A border of uniform width is placed around a rectangular photograph that measures 8 inches by 10 inches. If the area of the border is 144 square inches, what is the width of the border, in inches?

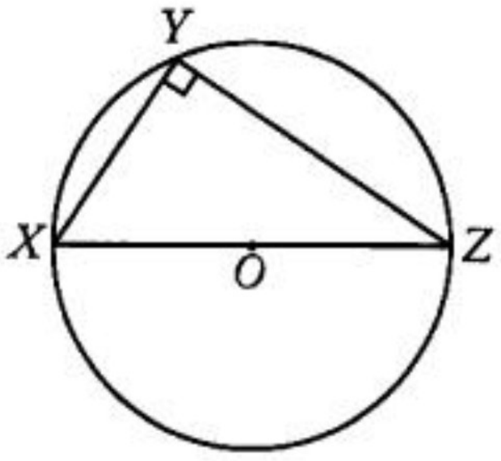
(A) 3
(B) 4
(C) 6
(D) 8
(E) 9

3.4 圆 (Circles)

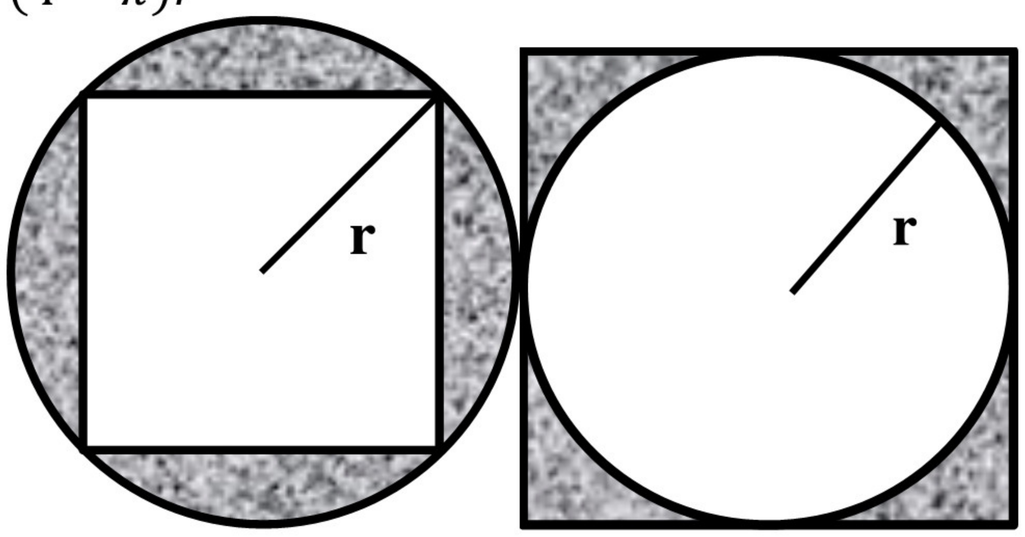
- 连接圆上任意两点的线段叫做弦(Chord)，最长的弦是直径(Diameter)
- 圆上任意两点间的部分叫做圆弧，简称弧(Arc)
- 周长(Circumference)= $2\pi r$
- 弧长(Arc)=$2\pi r\frac{\text{圆心角(Centeral Angel)}}{360}$
- 面积(Area)= πr^2
- 直线和圆有且只有一公共点，称相切(Tangent)，这条直线叫做圆的切线，这个唯一的公共点叫做切点(Point of Tangency)，AB 与⊙O 相切，圆心到直线的距离为半径(Radius)



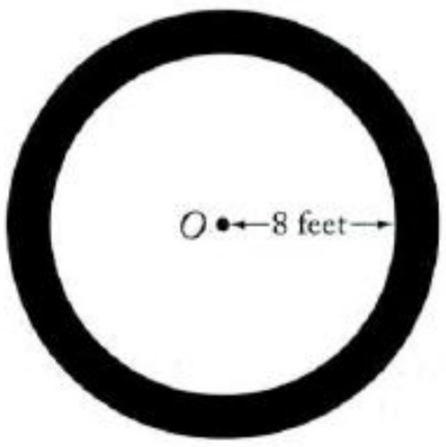
- 同一段圆弧所对圆心角(Central Angel)是圆周角(Inscribed Angle)的两倍



- 内切(Inscribe)与外接(Circumscribe)，阴影部分面积，正方形内切$(\pi-2)r^2$，正方形外接$(4-\pi)r^2$



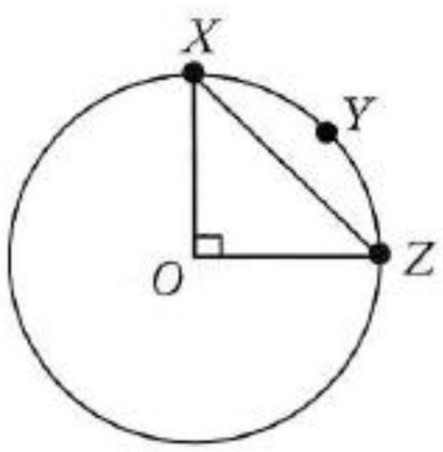
25)



The figure above shows a circular flower bed, with its center at O, surrounded by a circular path that is 3 feet wide. What is the area of the path, in square feet?

(A) 25π
(B) 38π
(C) 55π
(D) 57π
(E) 64π

26)

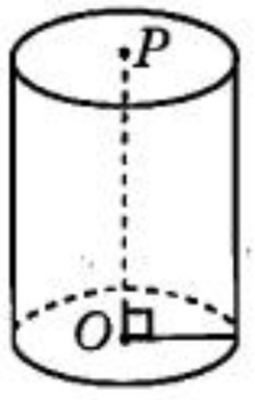


What is the circumference of the circle above with center O?

(1) The perimeter of ΔOXZ is $20+ 10\sqrt{2}$.
(2) The length of arc XYZ is 5π.

3.5 长方体与圆柱体 (Rectangular Solids and Cylinders)

- 长方体(Rectangular Solids)是底面是长方形的直棱柱
- 长方体的每一个矩形都叫做长方体的面(Faces)，面与面相交的线叫做长方体的棱(Edges)，三条棱相交的点叫做长方体的顶点(Vertices)
- 长方体有 6 个面，有三组相对的面完全相同
- 12 条棱相等的长方体是正方体(Cube)
- 长方体表面积(Surface Areas)=2ab+2ac+2bc，a、b、c 为长宽高
- 长方体体积(Volumes)=长×宽×高/底面积×高
- 以一个圆为底面，上或下移动一定的距离，所经过的空间叫做圆柱体(Cylinders)
- 圆柱体表面积(Surface Areas)= $2\pi r^2 + 2\pi r \times$ 高
- 圆柱体体积(Volumes)=底面积×高



27) A closed cylindrical tank contains 36π cubic feet of water and is filled to half its capacity. When the tank is placed upright on its circular base on level ground, the height of the water is 4 feet. When the tank is placed on its side on level ground, what is the height, in feet, of the surface of the water above the ground?

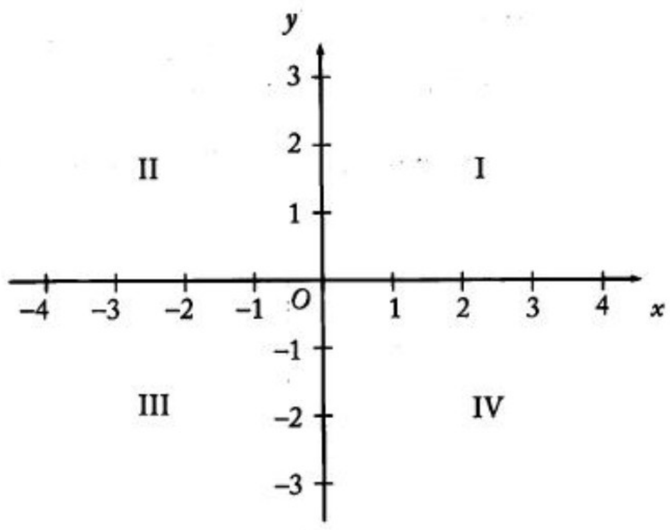
(A) 2
(B) 3
(C) 4
(D) 6
(E) 9

28) What is the volume of a certain rectangular solid?

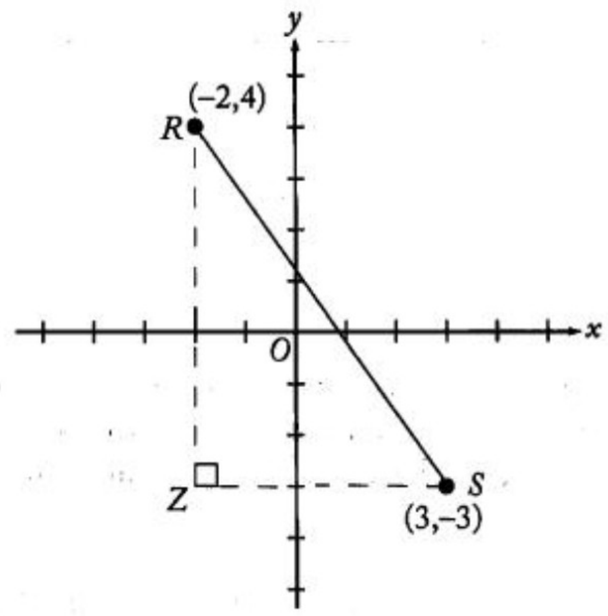
(1) Two adjacent faces of the solid have areas 15 and 24, respectively
(2) Each of two opposite faces of the solid has area 40

3.6 平面直角坐标系(Coordinate Plane)

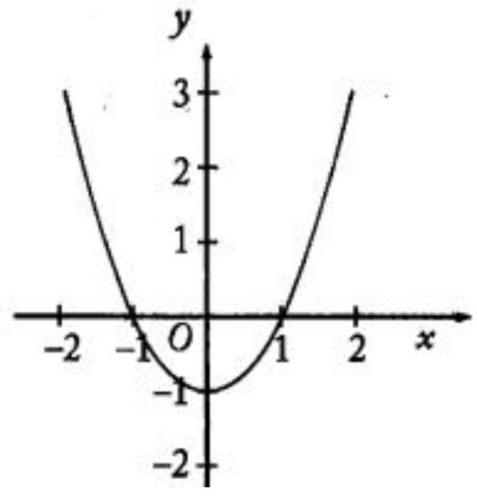
- 两条互相垂直且有公共原点的数轴组成平面直角坐标系(Rectangular Coordinates Plane)



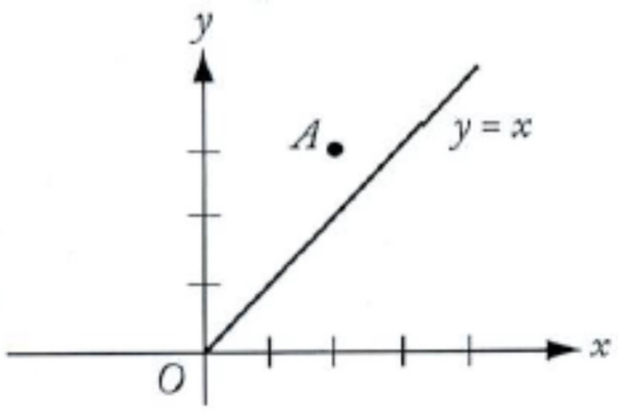
- 第一象限(Quadrant)写成Ⅰ，第二象限写成Ⅱ，第三象限写成Ⅲ，第四象限写成Ⅳ
- 坐标(a,b)关于 y=x 的对称点为(b,a)
- 坐标(a,b)关于 y=-x 的对称点为(-b,-a)
- 求两点之间的距离：勾股定理



- y=kx+b，k 为斜率(Slope)，b 为截距(Intercept)
- 两点确定一条直线，k=$\frac{y_1-y_2}{x_1-x_2}$
- 经过一三象限的直线，k>0，经过二四象限的直线，k<0，斜率的绝对值越大，直线越陡，平行于 x 轴的直线，斜率为 0
- 抛物线 (Parabola)：$y = ax^2 + bx + c,\ a \neq 0$
- a>0, 开口向上
- a<0, 开口向下
- 抛物线顶点(Vertex)坐标($-\frac{b}{2a}$, $\frac{4ac-b^2}{4a}$)，即当 x 为$-\frac{b}{2a}$时，函数达到最小/最大值



29)



In the rectangular coordinate system above, the line y = x is the 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)

30) In the xy-plane, region R consists of all the points (x,y) such that $2x + 3y < 6$. Is the point (r,s) in region R?

(1) $3r + 2s = 6$
(2) $r<3$ and $s<2$

4. 文字应用题（Word Problems)

4.1 速率问题(Rate Problems)

- $\text{Rate} = \frac{\text{Distance}}{\text{Time}}$

31) During a trip, Francine traveled x percent of the total distance at an average speed of 40 miles per hour and the rest of the distance at an average speed of 60 miles per hour. In terms of x, what was Francine's average speed for the entire trip?

(A) $\frac{180-x}{2}$

(B) $\frac{x+60}{4}$

(C) $\frac{300-x}{5}$

(D) $\frac{600}{115-x}$

(E) $\frac{12,000}{x+200}$

32) During a 40-mile trip, Marla traveled at an average speed of x miles per hour for the first y miles of the trip and at an average speed of 1.25x miles per hour for the last 40 - y miles of the trip. The time that Marla took to travel the 40 miles was what percent of the time it would have taken her if she had traveled at an average speed of x miles per hour for the entire trip?

(1) x = 48

(2) y = 20

4.2 工作问题（Work Problems)

- 只有一种考法：$\frac{1}{A}+\frac{1}{B}=\frac{1}{C}$

33) Working simultaneously at their respective constant rates, Machines A and B produce 800 nails in x hours. Working alone at its constant rate, Machine A produces 800 nails in y hours. In terms of x and y, how many hours does it take Machine B, working alone at its constant rate, to produce 800 nails?

(A) $\frac{x}{x+y}$

(B) $\frac{y}{x+y}$

(C) $\frac{xy}{x+y}$

(D) $\frac{xy}{x-y}$

(E) $\frac{xy}{y-x}$

4.3 混合问题（Mixture Problems)

- 加权平均值：
  即将各数值乘以相应的权重值，然后加总求和得到总体值，再除以总的单位数。

34) A contractor combined x tons of a gravel mixture that contained 10 percent gravel G, by weight, with y tons of a mixture that contained 2 percent gravel G, by weight, to produce z tons of a mixture that was 5 percent gravel G, by weight. What is the value of x?

(1) y = 10

(2) z = 16

4.4 利率问题（Interest Problems)

- 单利(Simple Interest)
- If $10,000 is invested at 10 percent simple annual interest, what is the balance after 2 years?
  - $10,000 + 10,000 \times 10\% \times 2 = 12,000$
- 复利(Compounded Interest)
- If $10,000 is invested at 10 percent annual interest, compounded semiannually
- What is the balance after 1year?
  - $10,000 \times (1 + \frac{10\%}{2})^2 = 11,025$
- What if compounded quarterly?
  - $10,000 \times (1 + \frac{10\%}{4})^4 = 11,038.13$
- What if compounded n times a year?
  - $10,000 \times (1 + \frac{10\%}{n})^n$

35) If money is invested at r percent interest, compounded annually, the amount of the investment will double in approximately $\frac{70}{r}$ years. If Pat's parents invested $5,000 in a long-term bond that pays 8 percent interest, compounded annually, what will be the approximate total amount of the investment 18 years later, when Pat is ready for college?

(A) $20,000

(B) $15,000

(C) $12,000

(D) $10,000

(E) $ 9,000

4.5 集合 (Sets)

- 一定范围的，确定的，可以区别的事物，当作一个整体来看待，就叫做集合(Sets)，其中各事物叫做集合的元素(Elements)
- 集合中任意两个元素都是不同的对象，如写成{1，1，2}，等同于{1，2}
- 无序性：{a,b,c}{c,b,a}是同一个集合
- 任何集合是它自身的子集(Subsets)
- 集合的分类：
  - 并集(Unions)：以属于 A 或属于 B 的元素为元素的集合称为 A 与 B 的并集，记作 A∪B(或 B∪A)，A∪B={x|x∈A,或 x∈B}
  - 交集(Intersection): 以属于 A 且属于 B 的元素为元素的集合称为 A 与 B 的交(集)，记作 A∩B(或 B∩A)，A∩B={x|x∈A,且 x∈B}
- 集合有以下性质：若 A 包含于 B，则 A∩B=A，A∪B=B
- A∪B=A+B-A∩B，如果 A,B 没有交集(Disjoint/Mutually Exclusive), A∪B=A+B，因为 A∩B=0
- A∪B∪C=A+B+C-A∩B-B∩C-A∩C+A∩B∩C

36) If 75 percent of a class answered the first question on a certain test correctly, 55 percent answered the second question on the test correctly, and 20 percent answered neither of the questions correctly, what percent answered both correctly?

(A) 10%
(B) 20%
(C) 30%
(D) 50%
(E) 65%

37)

	Favorable	Unfavorable	Not Sure
Candidate M	40	20	40
Candidate N	30	35	35

The table above shows the results of a survey of 100 voters who each responded "Favorable" or "Unfavorable" or "Not Sure" when asked about their impressions of Candidate M and of Candidate N. What was the number of voters who responded "Favorable" for both candidates?

(1) The number of voters who did not respond "Favorable" for either candidate was 40.
(2) The number of voters who responded "Unfavorable" for both candidates was 10.

4.6 组合、排列与概率（Combination, Permutation and Probability)

- 组合(Combination)是指从给定个数的元素中仅仅取出指定个数的元素，不考虑排序，$C_m^n = \frac{m!}{n!(m-n)!}$，$C_m^n = C_m^{m-n}$
- 排列(Permutation/Arrangement)是指从给定个数的元素中取出指定个数的元素进行排序，$P_m^n = \frac{m!}{(m-n)!}$
- $P_m^n = C_m^n \times P_n^n = \frac{m!}{(m-n)!}$
- $P_m^1 = C_m^1 = m$
- 概率(Probability)古典定义为：P(A)=m/n，其中 n 表示该试验中所有可能出现的基本结果的总数目，m 表示事件 A 包含的试验基本结果数
  - P(必然事件)=1
  - 0<P(可能事件)<1
  - P(不可能事件)=0
- 等可能事件概率
  - 掷一枚骰子，得到偶数的概率
    - ✓ $\frac{3}{6} = \frac{1}{2}$
- 互斥事件的概率：P(A∪B)= P(A)+P(B)
  - 一个袋子里装着标有 1,2,3,4,5 的五个小球，从中随机取两个，则其标注数字之和为 3 或 6 的概率
    - ✓ $\frac{1+2}{10} = \frac{3}{10}$
- 互斥的特例：对立事件的概率

  对立事件必然互斥，互斥事件不一定对立
  - P(A)=1-P($\bar{A}$)
- 相互独立事件同时发生的概率
  - P(AB)=P(A)×P(B)
  - 甲袋子里有 3 个白球，4 个红球，乙袋子里有 1 个白球，3 个红球，从甲乙两个袋子中各随机取出一个球，两球都是红球的概率
    - ✓ $\frac{4}{7} \times \frac{3}{4} = \frac{3}{7}$
- 独立重复事件的概率：$P_n(k) = C_n^k \times p^k(1-p)^{n-k}$
  - 甲参加任何一场乒乓球比赛获胜的概率都是 60%，循环赛共六场，甲获胜四场的概率
    - ✓ $P_6(4) = C_6^4 \times 0.6^4(1-0.6)^{6-4} = 0.62208$
  - 决赛采取“3 局 2 胜”，甲的胜率保持不变的话，甲赢得冠军的概率
    - ✓ $P=0.6^2 + 0.6 \times C_2^1 \times 0.6 \times 0.4 = 0.648$
- 加法原理和乘法原理：加法是类里的，乘法是分步的

38) Xavier, Yvonne, and Zelda each try independently to solve a problem. If their individual probabilities for success are 1/4, 1/2 and 5/8, respectively, what is the probability that Xavier and Yvonne, but not Zelda, will solve the problem?

(A) $\frac{11}{8}$

(B) $\frac{7}{8}$

(C) $\frac{9}{64}$

(D) $\frac{5}{64}$

(E) $\frac{3}{64}$

39) Terry holds 12 cards, each of which is red, white, green, or blue. If a person is to select a card randomly from the cards Terry is holding, is the probability less than $\frac{1}{2}$ that the card selected will be either red or white?

(1) The probability that the person will select a blue card is $\frac{1}{3}$.

(2) The probability that the person will select a red card is $\frac{1}{6}$.

4.7 描述统计学 (Descriptive Statistics)

- 算术平均数(Average or Arithmetic 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，如果数列含有偶数个数，取中间两个数，然后取这两个数的算术平均
- 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
- 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

$$D = \frac{1}{n}\sum_{i=1}^{n}(a_i - E)^2$$

- 标准方差(Standard Deviation)：方差的算术平方根，标准差能反映一个数据集的离散程度，平均数相同的，标准差未必相同
- 频率分布(Frequency Distribution)

40) At a certain company, a test was given to a group of men and women seeking promotions. If the average (arithmetic mean) score for the group was 80, was the average score for the women greater than 85?

(1) The average score for the men was less than 75.

(2) The group consisted of more men than women.

41) A certain bookcase has 2 shelves of books. On the upper shelf, the book with the greatest number of pages has 400 pages. On the lower shelf, the book with the least number of pages has 475 pages. What is the median number of pages for all of the books on the 2 shelves?

(1) There are 25 books on the upper shelf.

(2) There are 24 books on the lower shelf.

四. 数学知识点题目答案

1)	D	22)	C
2)	C	23)	A
3)	B	24)	A
4)	D	25)	D
5)	B	26)	D
6)	A	27)	B
7)	B	28)	C
8)	E	29)	D
9)	E	30)	E
10)	E	31)	E
11)	A	32)	B
12)	A	33)	E
13)	D	34)	D
14)	B	35)	A
15)	A	36)	D
16)	D	37)	A
17)	B	38)	E
18)	A	39)	E
19)	D	40)	C
20)	B	41)	C
21)	C		

五. Part II 练习题(共 222 题)

1. 算数 (Arithmetic)

1.1 奇数与偶数 (Odd and Even Numbers)

1. If n is an integer, which of the following must be even?
   (A) n+1
   (B) n+2
   (C) 2n
   (D) 2n+1
   (E) n^2

2. If i and j are integers, is i+j an even integer?
   (1) i< 10
   (2) i = j

3. If A and B are positive integers, is the product AB even?
   (1) The sum A + B is odd.
   (2) A is even.

4. If m is an integer, is m odd?
   (1) $\frac{m}{2}$is not an even integer.
   (2) m - 3 is an even integer.

5. If x and y are integers, is xy even?
   (1) x = y + l
   (2) $\frac{x}{y}$is an even integer.

1.2 质数、合数、因数与质因数 (Prime, Composite Numbers, Factors, and Prime Factors,)

6. A gym class can be divided into 8 teams with an equal number of players on each team or into 12 teams with an equal number of players on each team. What is the lowest possible number of students in the class?

(A) 20
(B) 24
(C) 36
(D) 48
(E) 96

7. What is the lowest positive integer that is divisible by each of the integers 1 through 7, inclusive?

(A) 420
(B) 840
(C) 1,260
(D) 2,520
(E) 5,040

8. 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

9. How many prime numbers between 1 and 100 are factors of 7,150?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

10. If n= 4p, where p is a prime number greater than 2, how many different positive even divisors does n have, including n?

(A) Two
(B) Three
(C) Four
(D) Six
(E) Eight

11. 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

1.3 整除、商和余数(Divisible, Quotient, and Remainders)

12. If n is a prime number greater than 3, what is the remainder when n^2 is divided by 12?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 5

13. At least 2/3 of the 40 members of a committee must vote in favor of a resolution for it to pass. What is the greatest number of members who could vote against the resolution and still have it pass?

(A) 19
(B) 17
(C) 16
(D) 14
(E) 13

14. Club X has more than 10 but fewer than 40 members. Sometimes the members sit at tables with 3 members at one table and 4 members at each of the other tables, and sometimes they sit at tables with 3 members at one table and 5 members at each of the other tables. If they sit at tables with 6 members at each table except one and fewer than 6 members at that one table, how many members will be at the table that has fewer than 6 members?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

15. A club collected exactly $599 from its members. If each member contributed at least $12, what is the greatest number of members the club could have?

(A) 43
(B) 44
(C) 49
(D) 50
(E) 51

16. What is the tens digit of positive integer x?

(1) x divided by 100 has a remainder of 30.
(2) x divided by 110 has a remainder of 30.

17. If r and s are positive integers, can the fraction $\frac{r}{s}$ be expressed as a decimal with only a finite number of nonzero digits?

(1) s is a factor of 100.
(2) r is a factor of 100.

1.4 比率，比例与百分数（Ratios, Proportions, and Percents)

18. A rainstorm increased the amount of water stored in State J reservoirs from 124 billion gallons to138 billion gallons. If the storm increased the amount of water in the reservoirs to 82 percent of total capacity, approximately how many billion gallons of water were the reservoirs short of total capacity prior to the storm?

    (A) 9
    (B) 14
    (C) 25
    (D) 30
    (E) 44

19. A bakery opened yesterday with its daily supply of 40 dozen rolls. Half of the rolls were sold by noon, and 80 percent of the remaining rolls were sold between noon and closing time. How many dozen rolls had not been sold when the bakery closed yesterday?

    (A) 1
    (B) 2
    (C) 3
    (D) 4
    (E) 5

20. Four staff members at a certain company worked on a project. The amounts of time that the four staff members worked on the project were in the ratio 2 to 3 to 5 to 6. If one of the four staff members worked on the project for 30 hours, which of the following CANNOT be the total number of hours that the four staff members worked on the project?

    (A) 80
    (B) 96
    (C) 160
    (D) 192
    (E) 240

21. A glass was filled with 10 ounces of water, and 0.01 ounce of the water evaporated each day during a 20-day period. What percent of the original amount of water evaporated during this period?

    (A) 0.002%
    (B) 0.02%
    (C) 0.2%
    (D) 2%
    (E) 20%

22. A glucose solution contains 15 grams of glucose per 100 cubic centimeters of solution. If 45 cubic centimeters of the solution were poured into an empty container, how many grams of glucose would be in the container?

(A) 3.00
(B) 5.00
(C) 5.50
(D) 6.50
(E) 6.75

23. On a certain day, orangeade was made by mixing a certain amount of orange juice with an equal amount of water. On the next day, orangeade was made by mixing the same amount of orange juice with twice the amount of water. On both days, all the orangeade that was made was sold. If the revenue from selling the orangeade was the same for both days and if the orangeade was sold at $0.60 per glass on the first day, what was the price per glass on the second day?

(A) $0.15
(B) $0.20
(C) $0.30
(D) $0.40
(E) $0.45

24. At a certain school, the ratio of the number of second graders to the number of fourth graders is 8 to 5, and the ratio of the number of first graders to the number of second graders is 3 to 4. If the ratio of the number of third graders to the number of fourth graders is 3 to 2, what is the ratio of the number of first graders to the number of third graders?

(A) 16 to 15
(B) 9 to 5
(C) 5 to 16
(D) 5 to 4
(E) 4 to 5

25. Yesterday's closing prices of 2,420 different stocks listed on a certain stock exchange were all different from today's closing prices. The number of stocks that closed at a higher price today than yesterday was 20 percent greater than the number that closed at a lower price. How many of the stocks closed at a higher price today than yesterday?

(A) 484
(B) 726
(C) 1,100
(D) 1,320
(E) 1,694

26. In the Johnsons' monthly budget, the dollar amounts allocated to household expenses, food, and miscellaneous items are in the ratio 5:2:1, respectively. If the total amount allocated to these three categories is $1,800, what is the amount allocated to food?

(A) $900
(B) $720
(C) $675
(D) $450
(E) $225

27. A dealer originally bought 100 identical batteries at a total cost of q dollars. If each battery was sold at 50 percent above the original cost per battery, then, in terms of q, for how many dollars was each battery sold?

(A) $\frac{3q}{200}$

(B) $\frac{3q}{2}$

(C) 150q

(D) $\frac{q}{100} + 50$

(E) $\frac{150}{q}$

28. In a certain city, 60 percent of the registered voters are Democrats and the rest are Republicans. In a mayoral race, if 75 percent of the registered voters who are Democrats and 20 percent of the registered voters who are Republicans are expected to vote for Candidate A, what percent of the registered voters are expected to vote for Candidate A?

(A) 50%
(B) 53%
(C) 54%
(D) 55%
(E) 57%

29. The present ratio of students to teachers at a certain school is 30 to 1. If the student enrollment were to increase by 50 students and the number of teachers were to increase by 5, the ratio of students to teachers would then be 25 to 1. What is the present number of teachers?

(A) 5
(B) 8
(C) 10
(D) 12
(E) 15

30. In a certain district, the ratio of the number of registered Republicans to the number of registered Democrats was $\frac{3}{5}$. After 600 additional Republicans and 500 additional Democrats registered, the ratio was $\frac{4}{5}$. After these registrations, there were how many more voters in the district registered as Democrats than as Republicans?

(A) 100
(B) 300
(C) 400
(D) 1,000
(E) 2,500

31. In Country C, the unemployment rate among construction workers dropped from 16 percent on September 1, 1992, to 9 percent on September 1, 1996. If the number of construction workers was 20 percent greater on September 1, 1996, than on September 1, 1992, what was the approximate percent change in the number of unemployed construction workers over this period?

(A) 50% decrease
(B) 30% decrease
(C) 15% decrease
(D) 30% increase
(E) 55% increase

32. A pharmaceutical company received $3 million in royalties on the first $20 million in sales of the generic equivalent of one of its products and then $9 million in royalties on the next $108 million in sales. By approximately what percent did the ratio of royalties to sales decrease from the first $20 million in sales to the next $108 million in sales?

(A) 8%
(B) 15%
(C) 45%
(D) 52%
(E) 56%

33. David has d books, which is 3 times as many as Jeff and $\frac{1}{2}$ as many as Paula. How many books do the three of them have altogether, in terms of d?

(A) $\frac{5}{6}$d
(B) $\frac{7}{3}$d
(C) $\frac{10}{3}$d
(D) $\frac{7}{2}$d
(E) $\frac{9}{2}$d

34. In Town X, 64 percent of the population are employed, and 48 percent of the population are employed males. What percent of the employed people in Town X are females?

(A) 16%
(B) 25%
(C) 32%
(D) 40%
(E) 52%

35. At a loading dock, each worker on the night crew loaded $\frac{3}{4}$ as many boxes as each worker on the day crew. If the night crew has $\frac{4}{5}$ as many workers as the day crew, what fraction of all the boxes loaded by the two crews did the day crew load?

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

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

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

(D) $\frac{4}{5}$

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

36. A tank contains 10,000 gallons of a solution that is 5 percent sodium chloride by volume. If 2,500gallons of water evaporate from the tank, the remaining solution will be approximately what percent sodium chloride?

(A) 1.25%
(B) 3.75%
(C) 6.25%
(D) 6.67%
(E) 11.7%

37. A photography dealer ordered 60 Model X cameras to be sold for $250 each, which represents a 20 percent markup over the dealer's initial cost for each camera. Of the cameras ordered, 6 were never sold and were returned to the manufacturer for a refund of 50 percent of the dealer's initial cost. What was the dealer's approximate profit or loss as a percent of the dealer's initial cost for the 60 cameras?

(A) 7% loss
(B) 13% loss
(C) 7% profit
(D) 13% profit
(E) 15% profit

38. During a certain season, a team won 80 percent of its first 100 games and 50 percent of its remaining games. If the team won 70 percent of its games for the entire season, what was the total number of games that the team played?

(A) 180
(B) 170
(C) 156
(D) 150
(E) 105

39. Thirty percent of the members of a swim club have passed the lifesaving test. Among the members who have not passed the test, 12 have taken the preparatory course and 30 have not taken the course. How many members are there in the swim club?

(A) 60
(B) 80
(C) 100
(D) 120
(E) 140

40. Last Sunday a certain store sold copies of Newspaper A for $1.00 each and copies of Newspaper B for $1.25 each, and the store sold no other newspapers that day. If r percent of the store's revenue from newspaper sales was from Newspaper A and if p percent of the newspapers that the store sold were copies of Newspaper A, which of the following expresses r in terms of p?

(A) $\frac{100p}{125-p}$

(B) $\frac{150p}{250-p}$

(C) $\frac{300p}{375-p}$

(D) $\frac{400p}{500-p}$

(E) $\frac{500p}{625-p}$

41. If 90 students auditioned for the school musical, how many were accepted?

(1) $\frac{2}{3}$ of the boys and $\frac{1}{3}$ of the girls who auditioned were accepted.

(2) 26 of the boys who auditioned were accepted.

42. A certain high school with a total enrollment of 900 students held a science fair for three days last week. How many of the students enrolled in the high school attended the science fair on all three days?

(1) Of the students enrolled in the school, 30 percent attended the science fair on two or more days.
(2) Of the students enrolled in the school, 10 percent of those that attended the science fair on at least one day attended on all three days.

43. The selling price of an article is equal to the cost of the article plus the markup. The markup on a certain television set is what percent of the selling price?

(1) The markup on the television set is 25 percent of the cost.
(2) The selling price of the television set is $250.

44. If p_1 and p_2 are the populations and r_1 and r_2 are the numbers of representatives of District 1 and District 2, respectively, the ratio of the population to the number of representatives is greater for which of the two districts?

(1) $p_1 > p_2$
(2) $r_2 > r_1$

45. Robots X, Y, and Z each assemble components at their respective constant rates. If r_x is the ratio of Robot X's constant rate to Robot Z's constant rate and r_y is the ratio of Robot Y's constant rate to Robot Z's constant rate, is Robot Z's constant rate the greatest of the three?

    (1) $r_x<r_y$

    (2) $r_y<1$

46. A clothing store acquired an item at a cost of x dollars and sold the item for y dollars. The store's gross profit from the item was what percent of its cost for the item?

    (1) y-x = 20

    (2) $\frac{y}{x}=\frac{5}{4}$

47. Guy's net income equals his gross income minus his deductions. By what percent did Guy's net income change on January 1, 1989, when both his gross income and his deductions increased?

    (1) Guy's gross income increased by 4 percent on January 1, 1989.

    (2) Guy's deductions increased by 15 percent on January 1, 1989.

48. Stores L and M each sell a certain product at a different regular price. If both stores discount their regular price of the product, is the discount price at Store M less than the discount price at Store L?

    (1) At Store L the discount price is 10 percent less than the regular price; at Store M the discount price is 15 percent less than the regular price.

    (2) At Store L the discount price is $5 less than the regular store price; at Store M the discount price is $6 less than the regular price

49. Each week a certain salesman is paid a fixed amount equal to $300, plus a commission equal to 5 percent of the amount of his sales that week over $1,000. What is the total amount the salesman was paid last week?

    (1) The total amount the salesman was paid last week is equal to 10 percent of the amount of his sales last week.

    (2) The salesman's sales last week totaled $5,000.

50. If the ratio of the number of teachers to the number of students is the same in School District M and School District P, what is the ratio of the number of students in School District M to the number of students in School District P?

    (1) There are 10,000 more students in School District M than there are in School District P.

    (2) The ratio of the number of teachers to the number of students in School District M is 1 to 20.

51. Is the number of seconds required to travel d_1 feet at r_1 feet per second greater than the number of seconds required to travel d_2 feet at r_2 feet per second?

    (1) d_1 is 30 greater than d_2.

    (2) r_1 is 30 greater than r_2.

52. Last year, if Arturo spent a total of $12,000 on his mortgage payments, real estate taxes, and home insurance, how much did he spend on his real estate taxes?

(1) Last year, the total amount that Arturo spent on his real estate taxes and home insurance was $33\frac{1}{3}$ percent of the amount that he spent on his mortgage payments.

(2) Last year, the amount that Arturo spent on his real estate taxes was 20 percent of the total amount he spent on his mortgage payments and home insurance.

53. In a certain office, 50 percent of the employees are college graduates and 60 percent of the employees are over 40 years old. If 30 percent of those over 40 have master's degrees, how many of the employees over 40 have master's degrees?

(1) Exactly 100 of the employees are college graduates.

(2) Of the employees 40 years old or less, 25 percent have master's degrees.

54. On a company-sponsored cruise, $\frac{2}{3}$ of the passengers were company employees and the remaining passengers were their guests. If $\frac{3}{4}$ of the company-employee passengers were managers, what was the number of company-employee passengers who were NOT managers?

(1) There were 690 passengers on the cruise.

(2) There were 230 passengers who were guests of the company employees.

55. The annual rent collected by a corporation from a certain building was x percent more in 1998 than in 1997 and y percent less in 1999 than in 1998. Was the annual rent collected by the corporation from the building more in 1999 than in 1997?

(1) x>y

(2) $\frac{xy}{100}$<x-y

56. The price per share of Stock X increased by 10 percent over the same time period that the price per share of Stock Y decreased by 10 percent. The reduced price per share of Stock Y was what percent of the original price per share of Stock X?

(1) The increased price per share of Stock X was equal to the original price per share of Stock Y.

(2) The increase in the price per share of Stock X was $\frac{10}{11}$ the decrease in the price per share of Stock Y.

57. The inflation index for the year 1989 relative to the year 1970 was 3.56, indicating that, on the average, for each dollar spent in 1970for goods, $3.56 had to be spent for the same goods in 1989. If the price of a Model K mixer increased precisely according to the inflation index, what was the price of the mixer in 1970?

(1) The price of the Model K mixer was $102.40 more in 1989 than in 1970.

(2) The price of the Model K mixer was $142.40 in 1989.

58. In a certain business, production index p is directly proportional to efficiency index e, which is in turn directly proportional to investment index i. What is p if i= 70?

(1) e = 0.5 whenever i = 60.

(2) p = 2.0 whenever i = 50.

59. Marcia's bucket can hold a maximum of how many liters of water?

(1) The bucket currently contains 9 liters of water.

(2) If 3 liters of water are added to the bucket when it is half full of water, the amount of water in the bucket will increase by $\frac{1}{3}$

1.5 幂与根 (Powers and Roots)

60. What is the smallest integer n for which $25^n > 5^{12}$?

(A) 6
(B) 7
(C) 8
(D) 9
(E) 10

61. If a = -0.3, which of the following is true?

(A) $a < a^2 < a^3$
(B) $a < a^3 < a^2$
(C) $a^2 < a < a^3$
(D) $a^2 < a^3 < a$
(E) $a^3 < a < a^2$

62. If $m^{-1} = -\frac{1}{3}$, then m^{-2} is equal to

(A) -9
(B) -3
(C) $-\frac{1}{9}$
(D) $\frac{1}{9}$
(E) 9

63. If x is an integer, is $x|x| < 2^x$?

(1) $x < 0$
(2) $x = -10$

64. Is 5^k less than 1,000?

(1) $5^{k+1} > 3{,}000$
(2) $5^{k-1} = 5^k - 500$

65. If n is a positive integer, is $(\frac{1}{10})^n$<0.01?

(1) n>2

(2) $(\frac{1}{10})^{n-1}$<0.1

66. Is n an integer?

(1) n^2 is an integer.

(2) $\sqrt{n}$is an integer.

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

67. What is the 25th digit to the right of the decimal point in the decimal form of$\frac{6}{11}$?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

68. If $t = \frac{1}{2^9 \times 5^3}$ is expressed as a terminating decimal, how many zeros will t have between the decimal point and the first nonzero digit to the right of the decimal point?

(A) Three
(B) Four
(C) Five
(D) Six
(E) Nine

69. If $\frac{p}{q}$<1, and p and q are positive integers, which of the following must be greater than 1?

(A) $\sqrt{\frac{p}{q}}$

(B) $\frac{p}{q^2}$

(C) $\frac{p}{2q}$

(D) $\frac{q}{p^2}$

(E) $\frac{q}{p}$

70. What is the difference between the sixth and the fifth terms of the sequence 2, 4, 7… whose nth term is $n + 2^{n-1}$?

(A) 2
(B) 3
(C) 6
(D) 16
(E) 17

71. In an electric circuit, two resistors with resistances x and y are connected in parallel. In this case, if r is the combined resistance of these two resistors, then the reciprocal of r is equal to the sum of the reciprocals of x and y. What is r in terms of x and y?

(A) xy
(B) $x + y$
(C) $\frac{1}{x+y}$
(D) $\frac{xy}{x+y}$
(E) $\frac{x+y}{xy}$

72. A straight pipe 1 yard in length was marked off in fourths and also in thirds. If the pipe was then cut into separate pieces at each of these markings, which of the following gives all the different lengths of the pieces, in fractions of a yard?

(A) $\frac{1}{6}$ and $\frac{1}{4}$ only
(B) $\frac{1}{4}$ and $\frac{1}{3}$ only
(C) $\frac{1}{6}$, $\frac{1}{4}$, and $\frac{1}{3}$
(D) $\frac{1}{12}$, $\frac{1}{6}$, and $\frac{1}{4}$
(E) $\frac{1}{12}$, $\frac{1}{6}$, and $\frac{1}{3}$

73. d = 0.43t7

If t denotes the thousandths digit in the decimal representation of d above, what digit is t?

(1) If d were rounded to the nearest hundredth, the result would be 0.44.
(2) If d were rounded to the nearest thousandth, the result would be 0.436.

74. What is the tenths digit in the decimal representation of a certain number?

(1) The number is less than $\frac{1}{3}$.
(2) The number is greater than $\frac{1}{4}$.

75. If d denotes a decimal, is d> 0.5?

(1) When d is rounded to the nearest tenth, the result is 0.5.

(2) When d is rounded to the nearest integer, the result is 1.

76. If x, y, and z are three-digit positive integers and if x = y + z, is the hundreds digit of x equal to the sum of the hundreds digits of y and z?

(1) The tens digit of x is equal to the sum of the tens digits of y and z.

(2) The units digit of x is equal to the sum of the units digits of y and z.

77. 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 rand s are positive integers and the ratio $\frac{r}{s}$ is expressed as a decimal, is $\frac{r}{s}$ a terminating decimal?

(1) 90<r<100

(2) s = 4

78. If n is a positive integer and $k= 5.1\times10^n$, what is the value of k?

(1) 6,000<k< 500,000

(2) $k^2 = 2.601\times10^9$

79. If n is a positive integer, what is the tens digit of n?

(1) The hundreds digit of 10n is 6.

(2) The tens digit of n + 1 is 7.

2. 代数（Algebra)

2.1 解方程（Equations)

80. A rope 40 feet long is cut into two pieces. If one piece is 18 feet longer than the other, what is the length, in feet, of the shorter piece?

(A) 9

(B) 11

(C) 18

(D) 22

(E) 29

81. Which of the following equations is NOT equivalent to $10y^2$ = (x + 2)(x- 2)?

(A) $30y^2 = 3x^2 - 12$

(B) $20y^2 = (2x - 4)(x + 2)$

(C) $10y^2 + 4 = x^2$

(D) $5y^2 = x^2 - 2$

(E) $y^2 = \frac{x^2-4}{10}$

82. If x = 1- 3f and y = 2t -1, then for what value of t does x = y?

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

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

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

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

(E) 0

83. If Jake loses 8 pounds, he will weigh twice as much as his sister. Together they now weigh 278 pounds. What is Jake's present weight, in pounds?

(A) 131

(B) 135

(C) 139

(D) 147

(E) 188

84. If x(2x+l)=0 and (x + $\frac{1}{2}$)(2x-3) =0, then x=

(A) -3

(B) $-\frac{1}{2}$

(C) 0

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

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

85. At his regular hourly rate, Don had estimated the labor cost of a repair job as $336 and he was paid that amount. However, the job took 4 hours longer than he had estimated and, consequently, he earned $2 per hour less than his regular hourly rate. What was the time Don had estimated for the job, in hours?

(A) 28

(B) 24

(C) 16

(D) 14

(E) 12

86. To mail a package, the rate is x cents for the first pound and y cents for each additional pound, where x > y. Two packages weighing 3 pounds and 5 pounds, respectively, can be mailed separately or combined as one package. Which method is cheaper, and how much money is saved?

(A) Combined, with a savings of x - y cents
(B) Combined, with a savings of y - x cents
(C) Combined, with a savings of x cents
(D) Separately, with a savings of x - y cents
(E) Separately, with a savings of y cents

87. In a weight-lifting competition, the total weight of Joe's two lifts was 750 pounds. If twice the weight of his first lift was 300 pounds more than the weight of his second lift, what was the weight, in pounds, of his first lift?

(A) 225
(B) 275
(C) 325
(D) 350
(E) 400

88. If $\frac{4-x}{2+x} = x$, what is the value of $x^2 + 3x - 4$?

(A) -4
(B) -1
(C) 0
(D) 1
(E) 2

89. Jack is now 14 years older than Bill. If in 10 years Jack will be twice as old as Bill, how old will Jack be in 5 years?

(A) 9
(B) 19
(C) 21
(D) 23
(E) 33

90. A positive number x is multiplied by 2, and this product is then divided by 3. If the positive square root of the result of these two operations equals x, what is the value of x?

(A) $\frac{9}{4}$
(B) $\frac{3}{2}$
(C) $\frac{4}{3}$
(D) $\frac{2}{3}$
(E) $\frac{1}{2}$

91. Lois has x dollars more than Jim has, and together they have a total of y dollars. Which of the following represents the number of dollars that Jim has?

(A) $\frac{y-x}{2}$

(B) $y-\frac{x}{2}$

(C) $\frac{y}{2}-x$

(D) $2y-x$

(E) $y-2x$

92. If $(x-l)^2 = 400$, which of the following could be the value of x-5?

(A) 15

(B) 14

(C) -24

(D) -25

(E) -26

93. A citrus fruit grower receives $15 for each crate of oranges shipped and $18 for each crate of grapefruit shipped. How many crates of oranges did the grower ship last week?

(1) Last week the number of crates of oranges that the grower shipped was 20 more than twice the number of crates of grapefruit shipped.

(2) Last week the grower received a total of $38,700 from the crates of oranges and grapefruit shipped.

94. If n+ k = m, what is the value of k?

(1) n = 10

(2) m + 10 = n

95. Is $4^{x+y} = 810$?

(1) x-y=9

(2) $\frac{y}{x}=\frac{1}{4}$

96.

	R	S	T	U
R	0	y	x	62
S	y	0	56	75
T	x	56	0	69
U	62	75	69	0

The table above shows the distance, in kilometers, by the most direct route, between any two of the four cities, R, S, T, and U. For example, the distance between City R and City U is 62 kilometers. What is the value of x?

(1) By the most direct route, the distance between S and T is twice the distance between S and R.

(2) By the most direct route, the distance between T and U is 1.5 times the distance between R and T.

97. Each gift certificate sold yesterday by a certain bookstore cost either $10 or $50. If yesterday the bookstore sold more than 5 gift certificates that cost $50 each, what was the total number of gift certificates sold yesterday by the bookstore?

(1) Yesterday the bookstore sold fewer than 10 gift certificates that cost $10 each.

(2) The total cost of gift certificates sold yesterday by the bookstore was $460.

98. At a certain picnic, each of the guests was served either a single scoop or a double scoop of ice cream. How many of the guests were served a double scoop of ice cream?

(1) At the picnic, 60 percent of the guests were served a double scoop of ice cream.

(2) A total of 120 scoops of ice cream were served to all the guests at the picnic.

99. What is the total number of coins that Bert and Claire have?

(1) Bert has 50 percent more coins than Claire.

(2) The total number of coins that Bert and Claire have is between 21 and 28.

100. Mary persuaded n friends to donate $500 each to her election campaign, and then each of these n friends persuaded n more people to donate $500 each to Mary's campaign. If no one donated more than once and if there were no other donations, what was the value of n?

(1) The first n people donated $\frac{1}{16}$ of the total amount donated.

(2) The total amount donated was $120,000.

101. At a bakery, all donuts are priced equally and all bagels are priced equally. What is the total price of 5 donuts and 3 bagels at the bakery?

(1) At the bakery, the total price of 10 donuts and 6 bagels is $12.90.

(2) At the bakery, the price of a donut is $0.15 less than the price of a bagel.

102. An employee is paid 1.5 times the regular hourly rate for each hour worked in excess of 40 hours per week, excluding Sunday, and 2 times the regular hourly rate for each hour worked on Sunday. How much was the employee paid last week?

(1) The employee's regular hourly rate is $10.

(2) Last week the employee worked a total of 54 hours but did not work more than 8 hours on any day.

103. When a player in a certain game tossed a coin a number of times, 4 more heads than tails resulted. Heads or tails resulted each time the player tossed the coin. How many times did heads result?

(1) The player tossed the coin 24 times.

(2) The player received 3 points each time heads resulted and 1 point each time tails resulted, for a total of 52 points.

104. What was the total amount of revenue that a theater received from the sale of 400 tickets, some of which were sold at x percent of full price and the rest of which were sold at full price?

(1) x = 50

(2) Full-price tickets sold for $20 each.

105. What amount did Jean earn from the commission on her sales in the first half of 1988?

(1) In 1988 Jean's commission was 5 percent of the total amount of her sales.

(2) The amount of Jean's sales in the second half of 1988 averaged $10,000 per month more than in the first half.

106. If Sara's age is exactly twice Bill's age, what is Sara's age?

(1) Four years ago, Sara's age was exactly 3 times Bill's age.

(2) Eight years from now, Sara's age will be exactly 1.5 times Bill's age.

107. Every member of a certain club volunteers to contribute equally to the purchase of a $60 gift certificate. How many members does the club have?

(1) Each member's contribution is to be $4.

(2) If 5 club members fail to contribute, the share of each contributing member will increase by $2.

108. What is the value of $\frac{2t+t-x}{t-x}$?

(1) $\frac{2t}{t-x}$

(2) t-x = 5

2.2 不等式 (Inequalities)

109. The positive integer n is divisible by 25. If $\sqrt{n}$ is greater than 25, which of the following could be the value of $\frac{n}{25}$?

(A) 22

(B) 23

(C) 24

(D) 25

(E) 26

110. Which of the following describes all values of x for which $1 - x^2 \geq 0$?

(A) $x \geq 1$
(B) $x \leq -1$
(C) $0 \leq x \leq 1$
(D) $x \leq -1$ or $x \geq 1$
(E) $-1 \leq x \leq 1$

111. How many of the integers that satisfy the inequality $\frac{(x+2)(x+3)}{x-2} \geq 0$, are less than 5?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

112. The weights of all dishes of type X are exactly the same, and the weights of all dishes of type Yare exactly the same. Is the weight of 1 dish of type X less than the weight of 1 dish of type Y?

(1) The total weight of 3 dishes of type X and 2 dishes of type Y is less than the total weight of 2 dishes of type X and 4 dishes of type Y.
(2) The total weight of 4 dishes of type X and 3 dishes of type Y is less than the total weight of 3 dishes of type X and 4 dishes of type Y.

113. If x and y are positive, is x < 10 < y?

(1) x < y and xy = 100
(2) $x^2 < 100 < y^2$

114. If r>0 and s>0, is $\frac{r}{s} < \frac{s}{r}$?

(1) $\frac{r}{3s} < \frac{1}{4}$
(2) s=r+4

115. If x and y are integers, is x > y?

(1) x + y>0
(2) $y^x<0$

116. If x is negative, is x <-3?

(1) $x^2>9$
(2) $x^3<-9$

117. Material A costs $3 per kilogram, and Material B costs $5 per kilogram. If 10 kilograms of Material K consists of x kilograms of Material A and y kilograms of Material B, is x>y?

(1) y>4
(2) The cost of the 10 kilograms of Material K is less than $40.

118. Last year, a certain company began manufacturing product X and sold every unit of product X that it produced. Last year the company's total expenses for manufacturing product X were equal to $100,000 plus 5 percent of the company's total revenue from all units of product X sold. If the company made a profit on product X last year, did the company sell more than 21,000 units of product X last year?

(1) The company's total revenue from the sale of product X last year was greater than $110,000.

(2) For each unit of product X sold last year, the company's revenue was $5.

119. If n and k are positive integers, is $\sqrt{n+k} > 2\sqrt{n}$?

(1) k >3n

(2) n + k >3n

2.3 绝对值 (Absolute Values)

120. If $|y - \frac{1}{2}| < \frac{11}{2}$, which of the following could be a value of y?

(A) -11

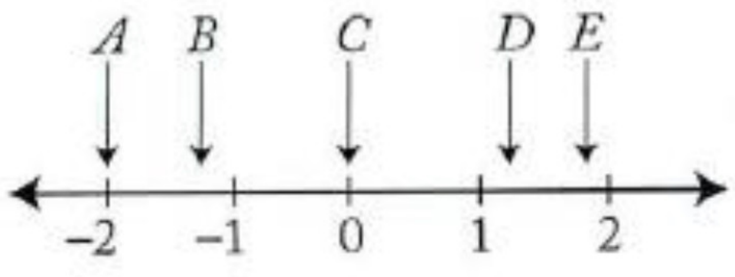
(B) $-\frac{11}{2}$

(C) $\frac{11}{2}$

(D) 11

(E) 22

121.



Of the five coordinates associated with points A, B, C, D, and E on the number line above, which has the greatest absolute value?

(A) A

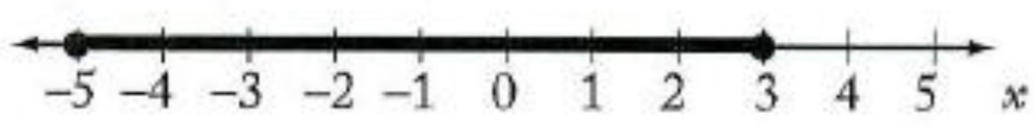
(B) B

(C) C

(D) D

(E) E

122.



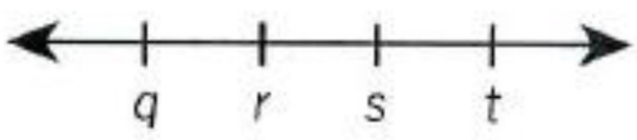
Which of the following inequalities is an algebraic expression for the shaded part of the number line above?

(A) |x|<3
(B) |x|<5
(C) |x-2|<3
(D) |x-l|<4
(E) |x+l|<4

123. What is the value of |x|?

(1) x = -|x|
(2) $x^2 = 4$

124.



Of the four numbers represented on the number line above, is r closest to zero?

(1) q = -s
(2) -t<q

2.4 数列（Sequences）

125. In an increasing sequence of 10 consecutive integers, the sum of the first 5 integers is 560. What is the sum of the last 5 integers in the sequence?

(A) 585
(B) 580
(C) 575
(D) 570
(E) 565

126. p, r, s, t, u

An arithmetic sequence is a sequence in which each term after the first is equal to the sum of the preceding term and a constant. If the list of letters shown above is an arithmetic sequence, which of the following must also be an arithmetic sequence?

I. 2p, 2r, 2s, 2t, 2u

II. p-3, r-3, s-3, t-3, u-3

III. p^2, r^2, s^2, t^2, u^2

(A) I only

(B) II only

(C) III only

(D) I and II

(E) II and III

127. In a certain sequence, the term x_n is given by the formula $x_n=2x_{n-1}-\frac{1}{2}(x_{n-2})$ for all $n \geq 2$. If x_0 =3and x_1 = 2, what is the value of x_3?

(A) 2.5

(B) 3.125

(C) 4

(D) 5

(E) 6.75

128. The number of seats in the first row of an auditorium is 18 and the number of seats in each row thereafter is 2 more than in the previous row. What is the total number of seats in the rows of the auditorium?

(1) The number of rows of seats in the auditorium is 27.

(2) The number of seats in the last row is 70.

129. If the sequence S has 300 terms, what is the 293rd term of S?

(1) The 298th term of S is -616, and each term of S after the first is 2 less than the preceding term.

(2) The first term of S is -22.

130. The profit from the sale of a certain appliance increases, though not proportionally, with the number of units sold. Did the profit exceed $4 million on sales of 380,000 units?

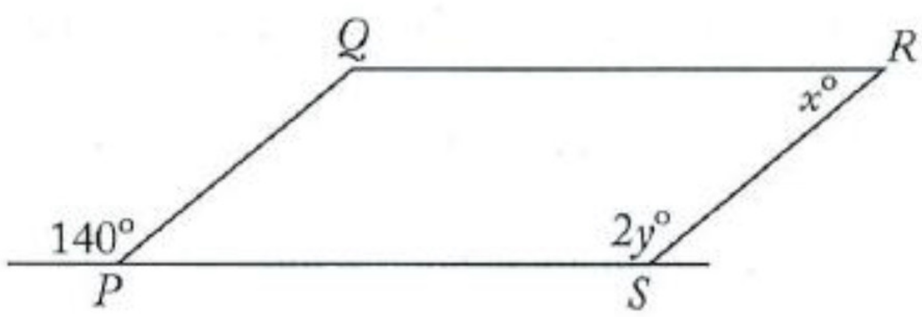
(1) The profit exceeded $2 million on sales of 200,000 units.

(2) The profit exceeded $5 million on sales of 350,000 units.

3. 几何(Geometry)

3.1 直线和角（ Lines and Angles)

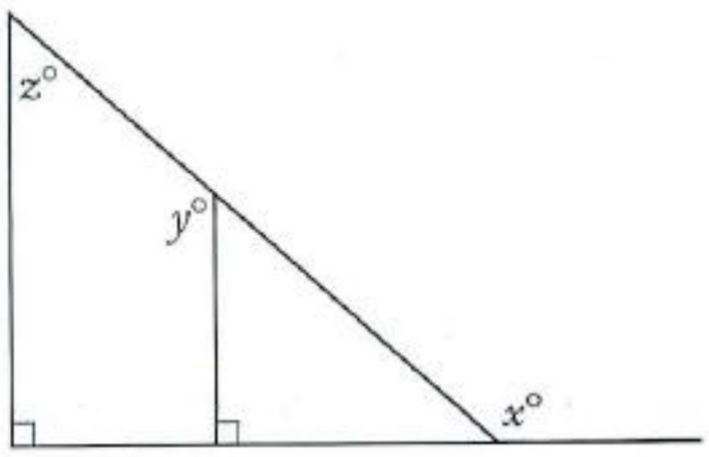
131.



In the figure above, if PQRS is a parallelogram, then y-x=

(A) 30
(B) 35
(C) 40
(D) 70
(E) 100

132.



In the figure above, if z = 50, then x+ y=

(A) 230
(B) 250
(C) 260
(D) 270
(E) 290

133. A certain expressway has Exits J, K, L, and M, in that order. What is the road distance from Exit K to Exit L?

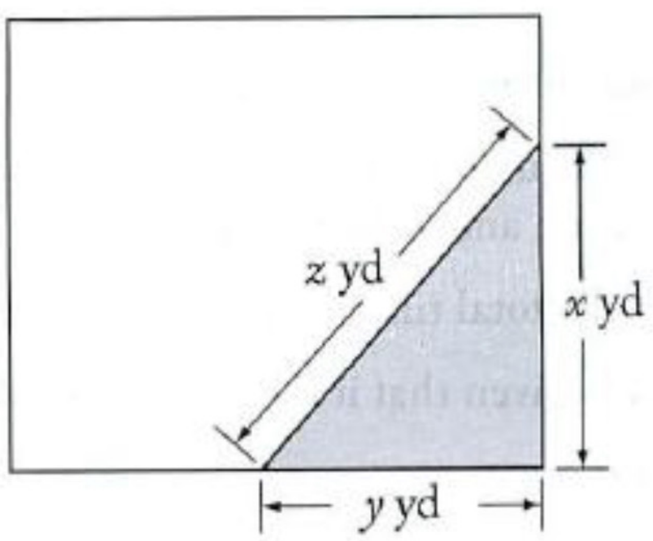
(1) The road distance from Exit J to Exit L is 21 kilometers.
(2) The road distance from Exit K to Exit M is 26 kilometers.

3.2 三角形（Triangles)

134. A ladder of a fire truck is elevated to an angle of 60° and extended to a length of 70 feet. If the base of the ladder is 7 feet above the ground, how many feet above the ground does the ladder reach?

(A) 35
(B) 42
(C) $35\sqrt{3}$
(D) $7+35\sqrt{3}$
(E) $7+42\sqrt{3}$

135.



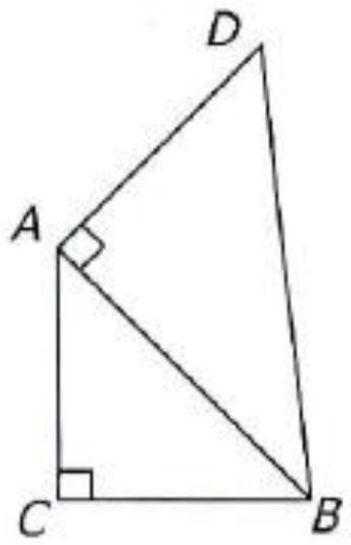
The shaded portion of the rectangular lot shown above represents a flower bed. If the area of the bed is 24 square yards and x = y + 2, then z equals

(A) $\sqrt{3}$
(B) $2\sqrt{3}$
(C) 6
(D) 8
(E) 10

136. In ΔPQR, if PQ=x, QR=x+2, and PR=y, which of the three angles of ΔPQR has the greatest degree measure?

(1) y=x+3
(2) x=2

137.



In the figure above, is the area of triangular region ABC equal to the area of triangular region DBA?

(1) $(AC)^2 = 2(AD)^2$

(2) ΔABC is isosceles.

138. In triangle ABC, point X is the midpoint of side AC and point Y is the midpoint of side BC. If point R is the midpoint of line segment XC and if point S is the midpoint of line segment YC, what is the area of triangular region RCS?

(1) The area of triangular region ABX is 32.

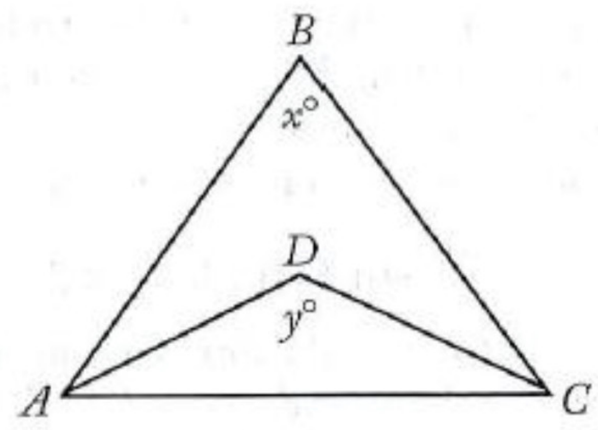
(2) The length of one of the altitudes of triangle ABC is 8.

139. The hypotenuse of a right triangle is 10 cm. What is the perimeter, in centimeters, of the triangle?

(1) The area of the triangle is 25 square centimeters.

(2) The 2 legs of the triangle are of equal length.

140.



In the figure above, what is the value of x+ y?

(1) x = 70

(2) ΔABC and ΔADC are both isosceles triangles.

3.3 四边形与多边形（Quadrilaterals and Polygons)

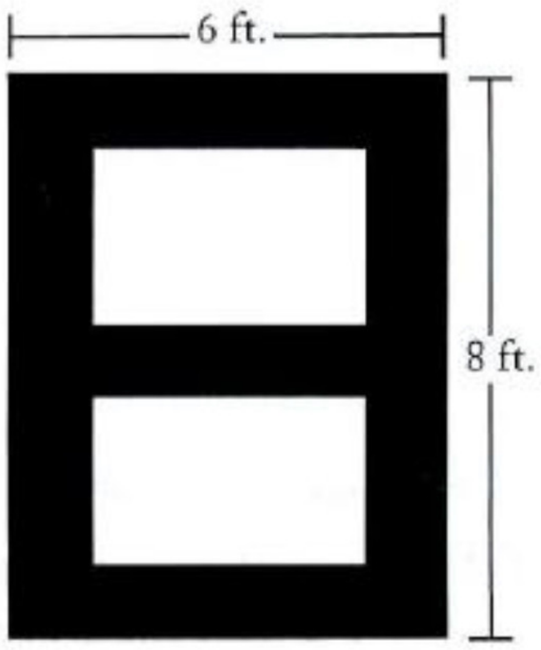
141. A rectangular garden is to be twice as long as it is wide. If 360 yards of fencing, including the gate, will completely enclose the garden, what will be the length of the garden, in yards?

(A) 120
(B) 140
(C) 160
(D) 180
(E) 200

142. If a square mirror has a 20-inch diagonal, what is the approximate perimeter of the mirror, in inches?

(A) 40
(B) 60
(C) 80
(D) 100
(E) 120

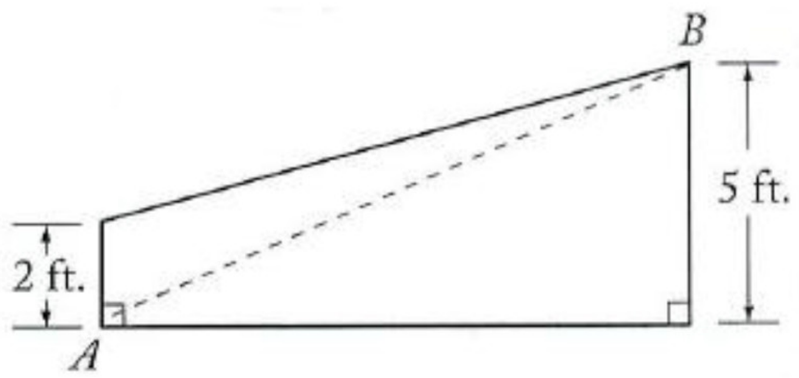
143.



The front of a 6-foot-by-8-foot rectangular door has brass rectangular trim, as indicated by the shading in the figure above. If the trim is uniformly 1 foot wide, what fraction of the door's front surface is covered by the trim?

(A) $\frac{13}{48}$
(B) $\frac{5}{12}$
(C) $\frac{1}{2}$
(D) $\frac{7}{12}$
(E) $\frac{5}{8}$

144.



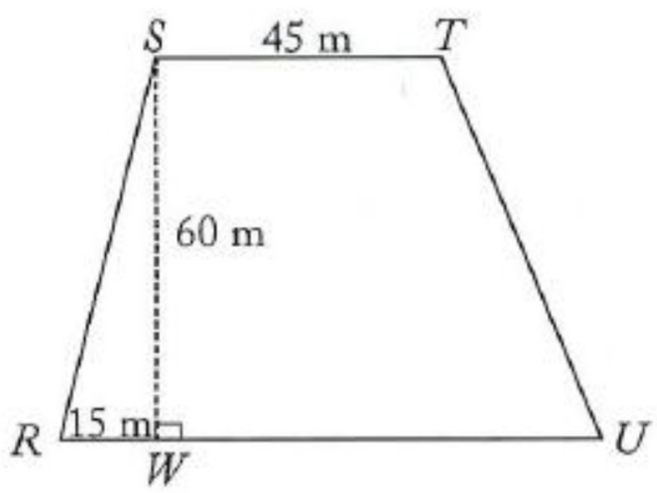
The trapezoid shown in the figure above represents a cross section of the rudder of a ship. If the distance from A to B is 13 feet, what is the area of the cross section of the rudder in square feet?

(A) 39
(B) 40
(C) 42
(D) 45
(E) 46.5

145. Can a certain rectangular sheet of glass be positioned on a rectangular tabletop so that it covers the entire tabletop and its edges are parallel to the edges of the tabletop?

(1) The tabletop is 36 inches wide by 60 inches long.
(2) The area of one side of the sheet of glass is 2,400 square inches.

146.

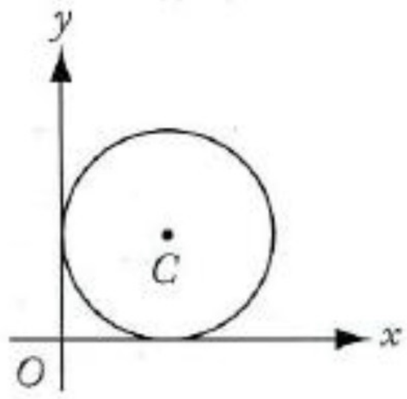


Quadrilateral RSTU shown above is a site plan for a parking lot in which side RU is parallel to side ST and RU is longer than ST. What is the area of the parking lot?

(1) RU= 80 meters
(2) TU = $20\sqrt{10}$ meters

3.4 圆 (Circles)

147.



The circle with center C shown above is tangent to both axes. If the distance from 0 to C is equal to k, what is the radius of the circle, in terms of k?

(A) k

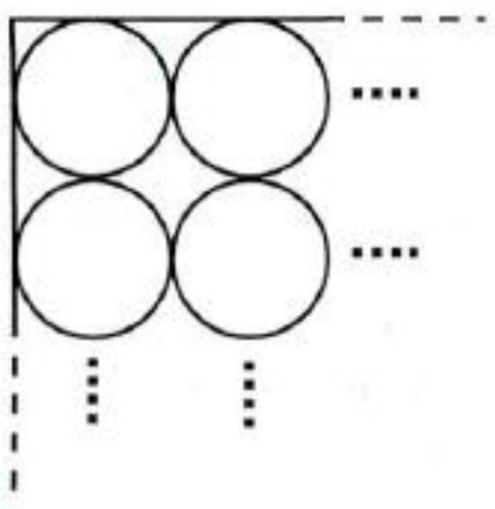
(B) $\frac{k}{\sqrt{2}}$

(C) $\frac{k}{\sqrt{3}}$

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

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

148.



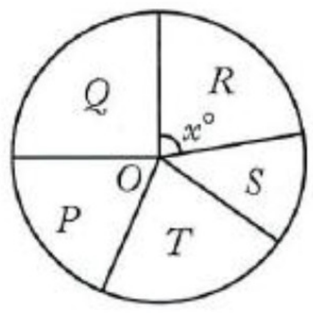
The inside of a rectangular carton is 48 centimeters long, 32 centimeters wide, and 15 centimeters high. The carton is filled to capacity with k identical cylindrical cans of fruit that stand upright in rows and columns, as indicated in the figure above. If the cans are 15 centimeters high, what is the value of k?

(1) Each of the cans has a radius of 4 centimeters.

(2) Six of the cans fit exactly along the length of the carton.

149.

TOTAL EXPENSES FOR THE
FIVE DIVISIONS OF COMPANY H



The figure above represents a circle graph of Company H's total expenses broken down by the expenses for each of its five divisions. If 0 is the center of the circle and if Company H's total expenses are $5,400,000, what are the expenses for Division R?

(1) x = 94

(2) The total expenses for Divisions S and T are twice as much as the expenses for Division R.

150. The length of the edging that surrounds circular garden K is $\frac{1}{2}$ the length of the edging that surrounds circular garden G.

What is the area of garden K? (Assume that the edging has negligible width.)

(1) The area of G is 25π square meters.

(2) The edging around G is 10π meters long.

3.5 长方体与圆柱体 (Rectangular Solids and Cylinders)

151. A carpenter constructed a rectangular sandbox with a capacity of 10 cubic feet. If the carpenter were to make a similar sandbox twice as long, twice as wide, and twice as high as the first sandbox, what would be the capacity, in cubic feet, of the second sandbox?

(A) 20

(B) 40

(C) 60

(D) 80

(E) 100

152. A rectangular box is 10 inches wide, 10 inches long, and 5 inches high. What is the greatest possible (straight-line) distance, in inches, between any two points on the box?

(A) 15

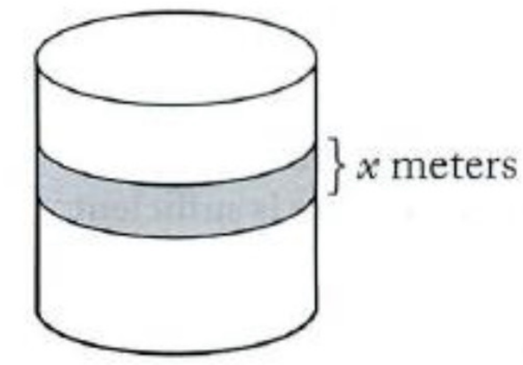
(B) 20

(C) 25

(D) $10\sqrt{2}$

(E) $10\sqrt{3}$

153.



A circular tub has a band painted around its circumference, as shown above. What is the surface area of this painted band?

(1) x = 0.5

(2) The height of the tub is 1 meter.

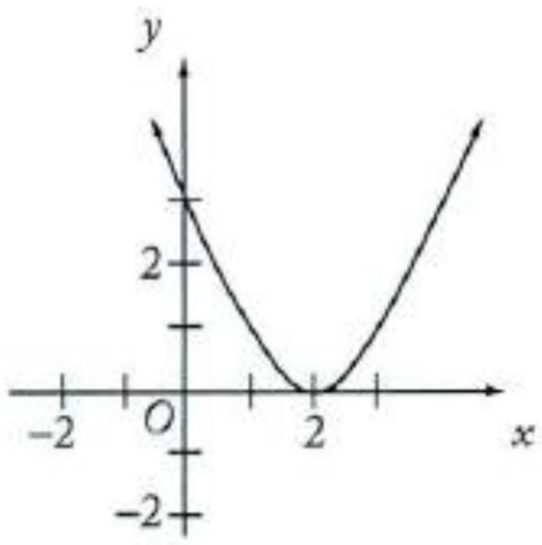
154. What is the number of cans that can be packed in a certain carton?

(1) The interior volume of this carton is 2,304 cubic inches.

(2) The exterior of each can is 6 inches high and has a diameter of 4 inches.

3.6 平面直角坐标系（Coordinate Plane)

155.



On the graph above, when x=1/2, y=2; and when x= 1, y = 1. The graph is symmetric with respect to the vertical line at x = 2. According to the graph, when x = 3, y =

(A) -1

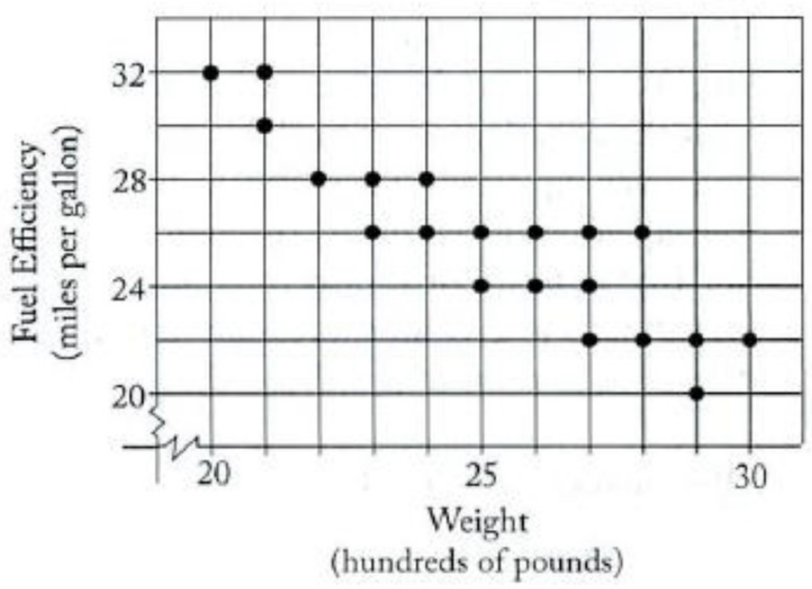
(B) $-\frac{1}{2}$

(C) 0

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

(E) 1

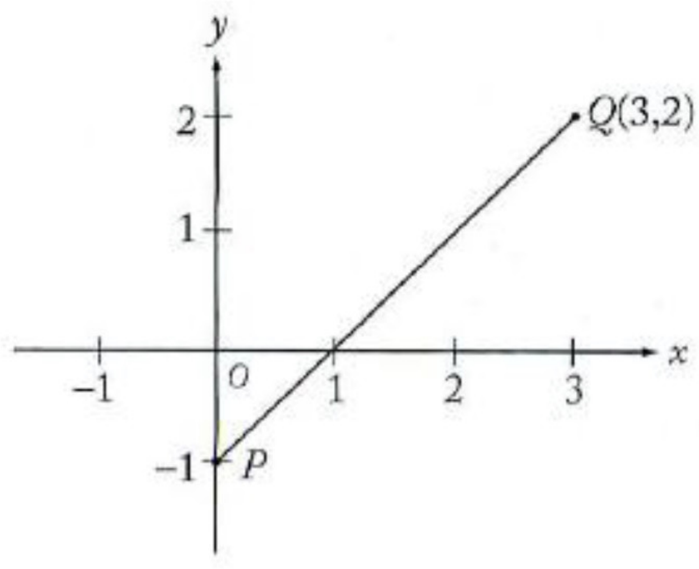
156.



The dots on the graph above indicate the weights and fuel efficiency ratings for 20 cars. How many of the cars weigh more than 2,500 pounds and also get more than 22 miles per gallon?

(A) 3
(B) 5
(C) 8
(D) 10
(E) 11

157.



In the figure above, the point on segment PQ that is twice as far from P as from Q is

(A) (3, 1)
(B) (2, 1)
(C) (2,-1)
(D) (1.5, 0.5)
(E) (1, 0)

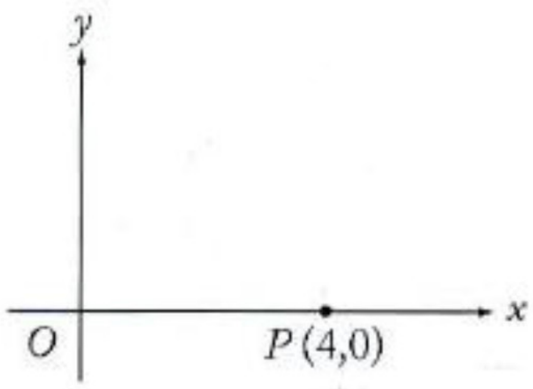
158. In the coordinate plane, a circle has center (2,-3) and passes through the point (5, 0). What is the area of the circle?

(A) 3π
(B) $3\sqrt{2}\pi$
(C) $3\sqrt{3}\pi$
(D) 9π
(E) 18π

159. An object thrown directly upward is at a height of h feet after t seconds, where $h = -16(t-3)^2 + 150$. At what height, in feet, is the object 2 seconds after it reaches its maximum height?

(A) 6
(B) 86
(C) 134
(D) 150
(E) 166

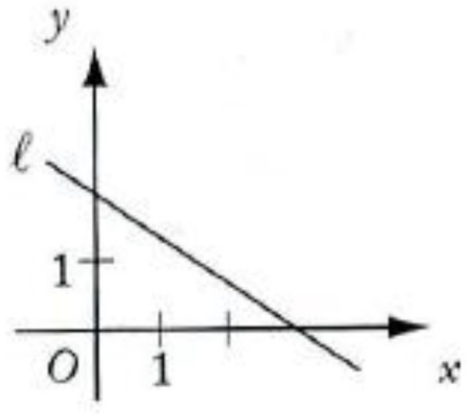
160.



In the rectangular coordinate system above, if point R (not shown) lies on the positive y-axis and the area of triangle ORP is 12, what is the y-coordinate of point R?

(A) 3
(B) 6
(C) 9
(D) 12
(E) 24

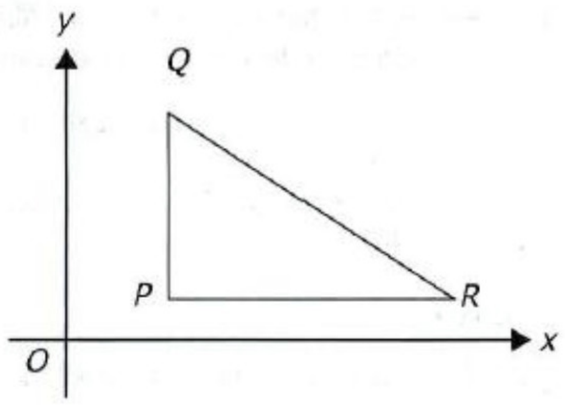
161.



In the coordinate system above, which of the following is the equation of line l?

(A) 2x-3y = 6
(B) 2x+ 3y= 6
(C) 3x+ 2y= 6
(D) 2x-3y = -6
(E) 3x-2y = -6

162.



In the xy-plane above, is angle QPR a right angle?

(1) Points P and Q have the same x-coordinate.

(2) Points P and R have the same y-coordinate.

163. In the xy-coordinate plane, is point R equidistant from points (-3,-3) and (1,-3)?

(1) The x-coordinate of point R is -1.

(2) Point R lies on the line y = -3.

4. 文字应用题（Word Problems)

4.1 速率问题（Rate Problems)

164. Running at the same constant rate, 6 identical machines can produce a total of 270 bottles per minute. At this rate, how many bottles could 10 such machines produce in 4 minutes?

(A) 648

(B) 1,800

(C) 2,700

(D) 10,800

(E) 64,800

165. Car X averages 25.0 miles per gallon of gasoline and Car Y averages 11.9 miles per gallon. If each car is driven 12,000 miles, approximately how many more gallons of gasoline will Car Y use than Car X?

(A) 320

(B) 480

(C) 520

(D) 730

(E) 920

166. After driving to a riverfront parking lot, Bob plans to run south along the river, turn around, and return to the parking lot, running north along the same path. After running 3.25 miles south, he decides to run for only 50 minutes more. If Bob runs at a constant rate of 8 minutes per mile, how many miles farther south can he run and still be able to return to the parking lot in 50 minutes?

(A) 1.5
(B) 2.25
(C) 3.0
(D) 3.25
(E) 4.75

167. Machine A produces bolts at a uniform rate of 120 every 40 seconds, and Machine B produces bolts at a uniform rate of 100 every 20 seconds. If the two machines run simultaneously, how many seconds will it take for them to produce a total of 200 bolts?

(A) 22
(B) 25
(C) 28
(D) 32
(E) 56

168. In order to complete a reading assignment on time, Terry planned to read 90 pages per day. However, she read only 75 pages per day at first, leaving 690 pages to be read during the last 6 days before the assignment was to be completed. How many days in all did Terry have to complete the assignment on time?

(A) 15
(B) 16
(C) 25
(D) 40
(E) 46

169. Car A is 20 miles behind Car B, which is traveling in the same direction along the same route as Car A. Car A is traveling at a constant speed of 58 miles per hour and Car B is traveling at a constant speed of 50 miles per hour. How many hours will it take for Car A to overtake and drive 8 miles ahead of Car B?

(A) 1.5
(B) 2.0
(C) 2.5
(D) 3.0
(E) 3.5

170. Water is pumped into a partially filled tank at a constant rate through an inlet pipe. At the same time, water is pumped out of the tank at a constant rate through an outlet pipe. At what rate, in gallons per minute, is the amount of water in the tank increasing?

(1) The amount of water initially in the tank is 200 gallons.
(2) Water is pumped into the tank at a rate of 10 gallons per minute and out of the tank at a rate of 10 gallons every $2\frac{1}{2}$ minutes.

171. If Car X followed Car Y across a certain bridge that is $\frac{1}{2}$ mile long, how many seconds did it take Car X to travel across the bridge?

(1) Car X drove onto the bridge exactly 3 seconds after Car Y drove onto the bridge and drove off the bridge exactly 2 seconds after Car Y drove off the bridge.

(2) Car Y traveled across the bridge at a constant speed of 30 miles per hour.

172. Carmen currently works 30 hours per week at her part-time job. If her gross hourly wage were to increase by $1.50, how many fewer hours could she work per week and still earn the same gross weekly pay as before the increase?

(1) Her gross weekly pay is currently $225.00.

(2) An increase of $1.50 would represent an increase of 20 percent of her current gross hourly wage.

173. A taxi company charges f cents for the first mile of the taxi ride and m cents for each additional mile. How much does the company charge for a 10-mile taxi ride?

(1) The company charges $0.90 for a 2-mile ride.

(2) The company charges $1.20 for a 4-mile ride.

174. While on a straight road, Car X and Car Y are traveling at different constant rates. If Car X is now 1 mile ahead of Car Y, how many minutes from now will Car X be 2 miles ahead of Car Y?

(1) Car X is traveling at 50 miles per hour and Car Y is traveling at 40 miles per hour.

(2) Three minutes ago Car X was $\frac{1}{2}$ mile ahead of Car Y.

175. If a certain animated cartoon consists of a total of 17,280 frames on film, how many minutes will it take to run the cartoon?

(1) The cartoon runs without interruption at the rate of 24 frames per second.

(2) It takes 6 times as long to run the cartoon as it takes to rewind the film, and it takes a total of 14 minutes to do both.

176. At what speed was a train traveling on a trip when it had completed half of the total distance of the trip?

(1) The trip was 460 miles long and took 4 hours to complete.

(2) The train traveled at an average rate of 115 miles per hour on the trip

177. Machines X and Y produced identical bottles at different constant rates. Machine X, operating alone for 4 hours, filled part of a production lot; then Machine Y, operating alone for 3 hours, filled the rest of this lot. How many hours would it have taken Machine X operating alone to fill the entire production lot?

(1) Machine X produced 30 bottles per minute.

(2) Machine X produced twice as many bottles in 4 hours as Machine Y produced in 3 hours.

4.2 工作问题（Work Problems)

178. The water from one outlet, flowing at a constant rate, can fill a swimming pool in 9 hours. The water from a second outlet, flowing at a constant rate, can fill the same pool in 5 hours. If both outlets are used at the same time, approximately what is the number of hours required to fill the pool?

(A) 0.22
(B) 0.31
(C) 2.50
(D) 3.21
(E) 4.56

179. It would take one machine 4 hours to complete a large production order and another machine 3 hours to complete the same order. How many hours would it take both machines, working simultaneously at their respective constant rates, to complete the order?

(A) $\frac{7}{12}$
(B) $1\frac{1}{2}$
(C) $1\frac{5}{7}$
(D) $3\frac{1}{2}$
(E) 7

4.3 混合问题（Mixture Problems)

180. On Monday, a person mailed 8 packages weighing an average (arithmetic mean) of $12\frac{3}{8}$pounds, and on Tuesday, 4 packages weighing an average of $15\frac{1}{4}$ pounds. What was the average weight, in pounds, of all the packages the person mailed on both days?

(A) $13\frac{1}{3}$
(B) $13\frac{13}{16}$
(C) $15\frac{1}{2}$
(D) $15\frac{15}{16}$
(E) $16\frac{1}{2}$

181. A certain fruit stand sold apples for $0.70 each and bananas for $0.50 each. If a customer purchased both apples and bananas from the stand for a total of $6.30, what total number of apples and bananas did the customer purchase?

(A) 10
(B) 11
(C) 12
(D) 13
(E) 14

182. In a small snack shop, the average (arithmetic mean) was $400 per day over a 10-day period. During this period, if the average daily revenue was $360 for the first 6 days, what was the average daily revenue for the last 4 days?

(A) $420
(B) $440
(C) $450
(D) $460
(E) $480

4.4 利率问题（Interest Problems)

183. Lucy invested $10,000 in a new mutual fund account exactly three years ago. The value of the account increased by 10 percent during the first year, increased by 5 percent during the second year, and decreased by 10 percent during the third year. What is the value of the account today?

(A) $10,350
(B) $10,395
(C) $10,500
(D) $11,500
(E) $12,705

184. Leona bought a 1-year, $10,000 certificate of deposit that paid interest at an annual rate of 8 percent compounded semiannually. What was the total amount of interest paid on this certificate at maturity?

(A) $10,464
(B) $ 864
(C) $ 816
(D) $ 800
(E) $ 480

185. For which type of investment, J or K, is the annual rate of return greater?

(1) Type J returns $115 per $1,000 invested for any one-year period and type K returns $300 per $2,500 invested for any one-year period.
(2) The annual rate of return for an investment of type K is 12 percent.

186. On a certain date, Hannah invested $5,000 at x percent simple annual interest and a different amount at y percent simple annual interest. What amount did Hannah invest at y percent simple annual interest?

(1) The total amount of interest earned by Hannah's two investments in one year was $900.

(2) Hannah invested the $5,000 at 6 percent simple annual interest.

187. A total of $60,000 was invested for one year. Part of this amount earned simple annual interest at the rate of x percent per year, and the rest earned simple annual interest at the rate of y percent per year. If the total interest earned by the $60,000 for that year was $4,080, what is the value of x?

(1) $x = \frac{3y}{4}$

(2) The ratio of the amount that earned interest at the rate of x percent per year to the amount that earned interest at the rate of y percent per year was 3 to 2.

4.5 集合 (Sets)

188. Of the 50 researchers in a workgroup, 40 percent will be assigned to Team A and the remaining 60 percent to Team B. However, 70 percent of the researchers prefer Team A and 30 percent prefer Team B. What is the lowest possible number of researchers who willNOT be assigned to the team they prefer?

(A) 15

(B) 17

(C) 20

(D) 25

(E) 30

189. Of the 300 subjects who participated in an experiment using virtual-reality therapy to reduce their fear of heights, 40 percent experienced sweaty palms, 30 percent experienced vomiting, and 75 percent experienced dizziness. If all of the subjects experienced at least one of these effects and 35 percent of the subjects experienced exactly two of these effects, how many of the subjects experienced only one of these effects?

(A) 105

(B) 125

(C) 130

(D) 180

(E) 195

190. Of 30 applicants for a job, 14 had at least 4 years' experience, 18 had degrees, and 3 had less than 4 years' experience and did not have a degree. How many of the applicants had at least 4 years' experience and a degree?

(A) 14

(B) 13

(C) 9

(D) 7

(E) 5

191. In College X the number of students enrolled in both a chemistry course and a biology course is how much less than the number of students enrolled in neither?

(1) In College X there are 60 students enrolled in a chemistry course.

(2) In College X there are 85 students enrolled in a biology course.

192. How many people are directors of both Company K and Company R?

(1) There were 17 directors present at a joint meeting of the directors of Company K and Company R, and no directors were absent.

(2) Company K has 12 directors and Company R has 8 directors.

193. In a survey of 200 college graduates, 30 percent said they had received student loans during their college careers, and 40 percent said they had received scholarships. What percent of those surveyed said that they had received neither student loans nor scholarships during their college careers?

(1) 25 percent of those surveyed said that they had received scholarships but no loans.

(2) 50 percent of those surveyed who said that they had received loans also said that they had received scholarships.

194. A number of people each wrote down one of the first 30 positive integers. Were any of the integers written down by more than one of the people?

(1) The number of people who wrote down an integer was greater than 40.

(2) The number of people who wrote down an integer was less than 70.

195. Is the number of members of Club X greater than the number of members of Club Y?

(1) Of the members of Club X, 20 percent are also members of Club Y.

(2) Of the members of Club Y, 30 percent are also members of Club X

196. How many of the 60 cars sold last month by a certain dealer had neither power windows nor a stereo?

(1) Of the 60 cars sold, 20 had a stereo but not power windows.

(2) Of the 60 cars sold, 30 had both power windows and a stereo.

197. In Jefferson School, 300 students study French or Spanish or both. If 100 of these students do not study French, how many of these students study both French and Spanish?

(1) Of the 300 students, 60 do not study Spanish.

(2) A total of 240 of the students study Spanish.

4.6 组合、排列与概率 (Combination, Permutation and Probability)

198. Raffle tickets numbered consecutively from 101 through 350 are placed in a box. What is the probability that a ticket selected at random will have a number with a hundreds digit of 2?

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

(B) $\frac{2}{7}$

(C) $\frac{33}{83}$

(D) $\frac{99}{250}$

(E) $\frac{100}{249}$

199.

$A = \{2, 3, 4, 5\}$
$B = \{4, 5, 6, 7, 8\}$

Two integers will be randomly selected from the sets above, one integer from set A and one integer from set B. What is the probability that the sum of the two integers will equal 9?

(A) 0.15
(B) 0.20
(C) 0.25
(D) 0.30
(E) 0.33

200. Sixty percent of the members of a study group are women, and 45 percent of those women are lawyers. If one member of the study group is to be selected at random, what is the probability that the member selected is a woman lawyer?

(A) 0.10
(B) 0.15
(C) 0.27
(D) 0.33
(E) 0.45

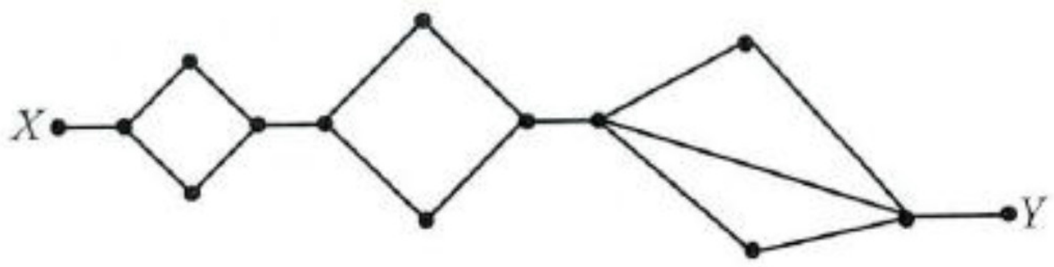
201.

	City A	City B	City C	City D	City E
City A		•	•	•	•
City B			•	•	•
City C				•	•
City D					•
City E					

Each • in the mileage table above represents an entry indicating the distance between a pair of the five cities. If the table were extended to represent the distances between all pairs of 30 cities and each distance were to be represented by only one entry, how many entries would the table then have?

(A) 60
(B) 435
(C) 450
(D) 465
(E) 900

202.



The diagram above shows the various paths along which a mouse can travel from point X, where it is released, to point Y, where it is rewarded with a food pellet. How many different paths from X to Y can the mouse take if it goes directly from X to Y without retracing any point along a path?

(A) 6
(B) 7
(C) 12
(D) 14
(E) 17

203. The probability is $\frac{1}{2}$ that a certain coin will turn up heads on any given toss. If the coin is to be tossed three times, what is the probability that on at least one of the tosses the coin will turn up tails?

(A) $\frac{1}{8}$

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

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

(D) $\frac{7}{8}$

(E) $\frac{15}{16}$

204. A box contains only red chips, white chips, and blue chips. If a chip is randomly selected from the box, what is the probability that the chip will be either white or blue?

(1) The probability that the chip will be blue is $\frac{1}{5}$.

(2) The probability that the chip will be red is $\frac{1}{3}$.

4.7 描述统计学 (Descriptive Statistics)

205. The numbers of cars sold at a certain dealership on six of the last seven business days were 4, 7, 2, 8, 3, and 6, respectively. If the number of cars sold on the seventh business day was either 2, 4, or 5, for which of the three values does the average (arithmetic mean) number of cars sold per business day for the seven business days equal the median number of cars sold per day for the seven days?

I. 2

II. 4

III. 5

(A) II only

(B) III only

(C) I and II only

(D) II and III only

(E) I, II, and III

206. If m is the average (arithmetic mean) of the first 10 positive multiples of 5 and if M is the median of the first 10 positive multiples of 5, what is the value of M - m?

(A) -5

(B) 0

(C) 5

(D) 25

(E) 27.5

207. If Q is an odd number and the median of Q consecutive integers is 120, what is the largest of these integers?

(A) $\frac{Q-1}{2}+120$

(B) $\frac{Q}{2}+119$

(C) $\frac{Q}{2}+120$

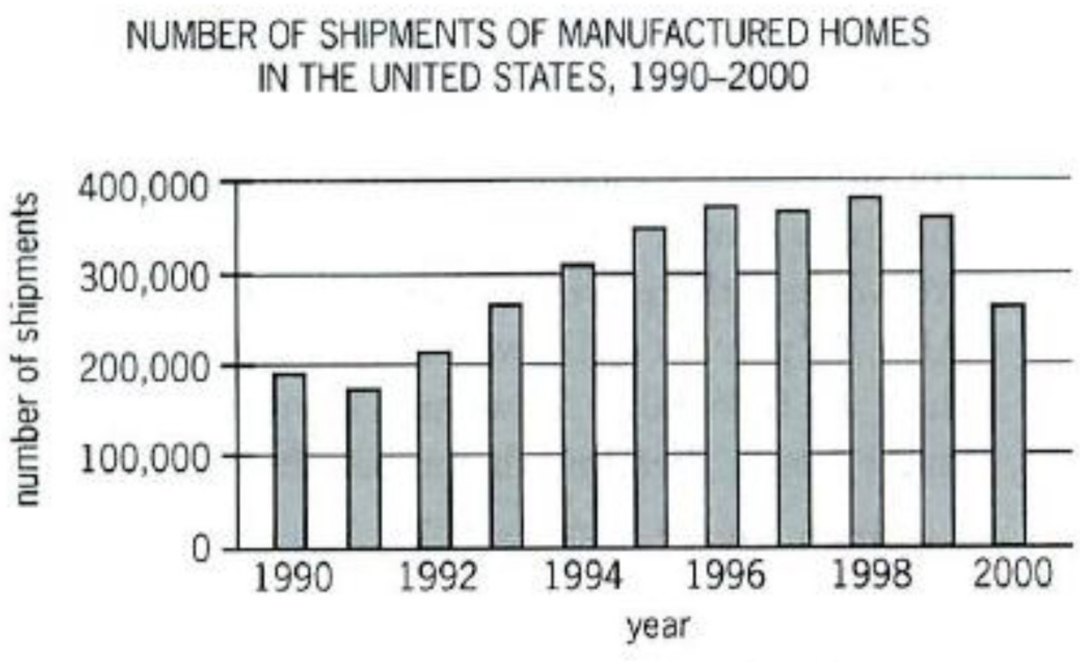
(D) $\frac{Q+119}{2}$

(E) $\frac{Q+120}{2}$

208. 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

209.



According to the chart shown, which of the following is closest to the median annual number of shipments of manufactured homes in the United States for the years from 1990 to 2000, inclusive?

(A) 250,000
(B) 280,000
(C) 310,000
(D) 325,000
(E) 340,000

210. A certain characteristic in a large population has a distribution that is symmetric about the mean m. If 68 percent of the distribution lies within one standard deviation d of the mean, what percent of the distribution is less than m + d?

(A) 16%
(B) 32%
(C) 48%
(D) 84%
(E) 92%

211. n, 15, 12, 9, 20

What is the value of n in the list above?

(1) n>12
(2) The median of the numbers in the list is 13.

212. A scientist recorded the number of eggs in each of 10 birds' nests. What was the standard deviation of the numbers of eggs in the 10 nests?

(1) The average (arithmetic mean) number of eggs for the 10 nests was 4.
(2) Each of the 10 nests contained the same number of eggs.

213. At a certain company, a test was given to a group of men and women seeking promotions. If the average (arithmetic mean) score for the group was 80, was the average score for the women greater than 85?

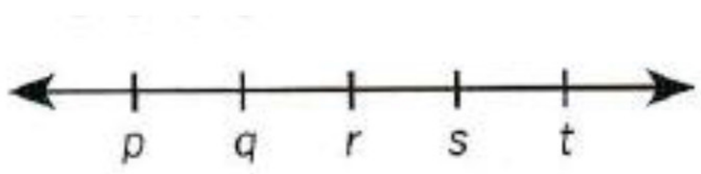
(1) The average score for the men was less than 75.
(2) The group consisted of more men than women.

214. k, n, 12, 6, 17

What is the value of n in the list above?

(1) k<n
(2) The median of the numbers in the list is 10.

215.



On the number line above, p, q, r, s, and t are five consecutive even integers in increasing order. What is the average (arithmetic mean) of these five integers?

(1) q + s = 24
(2) The average (arithmetic mean) of q and r is 11.

216. 4, 6, 8, 10, 12, 14, 16, 18, 20, 22

List M (not shown) consists of 8 different integers, each of which is in the list shown. What is the standard deviation of the numbers in list M?

(1) The average (arithmetic mean) of the numbers in list M is equal to the average of the numbers in the list shown.
(2) List M does not contain 22.

217. Tom, Jane, and Sue each purchased a new house. The average (arithmetic mean) price of the three houses was $120,000. What was the median price of the three houses?

(1) The price of Tom's house was $110,000.

(2) The price of Jane's house was $120,000.

218. During a 6-day local trade show, the least number of people registered in a single day was 80. Was the average (arithmetic mean) number of people registered per day for the 6 days greater than 90?

(1) For the 4 days with the greatest number of people registered, the average (arithmetic mean) number registered per day was 100.

(2) For the 3 days with the smallest number of people registered, the average (arithmetic mean) number registered per day was 85.

219. What is the median number of employees assigned per project for the projects at Company Z?

(1) 25 percent of the projects at Company Z have 4 or more employees assigned to each project.

(2) 35 percent of the projects at Company Z have 2 or fewer employees assigned to each project.

220. Are all of the numbers in a certain list of 15 numbers equal?

(1) The sum of all the numbers in the list is 60.

(2) The sum of any 3 numbers in the list is 12.

221. If the average (arithmetic mean) of six numbers is 75, how many of the numbers are equal to 75?

(1) None of the six numbers is less than 75.

(2) None of the six numbers is greater than 75.

222. A report consisting of 2,600 words is divided into 23 paragraphs. A2-paragraph preface is then added to the report. Is the average (arithmetic mean) number of words per paragraph for all 25 paragraphs less than 120?

(1) Each paragraph of the preface has more than 100 words.

(2) Each paragraph of the preface has fewer than 150 words.

六. Part II 练习题答案

1	C	31	B	61	B	91	A
2	B	32	C	62	D	92	C
3	D	33	C	63	D	93	C
4	B	34	B	64	B	94	B
5	D	35	E	65	D	95	C
6	B	36	D	66	B	96	B
7	A	37	D	67	C	97	E
8	E	38	D	68	B	98	C
9	D	39	A	69	E	99	C
10	C	40	D	70	E	100	D
11	D	41	C	71	D	101	A
12	B	42	E	72	D	102	E
13	E	43	A	73	B	103	D
14	E	44	C	74	E	104	E
15	C	45	C	75	B	105	E
16	A	46	B	76	A	106	D
17	A	47	E	77	B	107	D
18	E	48	C	78	D	108	A
19	D	49	D	79	A	109	E
20	D	50	E	80	B	110	E
21	D	51	E	81	D	111	D
22	E	52	B	82	D	112	B
23	D	53	A	83	E	113	D
24	E	54	D	84	B	114	D
25	D	55	B	85	B	115	C
26	D	56	D	86	A	116	A
27	A	57	D	87	D	117	B
28	B	58	B	88	C	118	B
29	E	59	B	89	D	119	A
30	B	60	B	90	D	120	C

121	A	151	D	181	B	211	B
122	E	152	A	182	D	212	B
123	B	153	E	183	B	213	C
124	A	154	E	184	C	214	C
125	A	155	E	185	A	215	D
126	D	156	B	186	E	216	C
127	C	157	B	187	C	217	B
128	D	158	E	188	A	218	A
129	A	159	B	189	D	219	C
130	B	160	B	190	E	220	B
131	A	161	B	191	E	221	D
132	D	162	C	192	C	222	B
133	E	163	A	193	D		
134	D	164	B	194	A		
135	E	165	C	195	C		
136	A	166	A	196	E		
137	C	167	B	197	D		
138	A	168	B	198	A		
139	D	169	E	199	B		
140	E	170	B	200	C		
141	A	171	C	201	B		
142	B	172	D	202	C		
143	D	173	C	203	D		
144	C	174	D	204	B		
145	E	175	D	205	B		
146	D	176	E	206	B		
147	B	177	B	207	A		
148	D	178	D	208	B		
149	A	179	C	209	C		
150	D	180	A	210	D		

七. 数学词汇

1. Arithmetic 算数

Integer 整数
Positive Integer/Number 正数
Negative Integer/Number 负数
Odd Integer/Number 奇数
Even Integer/Number 偶数
Consecutive Number 连续整数
Real/Rational Number 实数,有理数
Irrational Number 无理数
Composite Number 合数
Prime Number 质数
Inverse/Reciprocal 倒数
Add/Plus 加
Subtract/Minus 减
Multiply/Times 乘
Product 积
Divide 除
Divisible 可被整除的
Divided Evenly 被整除
Dividend 被除数，红利
Factorial 阶乘
Power 乘方
Divisor/Factor 除数、因子
Greatest Common Divisor (GCD) 最大公约数
Multiple 倍数
Quotient 商
Remainder 余数
Respectively 分别的
Fraction 分数
Numerator 分子
Denominator 分母
Common Denominator 公分母
Quarter 四分之一
Equivalent 相等的
Mixed Number 带分数
Decimal 小数
Terminating Decimal 有限小数
Infinite Decimal 无穷小数
Recurring Decimal 循环小数
Units Digit 个位数
Tens Digit 十位数
Decimal Point 小数点
Tenth 十分位数,小数点后第一位
Hundredth 百分位数,小数点后第两位
Thousandth 千分位数,小数点后第三位
Ordinary /Decimal Scale 十进制
Round to/off ,to the Nearest 四舍五入
Scientific Notation 科学计数法
Exponent 指数
Number Line 数轴
Absolute Value 绝对值
Percent 百分数
Ratio 比率
Proportion 比例
Cross Multiply 交叉相乘
Roots 开放
Square 平方
Cube 立方
Cube Root 三次根号
Numerical Data 数据

2. Algebra 代数

Equation 方程
Quadratic Equation 二次方程
Equivalent Equation 同解/等价方程
Linear Equation 线性方程
Coefficient 系数
Inequity 不等式
≠ Not Equal to 不等于
> Greater Than 大于
≥ Greater Than or Equal to 大于等于
< Less Than 小于
≤ Less Than or Equal to 小于等于

Absolute Value 绝对值
Functions 函数
Constant 常数
Variable 变量
Inverse Function 反函数
Complementary Function 余函数
Factorization 因式分解
Solution 解
Arithmetic Progression(Sequence) 等差数列
Geometric Progression(Sequence) 等比数列
Term 序列中的项

3. Geometry 几何

Plane Geometry 平面几何
Plane 平面
Line Segment 线段
Parallel Lines 平行线
Midpoint 中点
Endpoint 端点
Alternate Angle 内错角
Corresponding Angle 同位角
Vertical Angle 对顶角
Supplementary Angles 补角
Complementary Angle 余角
Adjacent Angle 邻角
Right Angle 直角
Straight Angle 平角
Included Angle 夹角
Degree 角度
Central Angle 圆心角
Interior Angle 内角
Exterior Angle 外角
Acute Angle 锐角
Obtuse Angle 钝角

Trigonometry 三角学
Equilateral Triangle 等边三角形
Scalene Triangle 不等边三角形
Isosceles Triangle 等腰三角形
Right Triangle 直角三角形
Oblique 斜三角形
Inscribed Triangle 内接三角形
Arm 直角三角形的股
Hypotenuse 斜边
Included Side 夹边
Pythagorean Theorem 勾股定理
Leg 三角形的直角边
Median(三角形的)中线
Side 边
Base 底边
Altitude 高
Opposite 直角三角形中的对边
Vertex (复数形式 Vertices) 顶点
Quadrilateral 四边形
Pentagon 五边形
Hexagon 六边形

Heptagon 七边形
Octagon 八边形
Nonagon 九边形
Decagon 十边形
Polygon 多边形
Parallelogram 平行四边形
Square 正方形，平方
Rectangle 长方形
Rhombus 菱形
Trapezoid 梯形
Equilateral 等边形
Regular Polygon 正多边形
Concentric Circles 同心圆
Rectangular Solid 长方体
Regular Solid/Polyhedron 正多面体
Circular Cylinder 圆柱体
Cone 圆锥
Sphere 球体
Solid 立体的
Bisect 平分
Tangent 切线的
Circumscribe 外切
Inscribe 内切
Intersect 相交
Perpendicular 垂直
Congruent 全等的
Multilateral 多边的
Circumference, Perimeter 周长

Diameter 直径
Radius 半径
Chord 弦
Arc 弧
Semicircle 半圆
Radian 弧度
Center of A Circle 圆心
Segment of A Circle 弧形
Angle Bisector 角平分线
Diagonal 对角线
Cube 立方体，立方数
Face Of A Solid 立体的面
Edge 棱
Volume 体积
Surface Area 表面积
Cross Section 横截面
Complex Plane 复平面
Coordinate System 坐标系
Rectangular Coordinate 直角坐标系
Origin 原点
Abscissa 横坐标
Ordinate 纵坐标
Number Line 数轴
Quadrant 象限
Slope 斜率
Transversal 截线
Intercept 截距

4. Word Problems 文字应用题

Depreciation 折旧
Down Payment 直接付款
Discount 打折
Denote 表示
Margin /Profit 利润
Interest 利息
Dividend 红利

Simple Interest 单利
Compounded Interest 复利
Increase / Decrease to 增加/减少到
Increase /Decrease by 增加/减少了
List Price 标价
Markup 涨价
Retail Price 零售价

Per Capita 每人
Cent 美分
Penny 一美分硬币
Nickel 5 美分硬币
Dime 一角硬币
Dozen 打(12 个)
Score 廿 (20 个)
Centigrade 摄氏
Fahrenheit 华氏
Quart 夸脱
Gallon 加仑 (1 Gallon = 4 Quart)
Yard 码
Inch 英寸
Foot 英尺
Set 集合
Element 集合里面的元素
Subset 子集
Union 并集
Intersection 交集
Disjoint/Mutually Exclusive 没有交集
Inclusive 包含序列的首末项
Exclusive 不包含序列的首末项
Venn Diagram 维恩图
Permutation 序列、排列
Combination 组合
Independent Event 独立事件
Arithmetic Mean 算术平均值
Weighted Average 加权平均值
Mode 众数
Median 中位数
Range 区间/范围
Variance 方差
Standard Deviation 标准差
Numerical Data 数据
Spread Out/ Disperse 分散、分布
Frequency Distribution 频率分布，多用柱状图表