Mathematics is not just solving X.
It's also figuring out whY.

姓名：

微臣 GRE 数学 600 题 使用说明

本资料题目源自 GRE Official Guide、过往 GRE 考试题目、针对知识点讲解的改编题目，以及最新的 2019 年-2020 年 GRE 考试题目。

第一章精选 200 题，作为 GRE 数学 ONE PASS 班上课使用的内容，是针对六大专题：算术、代数、几何、数据分析、应用题与图表题、陷阱题与解题技巧的最典型的题目，难度等级为 3-5。建议同学们在结课后至少再做一遍这部分练习。

第二章综合练习 300 题，包括基础练习和进阶练习（真 • 170）两部分。

- 基础练习 130 题来自 Official Guide，难度等级为 1-3，用于熟悉知识点并巩固基础，入班测试成绩小于 8 分的同学必做，8 分及以上的同学选做。
- 进阶练习部分（真 • 170），用于在考前巩固解题思路和技巧，难度等级为 2-5，建议从考前两周开始每天做 10-15 题，保持做题的“题感”。一共 170 题，冲刺 170 分。

第三章补充真题 100 题，题目均选自 2019 年-2020 年 GRE 考试，用于考试前的查缺补漏。本套题目把相似的题型放到一起，为的是让同学们在做的过程中思考同一类型题目的解题特点。我们做真题的目的不是背住答案，而是学会题目背后传递的方法。**【获取该部分的解析，请在“微臣留美”公众号回复“新 100 题解析”】**

本资料中，数量比较题（比较 Quantity A 和 Quantity B）的选项如下：

A. Quantity A is greater.

B. Quantity B is greater.

C. The two quantities are equal.

D. The relationship cannot be determined from the information given.

最后建议同学们不要仅仅为了把 600 题做完就一天狂刷 100 多道。做每道题要保证效果，思考题目中有哪些知识点和技巧。有线下 325 班的同学说，课上听懂的题目，隔两周不复习，当时跳进去的坑现在还会往里跳。对于数学题而言，做过的题目，尤其是精讲过的题目重做的意义，比盲目做新题的意义要大得多。所以在时间有限的前提下，优先重做上课讲过的精选 200 题。

目录

第一章. 精选 200 题

第一节. 算术

1. If x and y are integers, and$w = (x^2)y + x + 3y$, which of the following statements must be true? **Indicate all such statements.**

   A. If w is even, then x must be even.
   B. If x is odd, then w must be odd.
   C. If y is odd, then w must be odd.
   D. If w is odd, then y must be odd.

2. If x is an odd negative integer and y is an even integer, which of the following statements must be true?

   I. $(3x - 2y)$ is odd
   II. xy^2 is an even negative integer
   III. (y^2-x) is an odd negative integer

   A. I only B. II only C. I and II D I and III E. II and III

3. If $a^2 + b^2 = c^2$, and a, b, c are all integers. Which of the following CANNOT be the value of $a + b + c$?

   A. 2 B. 1 C. -2 D. 4 E. 6

4. x and y are prime numbers and $x+y=18$

Quantity A	**Quantity B**
xy	70

5. n is an odd integer between 2 and 10, and n is not a prime number.

Quantity A	**Quantity B**
n	9

6.

Quantity A	**Quantity B**
The number of prime numbers divisible by 13	The number of prime numbers divisible by 2

7. If n is any prime number greater than 2, which of the following CANNOT be a prime number?

A. $n-4$ B. $n-3$ C. $n-1$ D $n+2$ E. $n+5$

8. If p and n are prime numbers, $p-n=4$, and $\frac{3}{2}<\frac{P}{n}<2$, what is the value of p?

9.

Quantity A	**Quantity B**
The number of different prime factors of 500	The number of different prime factors of 360.

10. If $1 \leq n \leq 100$, and $\frac{n+7}{2}$ is a multiple of 4 but not a multiple of 3, then which of the following could be true? **Indicate all such statements.**

A. n is even B. n is odd C. n is prime D. n is a multiple of 3

E. n is a multiple of 4

11. n is an even integer.

Quantity A	**Quantity B**
The number of prime factors of n	The number of prime factors of n/2

12. What is the least positive integer that is not a factor of 25! and is not a prime number?
A. 26 B. 28 C. 36 D.56 E. 58

13. How many integers from 1 to 900 inclusive have exactly 3 positive divisors?
A. 10 B. 14 C. 15 D. 29 E. 30

14. If n= $2\times3\times5\times7\times11\times13\times17$, then which of the following statements must be true?

I. $n^2$is divisible by 600
II. n+19 is divisible by 19
III. $\frac{n+4}{2}$ is even

A. I only B. II only C. III only D. I and III E. None of the above

15. If n and m are positive integers and m is a factor of 2^6, what is the greatest possible number of integers that can be equal to both 3n and 2^6/m?
A. Zero B. One C. Three D. Four E. Six

16. How many positive integers less than 100 have a remainder of 2 when divided by 13?

A. 6 B. 7 C. 8 D. 9 E. 10

17. When the positive integer x is divided by 42, the remainder is 19. What is the remainder when x is divided by 7?

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

18. n is a positive integer.

Quantity A	**Quantity B**
The remainder when 3^{4n} is divided by 10	1

19. When the even integer n is divided by 7, the remainder is 3.

Quantity A	**Quantity B**
The remainder when n is divided by 14.	10

20. s, t, and u are integers, and $10 \leq s < t < u \leq 20$

Quantity A	**Quantity B**
$s + \frac{t}{u}$	11

21. Compute the sum of the numerator and the denominator of the simplest fraction of the repeating decimal 0.63636363...

22.

Quantity A	**Quantity B**
27^{-8}	81^{-6}

23. If $\frac{1}{(2^{11})(5^{17})}$ is expressed as a terminating decimal, how many nonzero digits will the decimal have?
A. One B. Two C. Four D. Six E. Eleven

24. What's the nearest value of $\frac{0.888888^{27}\times 0.333333^{6}}{0.592592^{20}\times 0.444444}$?
A. 4.5 B. 5.0 C. 6.3 D. 10.2 E. 8.4

25. x is an integer greater than 1.

Quantity A	**Quantity B**
3^{x+1}	4^{x}

26. n is an integer.

Quantity A	Quantity B
$(-1)^n(-1)^{n+2}$	1

27. If n is an integer, what is the least possible value of $3^n+(3)(3^{-n})$

A. 1 B. 2 C. 3 D. $3\frac{1}{3}$ E. 4

28. If a, b, x, and y are positive integers, and$13^a \times 13^b = (13^x)^y=13^{13}$, what is the average (arithmetic mean) of a, b, x, and y?

29. Which of the following are equal to $(\frac{1}{560})^{-4}$? **Indicate all correct answers.**

A. $\frac{560^5-560^4}{559}$ B. $\frac{560^{-8}}{560^2}$ C. $70^4 \cdot \left(\frac{1}{8}\right)^{-4}$ D.$(560^{16})^{0.5}$

30. What is the remainder when 3^{283} is divided by 5?

A. 0 B. 1 C. 2 D.3 E. 4

31. n and k are positive even integers.

Quantity A	**Quantity B**
The remainder when k^2+n is divided by 2	The remainder when k^n is divided by 2

32. Find the remainder when $3192^{2109}-3159^{2109}$ is divided by 11.

33.

Quantity A	**Quantity B**
The two-digit integer that equals twice the sum of its digits	16

34. If 2, 4, 6, 9 are the digits of two 2-digit integers, what is the least possible positive difference between the integers?

A. 28 B. 27 C. 17 D.13 E. 9

35. 690,□70

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

A. 2 B. 3 C. 4 D.5 E. 7

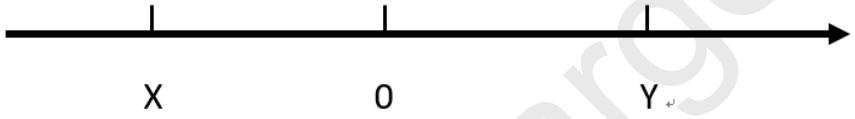
36. If 10^{50}-74 is written as an integer in base decimal notation, what is the sum of the digits in that integer?

A. 424 B. 434 C. 440 D.449 E. 467

37. 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

38.



If x and y are numbers on the number line above, which of the following statements must be true?
Note: Figure not drawn to scale

I. $|x + y| < y$

II. $x + y < 0$

III. $xy < 0$

A. I only B. III only C. I and II D. I and III E. II and III

39. $s = |t - 2|$

Quantity A	**Quantity B**
$s + 2$	$\|t\|$

40. If $|z| \leq 1$, which of the following statements must be true? Indicate all such statements.

A. $z^2 \leq 1$ B. $z^2 \leq z$ C. $z^3 \leq z$

第二节. 应用题与图表题

RESULTS OF A USED-CAR AUCTION

	Small Cars	Large Cars
Number of cars offered	32	23
Number of cars sold	16	20
Projected sales total for cars offered (in thousands)	$70	$150
Actual sales total (in thousands)	$41	$120

1. For the large cars sold at an auction that is summarized in the table above, what was the average sale price per car?

2. What is the cost, in cents, of using a certain fax machine to send n pages of a report if the total cost for sending the first k pages is r cents and the cost for sending each additional page is s cents? (Assume that $n > k$.)

   A. $r + s(n - k)$ B. $r + s(n + k)$ C. $r \cdot s(n - k)$ D. $kr + s(n - k)$ E. $kr + ns$

3. On a highway there is an electric pole every 96 feet. If the poles are numbered consecutively, what is the number of the pole 2 miles past pole number 56? (1 mile =5,280 feet)

   A. 109 B. 110 C. 152 D. 165 E. 166

4. A historian asserts that at the beginning of 1852, the population of a certain mining town was 16,000. The historian also asserts that for each of the years from 1849 through 1853, the town's population at the beginning of the year was twice that of the preceding year. According to the historian, what was the range of the town's populations at the beginning of each year from 1848 through 1853?
   A. 14,000 B. 15,000 C. 28,000 D. 30,000 E. 31,000

5. There are a total of 20 dogs and cats at a kennel. If the ratio of the number of dogs to the number of cats at the kennel is 3 to 2, how many cats are at a kennel?

6. A certain bag contains red balls, green balls, and blue balls and no other balls. The ratio of the number of red balls to the number of blue balls is 2:3, and the ratio of the number of blue balls to the number of green balls is 4:3. The number of blue balls in the bag is what fraction of the total number of balls in the bag?

   A. 3/8 B. 12/29 C. 7/13 D. 15/23 E. 12/17

7. One month Mary used 1/6 of her monthly salary for a car payment and 1/4 more than the car payment for rent. What fraction of her monthly salary did Mary use that month for the car payment and rent combined?

   A. $\frac{5}{24}$ B. $\frac{3}{8}$ C. $\frac{5}{12}$ D. $\frac{1}{2}$ E. $\frac{7}{12}$

8. Tuk weighs 60 percent more than Kim, Lee weighs 50 percent less than Tuk, and Pat weighs 25 percent more than Lee. If Pat weighs 126 pounds, what is Kim's weight?

9. A pianist agreed to perform one concert at a fee 12.5 percent less than her usual fee and a second concert at a fee 20 percent greater than the first fee. The fee for the second concert was what percent greater than her usual fee?

   A. 5% B. 7.5% C. 15% D. 16.25% E. 32.5%

10. From 2011 to 2012, Jack's annual salary increased by 10 percent and Arnie's annual salary decreased by 5 percent. If their annual salaries were equal in 2012, then Arnie's annual salary in 2011 was what percent greater than Jack's annual salary in 2011? **Give your answer to the nearest 0.1 percent.**

11. For each of the last 5 years, the population of a colony of beetles increased by 8 percent of the preceding year's population. If P represents the current population of the colony, which of the following best represents the population 5 years ago, in terms of P?

A. $5(1.08P^{-1})$ B. $(1.08^{-5})\,P^{-1}$ C. $(1.08P)^{-5}$ D. $(1.08)^{-5}P$ E. $(1.08)^{-5}(P)^{5}$

12. By weight, liquid A makes up 8 percent of solution R and 18 percent of solution S. If 3 grams of solution R are mixed with 7 grams of solution S, then liquid A accounts for what percent of the weight of the resulting solution?

A. 10% B. 13% C. 15% D. 19% E. 26%

13. A certain money market account that had a balance of $48,000 during all of last month earned $360 in interest for the month. At what simple annual interest rate did the account earn interest last month?

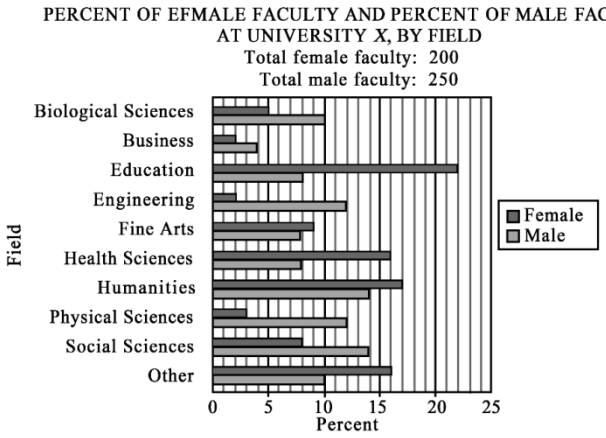
A. 7% B. 7.50% C. 8% D. 8.50% E. 9%

14. If A is the initial amount put into an account, R is the annual percentage of interest written as a decimal, and the interest compounds annually, then which of the following would be an expression, in terms of A and R, for the interest accrued in three years?

A. $A(R)^3$ B. $A(R+R^3)$ C. $A(3R+3R^2+R^3)$ D. $3A(R)^3$ E. $3A(R+R^2+R^3)$

15. If an amount P is to be invested at an annual interest rate of 3.5 percent, compounded annually, what should be the value of P so that the value of the investment is $1,000 at the end of 3 years? **Give your answer to the nearest 1 dollar.**

Question 16 to 18 are based on the following data.

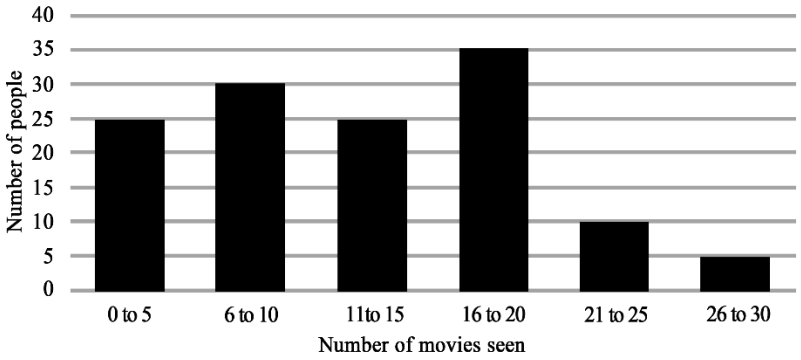


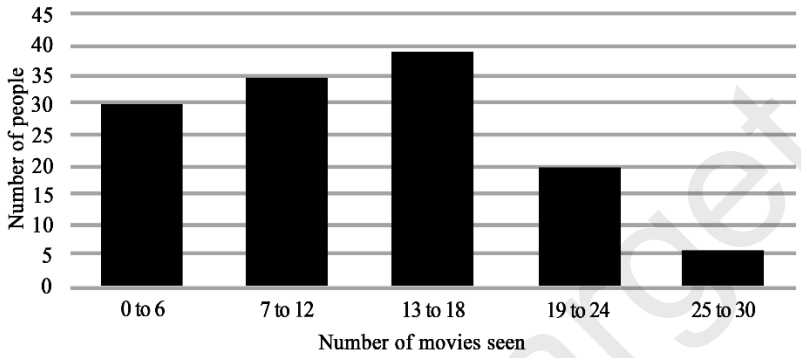
16. There are 275 students in the field of engineering at University X. Approximately what is the ratio of the number of students in engineering to the number of faculty in engineering?
A. 8 to 1 B. 10 to 1 C. 12 to 1 D. 14 to 1 E. 20 to 1

17. Approximately what percent of the faculty in humanities are male?
A. 35% B. 38% C. 41% D. 45% E. 51%

18. For the biological sciences and health sciences faculty combined, 1/3 of the female and 2/9 of the male faculty members are tenured professors. What fraction of all the faculty members in those two fields combined are tenured professors?

19.





In a survey, 130 people were asked how many movies they had seen in the preceding year. Their responses varied from 0 to 30 movies. The graphs above show two different summaries of the same survey results. How many people responded that they had seen 11 or 12 movies?

A. 10 B. 12 C. 15 D. 20 E. 23

20. A bookcase has s shelves with n books on each shelf, where n is a multiple of both s and s-1. If all of the books on the highest shelf were removed and redistributed equally among the other shelves, which of the following represents the number of books that would be on each of the other shelves?

A. $\frac{ns}{S-1}$ B. $\frac{n(s+1)}{s}$ C. $\frac{(n+1)s}{s-1}$ D. $\frac{(n-1)s}{s-1}$ E. $\frac{(n+1)(s-1)}{s}$

21. A solid yellow stripe is to be painted in the middle of a certain highway. If 1 gallon of paint covers an area of p square feet of highway, how many gallons of paint will be needed to paint a stripe t inches wide on a stretch of highway m miles long? (1 mile = 5,280 feet and 1 foot =12 inches)

A. $\frac{5280\text{mt}}{12p}$ B. $\frac{5280pt}{12m}$ C. $\frac{5280\text{pmt}}{12}$ D. $\frac{5280\cdot 12m}{pt}$ E. $\frac{5280\cdot 12p}{mt}$

22. A 12-inch ruler is marked off in sixteenths of an inch. What is the distance, in inches, from the zero mark to the 111th mark after the zero mark?

A. $6\frac{1}{4}$ B. $6\frac{15}{16}$ C. $7\frac{3}{7}$ D. $9\frac{1}{4}$ E. $11\frac{1}{16}$

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

A. $12 B. $14 C. $16 D. $17 E. $18

24. The daily rate for a hotel room that sleeps 4 people is $39 for one person and x dollars for each additional person. If 3 people take the room for one day and each pays $21 for the room, which is the value of x?

A. 6 B. 8 C. 12 D. 13 E. 24

25. A manufacturing company has plants in three locations: Indonesia, Mexico, and Pakistan. The company has 6,000 employees, and each of the employees works at only one of the plants. If 3/8 of the employees work at the plant in Indonesia and if twice as many employees work at the plant in Mexico as work at the plant in Pakistan, how many employees work at the plant in Mexico?

26. A school bus has 10 double seats in each of 2 rows. Two students can sit in each double seat. If an empty bus starts out and makes two stops, picking up three times the number of students at the second stop as at the first stop, and if the bus is then filled to seating capacity, how many students got on the bus at the second stop?

A. 5 B. 10 C. 15 D. 20 E. 30

27. Last year Melania had a total of $20000 invested in two mutual funds, Capital Growth Fund and Venture Index Fund. At the end of the year, she analyzed her investments and found that her earnings on her shares of Capital Growth Fund were three times half of her earnings on her investment in Venture Index Fund. If she earned a total of $1250 on her investments in the two funds, and had three times as much money invested in Capital Growth Fund as in Venture Index Fund, what percent interest did Melania earn on her investment in Venture Index Fund?

A. 0.075 B. 0.01 C. 7.5 D. 10 E. 500

28. A certain company has found that the number of labor hours required to produce x items is directly proportional to the square root of x. If 3 labor hours are required to produce 20 items, how many labor hours are required to produce 40 items?

A. $3\sqrt{2}$ B. 6 C. $\frac{\sqrt{3}}{20}$ D. 12 E. $3\sqrt{20}$

29. The total amount that Mary paid for a book was equal to the price of the book plus a sales tax that was 4 percent of the price of the book. Mary paid for the book with a $10 bill and received the correct change, which was less than $3.00. Which of the following statements must be true? **Indicate all such statements.**

A. The price of the book was less than $9.50.
B. The price of the book was greater than $6.90.
C. The sales tax was less than $0.45.

30. Each week a salesperson receives a commission that is equal to 12 percent of the first $500 of sales plus 20 percent of additional sales. If the salesperson received a commission of $380 last week, what was the total amount of the sales that the salesperson made last week?

A. $1,600 B. $1,660 C. $1,860 D. $2,000 E. $2,100

31. Anne pays 150 percent more for a wholesale widget than Bart pays. Anne's retail price per widget is 15 percent greater than the wholesale price she paid. Bart's retail price per widget is 185 percent greater than the wholesale price he paid.

Quantity A	**Quantity B**
Anne's retail price	Bart's retail price

32. At a certain company, employees who earn $20.00 per hour will be given an increase of $1.00 per hour. For each of the other employees, either the employee will be given an increase of $1.00 per hour or the employee will be given a percent increase equal to the percent increase that will be given to the employees who earn $20.00 per hour, whichever results in a larger increase for that employee. Which of the following statements are true? **Indicate all such statements.**

A. An employee who earns less than $20.00 per hour will be given a percent increase that is greater than the percent increase that will be given to the employees who earn $20.00 per hour.
B. An employee who earns $22.00 per hour will be given an increase of $1.10 per hour.
C. An employee who earns $24.00 per hour will earn $25.20 per hour after the increase.

33. 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. 762 C. 1,000 D. 1,320 E. 1,694

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

A. $0 B. $3 C. $4 D. $12 E. $15

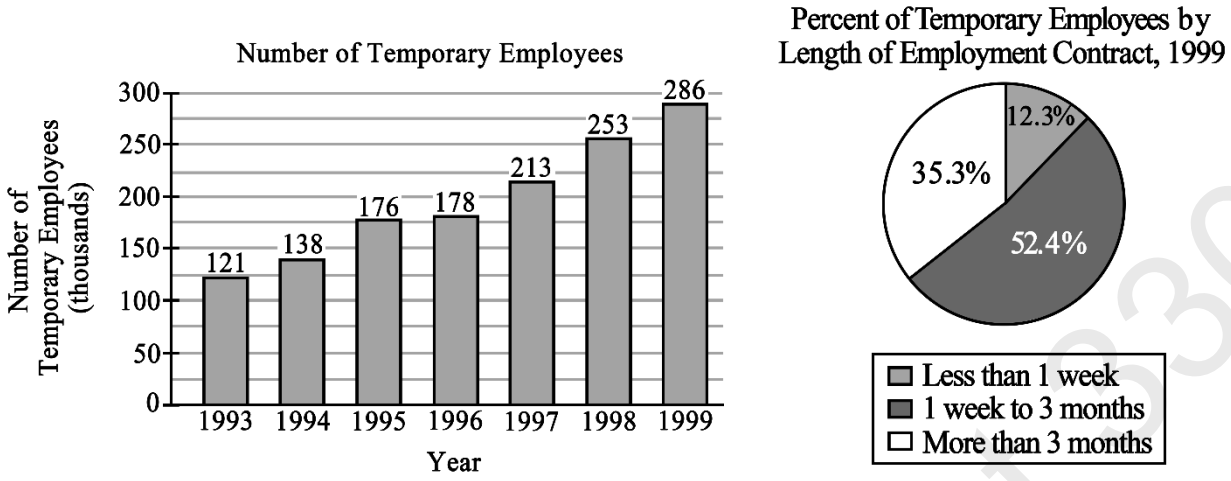
35. A college student expects to earn at least $1,000 in interest on an initial investment of $20,000. If the money is invested for one year at interest compounded quarterly, what is the least annual interest rate that would achieve the goal? **Give your answer to the nearest whole percent.**

36. If $5,000,000 is the initial amount placed in an account that collects 7% annual interest, which of the following compounding rates would produce the largest total amount after two years?

A. compounding annually B. compounding quarterly C. compounding monthly
D. compounding daily E. All four of these would produce the same total

Question 37 to 39 are based on the following data.

TEMPORARY EMPLOYMENT IN GERMANY, 1993 - 1999



37. Which of the following is closest to the percent increase in the number of temporary employees from 1993 to 1999?

A. 36% B. 58% C. 136% D. 158% E. 236%

38. In 1999 approximately how many of the temporary employees had an employment contract with a length of at most 3 months?

A. 185,000 B. 150,000 C. 101,000 D. 35,000 E. 19,000

39. In 1998 the ratio of the number of female temporary employees to the number of male temporary employees was 1 to x, where $x > 0$. In terms of x, what was the number, in thousands, of female temporary employees in 1998?

A. 253(x-1) B. 253(x+1) C. $\frac{253}{x}$ D. $\frac{253}{x-1}$ E. $\frac{253}{x+1}$

第三节. 代数

1. $x^2 + 6x = 7$

Quantity A	**Quantity B**
$(x+3)^2$	16

2. $(2x+1)^2 - (2x-1)^2 =$

A. 2 B. 8x C. 4x-1 D. 4x+1 E. 8x+2

3. $x \neq 0$

Quantity A	**Quantity B**
x^2	$x(x+5)$

4. Six more than 1/2 of the number *r* equals 14. Three fewer than the square root of the number *w* equals 1.

Quantity A	**Quantity B**
r	*w*

5. What is the y-intercept of the graph of the equation $y=2 \cdot |4x-4| - 10$

6. If $6\left|4-\frac{k}{3}\right| > 12$, which of the following could be the value of k?

A. -15 B.-10 C.-5 D. 0 E. 5

F. 10 G.15 H.20

7. Which of the following is an equation of a line that does NOT contain any points in the xy-plane for which both coordinates are integers?

A. y=4 B. $y=\frac{1}{2}x$ C. y=x+3 D. $y=x+\frac{1}{2}$ E. $y=\frac{1}{2}x+3$

8. For all real numbers v, the operation $v*$ is defined by the equation $v* = v - \frac{v}{3}$. If $(v*)* = 8$, then $v =$

A. 15 B. 18 C. 21 D. 24 E. 27

9. $x < y - 2$

Quantity A	**Quantity B**
The average (arithmetic mean) of x and y	$y - 1$

10. $|2y - 5| < 1$

Quantity A	**Quantity B**
y	1

11. Which of the following is equivalent to $0 < x < 2$?

A. x = 1 B. $|x| < 1$ C. $|x| < 2$ D. $|x + 1| < 1$ E. $|x - 1| < 1$

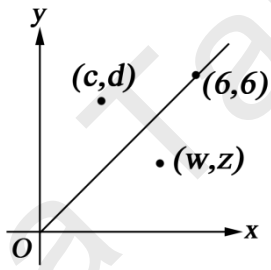
12. Which of the following inequalities has a solution set that, when graphed in the number line, is a single line segment of finite length?

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

13. In the xy-plane, the point (c, c) lies on the graph of the equation 0.3x + 0.3y =12

Quantity A	**Quantity B**
The value of c	20

14.



Quantity A	**Quantity B**
w+d	c+z

15. If x is 4 more than half of y and if y is 10 more than half of x, what is the value of x?

16. The functions *f* and g are defined by $f(x) = |2x + 1|$ and $g(x)=3$ for all numbers x. What is the least value of c for which $f(c) = g(c)$?

17. If x < y, which of the following must be true?

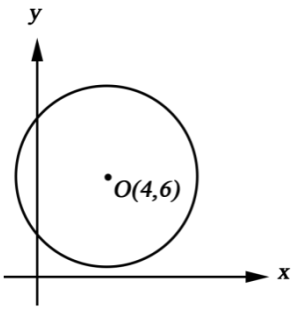
A. 2x < y B. 2x > y C. $x^2 < y^2$ D. 2x-y < y E. 2x-y < 2xy

18. In the xy-plane, the point (t, t-1) lies on the line with equation $y=-\frac{1}{2}x+\frac{1}{3}$. What is the value of t? **Give your answer as a fraction.**

19. The average (arithmetic mean) of m and n is 1 more than k.

Quantity A	**Quantity B**
m+n	$2k+1$

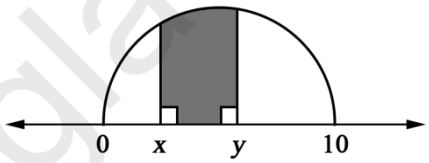
20.



(4,6) is the center of the circle above.

Quantity A	**Quantity B**
The radius of the circle	6

21.



If $0<x<y<10$, then A(x, y) represents the area of the region bounded by the number line. The semi-circle, and the vertical segments at x and y, as indicated by the shaded region.

$$0<a<b<c<10$$

Quantity A	**Quantity B**
A(a, b)+A(b, c)	A(a, c)

22. Line k lies in the xy-plane. The x-intercept of line k is -4, and line k passes through the midpoint of the line segment whose endpoints are (2, 9) and (2, 0). What is the slope of line k? **Give your answer as a fraction.**

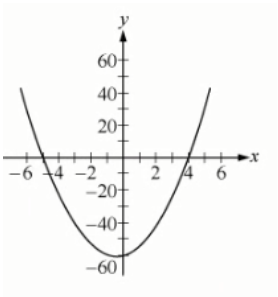
23. Line l passes through points in both quadrants II and III. Which of the following statements are true? **Indicate all such statements.**

A. Line l cannot pass through the origin.
B. Line l cannot pass through any point in quadrant I.
C. Line l cannot pass through any point in quadrant IV.
D. The slope of line l cannot be 0.
E. The slope of line l cannot be positive.
F. The slope of line l cannot be negative.

24. In the rectangular coordinate system, the point (3, 1) is on the circle with center (0, -3). What is the area of the circle?

A. 5π B. 7π C. 10π D. 25π E. $\pi\sqrt{7}$

25.



Which of the following could be the equation of the graph in the xy-plane shown above?

A. $y = x^2 + x - 60$ B. $y = x^2 + x - 20$ C. $y = x^2 + 3x - 60$
D. $y = 3x^2 + x - 60$ E. $y = 3x^2 + 3x - 60$

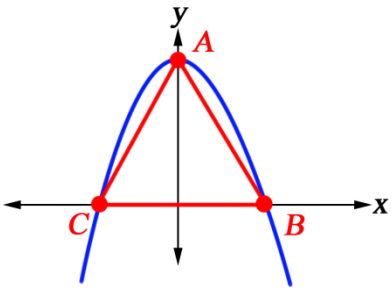
26. In the rectangular coordinate system, (x, y) is a point on a circle that has center (3, 2) and is tangent to the x-axis at (3,0).

Quantity A	**Quantity B**
The least possible value of x	0

27. In the xy-plane, one of the vertices of square S is the point (2, 2). The diagonals of S intersect at the point (6, 6).

Quantity A	**Quantity B**
the area of S	64

28.



The figure shows the graph of the equation $y = k - x^2$, where k is a constant. If the area of triangle ABC is 1/8, what is the value of k? **Give your answer to the nearest 0.01.**

29. Line l in the xy-plane contains points A and B with coordinates (-4, 5) and (6, -1), respectively. Line k is perpendicular to l and contains the midpoint of line segment AB. Which of the following statements are true? **Indicate all such statements.**

    A. The slope of line l is -3/5.
    B. Line k has a negative slope.
    C. Line k contains the point (1,2).

30. If $r * = \frac{1}{(r-1)^2}$, what is the value of (3*)*? **Give your answer as a fraction.**

第四节. 几何

1. P, Q, and R are three points in a plane, and R does not lie on line PQ. Which of the following is true about the set of all points in the plane that are the same distance from all three points?

A.It contains no points. B. It contains one point. C. It contains two points.
D. It is a line. E. It is a circle.

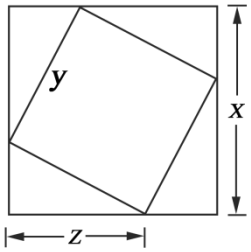
2. P1 is a polygon with 5 sides. P2 is a polygon with twice the number of sides of P1.

Quantity A	**Quantity B**
Twice the sum of the measure of the interior angles of P1	The sum of the measure of the interior angles of P2

3. In the ceiling of room, an opening was cut in the shape of a square with sides that are 1 foot in length. A circular fixture will be placed over the opening. If the circular fixture covers the square opening completely, which of the following could be the diameter of the circular fixture, in inches? (Note:1 foot=12 inches.) **Indicate all such diameters.**

A.12 B.13 C.14 D.15
E.16 F.17 G.18

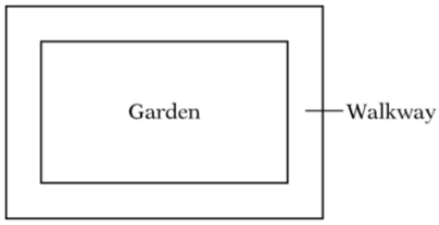
4.



The figure shows a smaller square with sides of length y inscribed in a larger square with sides of length x. Which of the following relationships between x, y, and z must be true?

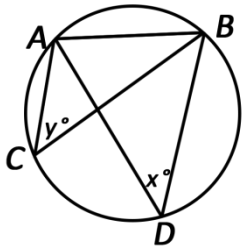
A. $x^2 = y^2 + z^2$ B. $x^2 = y^2 - z^2$ C. $(x - z)^2 = y^2$
D. $(x - z)^2 = z^2$ E. $(x - z)^2 + z^2 = y^2$

5.



The figure above represents a rectangular garden with a walkway around it. The garden is 18 feet long and 12 feet wide. The walkway is uniformly 3 feet wide, and its edges meet at right angles. What is the area of the walkway?

6.

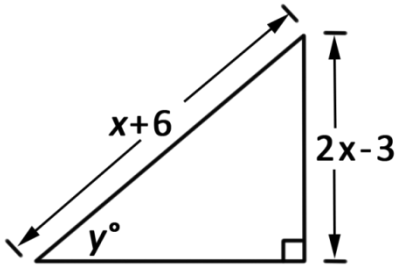


$AB=12, AC=10, AD=18$

Note:the region above is circular

Quantity A	**Quantity B**
x	y

7.



In the triangle, is y =30, then x =

A. 3 B.4 C. 5 D8 E. 9

8. If the length of each side of an equilateral triangle were increased by 50 percent, what would be the percent increase in the area?

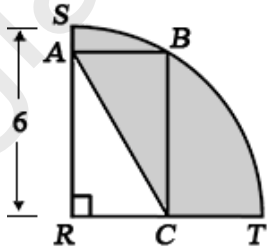
A. 75% B. 100% C. 125% D. 150% E. 225%

9. Two sides of a triangle have length 6 and 8. Which of the following are possible areas of the triangle?

I. 2 II. 12 III. 24

A. I only B. I and II only C. II and III only D. I and III only E. I, II and III

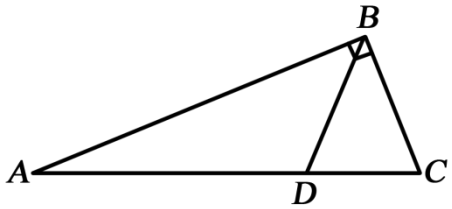
10.



In the figure above, arc SBT is one quarter of a circle with center R and radius 6. If the length plus the width of rectangle ABCR is 8. Then the perimeter of the shaded region is

A. $8 - 3\pi$ B. $10 + 3\pi$ C. $14 + 3\pi$ D. $1 + 6\pi$ E. $12 + 6\pi$

11.

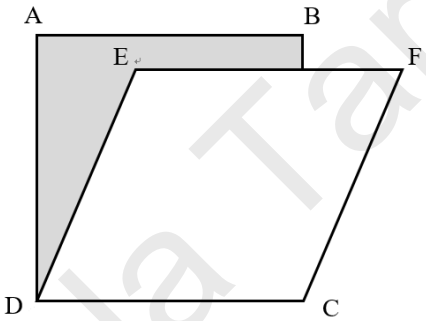


The length of AB is $10\sqrt{3}$

Which of the following statements individually provide(s) sufficient additional information to determine the area of triangle ABC above? **Indicate all such statements.**

A. DBC is an equilateral triangle.
B. ABD is an isosceles triangle.
C. The length of BC is equal to the length of AD.
D. The length of BC is 10.
E. The length of AD is 10.

12.



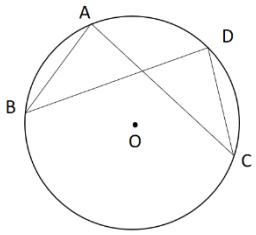
If ABCD is a square with area 625, and CDEF is a rhombus with area 500, then the area of the shaded region is
Note: Figure not drawn to scale

A. 125 B. 175 C. 200 D250 E. 275

13. If x>0, and two sides of a certain triangle have lengths 2x+1 and 3x+4 respectively, which of the following could be the length of the third side of the triangle? **Indicate all possible lengths.**

A. $4x + 5$ B. $x + 2$ C. $5x + 1$ D $5x + 6$ E. $2x + 17$

14.



In the figure above, AB=CD, ∠A=70°, ∠C=50°, the radius of the circle is 3. Then what is the length of minor arc AB?

15. The measure of each interior angle of a polygon with n sides is between 110° and 130°.

Quantity A	**Quantity B**
n	8

第五节. 数据分析

1. The sum of n numbers is greater than 48. If the average (arithmetic mean) of n numbers is 1.2, what is the least possible value of n?

2. S is a set of n consecutive integers.

Quantity A	**Quantity B**
The mean of S	The median of S

3. Consider the following list of numbers that represent the number of text messages that Geraldine received on 10 consecutive days: 10, 9, 1, 3, 7, 7, 8, 3, 4, 3. Which of the following statements concerning this set of data are true? **Indicate all such statements.**

   A. The median is less than the average (arithmetic mean).
   B. The median is less than the mode.
   C. The mode is less than the average.
   D. The average of the median and the mode is between 4 and 4.5.

4. If the average (arithmetic mean) of x, y, z, 5 and 7 is 8, which of the following must be true?
   I. The median of the five numbers cannot be 5.
   II. At least one of x, y and z is greater than 9.
   III. The range of the five numbers is 2 or more.

   A. I only B. II only C. III only D. I and III E. II and III

5. For a sample of 210 households, one-third of the households do not have any pets, one-third of the households each have 1 pet, and the rest of the households each have 2 pets. Which of the following statistics for the sample are equal to 1? **Indicate all such statistics.**

A. The average (arithmetic mean) number of pets per household.
B. The median number of pets per household.
C. The range of the numbers of pets per household.

6. From a set of 100 numbers, half were selected to form group I, and 60 percent of the remaining numbers were selected to form group II. The average (arithmetic mean) of the numbers in group I is 24.4, and the average of the numbers in group II is 31.5. Which of the following is closest to the average of the numbers in groups I and II combined?

A. 27.1 B. 27.6 C. 27.8 D. 28.0 E. 28.3

7. The range of the heights of the female students in a certain class is 13.2 inches, and the range of the heights of the male students in the class is 15.4 inches. Which of the following statements individually provide(s) sufficient additional information to determine the range of the heights of all the students in the class? **Indicate all such statements.**

A. The tallest male student in the class is 5.8 inches taller than the tallest female student in the class.
B. The median height of the male students in the class is 1.1 inches greater than the median height of the female students in the class.
C. The average (arithmetic mean) height of the male students in the class is 4.6 inches greater than the average height of the female students in the class.

8. The company at which Mark is employed has 80 employees, each of whom has a different salary. Mark's salary of $43,700 is the second-highest salary in the first quartile of the 80 salaries. If the company were to hire 8 new employees at salaries that are less than the lowest of the 80 salaries, what would Mark's salary be with respect to the quartiles of the 88 salaries at the company, assuming no other changes in the salaries?

A. The fourth-highest salary in the first quartile
B. The highest salary in the first quartile
C. The second-lowest salary in the second quartile
D. The third-lowest salary in the second quartile
E. The fifth-lowest salary in the second quartile

9. For the 500 measurements obtained in experiment X, the average (arithmetic mean) value is 280 and the value k is at the 75th percentile. For the 500 measurements obtained in experiment Y, the average value is 280 and the value n is at the 75th percentile.

Quantity A	**Quantity B**
k	n

10. List A: 0, 5, 10, 15, 20
List B: 25, 30, 35, 40, 45

Quantity A	**Quantity B**
The standard deviation of List A	The standard deviation of List B

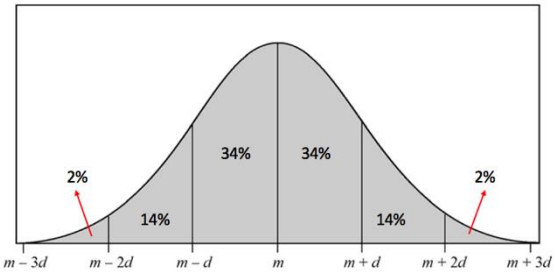
11. Each of the following linear equations defines y as a function of x for all integers x from 1 to 100. For which of the following equations is the standard deviation of the y-values corresponding to all the x-values the greatest?

A. $y = \frac{x}{3}$ B. $y = \frac{x}{2} + 40$ C. $y = x$ D. $y = 2x + 50$ E. $y = 3x - 20$

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

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

13.



The figure above shows the standard normal distribution, with mean 0 and standard deviation 1, including approximate percent of the distribution corresponding to the six regions shown. The random variable Y is normally distributed with a mean of 470, and the value Y = 340 is at the 15th percentile of the distribution. Of the following, which is the best estimate of the standard deviation of the distribution?

A. 125 B. 135 C. 145 D. 155 E. 165

14. Weichen has conducted a survey to determine how Chinese students behave on GRE Quantitative test. The data indicates that the score is approximately normally distributed with a mean of 158 and a standard deviation of 8. Suppose the data size is 1000 then according to the survey, approximately how many students have a score more than 166?

A. 160 B. 280 C. 500 D. 680 E. 840

15. If 55 percent of a group of people have brown hair and 80 percent of the same group do not have red hair, what fraction of those who do not have brown hair have red hair?

A. 1/4 B. 4/11 C. 4/9 D. 5/9 E. 4/5

16. {1, –3, 4, 1, –3, 4, 1, –3, 4,..}

In the sequence above, the first 3 terms repeat without end. What is the sum of the terms of the sequence from the 150th term to the 154th term?

17. What is the sum of the integers between -90 and 95, inclusive?

A. 5 B. 185 C. 465 D. 4,275 E. 4,560

18. In a certain sequence of numbers, each term after the first is equal to 3 less than twice the previous term. If 515 is 10^{th} term in the sequence, what is the 8^{th} term?

A. 126 B. 129 C. 131 D. 138 E. 143

19. If x is the sum of seven consecutive odd integers beginning with 3 and y is the sum of seven consecutive odd integers beginning with 5, then y-x equals

A. 2 B. 7 C. 8 D. 12 E. 14

20. Suppose there are 7 monkeys and they all have some number of chestnuts. If in average they have 10 chestnuts per monkey and only one of them has less than 5. If every monkey has an integer number of chestnuts and they all have different number of nuts. Then how many chestnuts does the monkey who has third most chestnuts have at least if given none of them has more than 20 chestnuts?

A. 6 B. 7 C. 8 D. 9 E. 10

21. N equals the number of positive 3-digit numbers that contain odd digits only.

Quantity A	**Quantity B**
N	125

22. There are 10 people in a room. If each person shakes hands with exactly 3 other people, what is the total number of handshakes?

A. 15 B. 30 C. 45 D. 60 E. 120

23. In a series of races, 10 toy cars are raced, 2 cars at a time. If each car must race each of the other cars exactly twice, how many races must be held?

A. 40 B. 90 C. 100 D. 180 E. 200

24. A website requires their users to create a password for their own account using numbers from 0-5, inclusive, non-repeatedly. The password has to be at least 5-digit long, then how many possible ways are there for them to create their passwords?

25. In a certain state, each license plate consists of either three digits (between 0 and 9, inclusive) followed by two letters or three letters followed by two digits. For example, 055-XY, 123-PP, and AAA-70 are all acceptable plates. How many different license plates can the state issue?

26. In how many different ways can 3 boys and 3 girls be seated in a row of 6 chairs such that the girls are not separated, and the boys are not separated?

A. 24 B. 36 C. 72 D. 144 E. 288

27. From a group of 8 people, it is possible to create exactly 56 different k-person committees. Which of the following could be the value of k? **Indicate all such values.**

A. 1 B. 2 C. 3 D. 4
E. 5 F. 6 G. 7

28. From a box of 10 lightbulbs, you are to remove 4. How many different sets of 4 lightbulbs could you remove?

29. Sid intended to type a seven-digit number, but the two "3" he meant to type did not appear. What appeared instead was the five-digit number 52115. How many different seven-digit numbers could Sid have meant to type?

A. 10 B. 16 C. 21 D. 24 E. 27

30. Suppose that we are trying to select 7 students to have a dinner with Qishu. We have 14 candidates and half of them are girls. If the students selected must contain at least four girls and one boy, then how many ways can we select?

A. 441 B. 1225 C. 1666 D. 1715 E.1820

31. In how many ways can Ann, Bob, Chunk, Don and Ed be seated in a row such that Ann and Bob are not seated next to each other?

A. 24 B.48 C.56 D. 72 E. 96

32. How many positive integers can be expressed as a product of two or more of the prime numbers 5, 7, 11, and 13 if no one product is to include the same prime factor more than once.

A. Eight B. Nine C. Ten D. Eleven E. Twelve

33. Ryan has 10 pets: 4 dogs, 3 cats, 2 alpacas and 1 bunny. If she wants to arrange them in a row and make sure the pets are always grouped according to species, how many ways can she arrange the pets?

A. 24 B. 242 C. 288 D. (24)(288) E. 1442

34. Box contains 10 balls numbered from 1 to 10 inclusive. If Ann removes a ball at random and replaces it, and then Jane removes a ball at random, what is the probability that both women removed the same ball?

A. 1/100 B. 1/90 C. 1/45 D. 1/10 E. 41/45

35. Eight points are equally spaced on a circle. If 4 of the 8 points are to be chosen at random, what is the probability that a quadrilateral having the 4 points chosen as vertices will be a square?

A. 1/70 B. 1/35 C. 1/7 D. 1/4 E. 1/2

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

A. $\frac{1}{6}$ B. $\frac{1}{5}$ C. $\frac{1}{3}$ D. $\frac{2}{5}$ E. $\frac{2}{3}$

37. If one number is chosen at random from the first 1,000 positive integers, what is the probability that the number chosen is a multiple of both 2 and 8?

A. 1/125 B. 1/8 C. 1/2 D. 9/16 E. 5/8

38. A box at a yard sale contains 3 different china dinner sets, each consisting of 5 plates. A customer will randomly select 2 plates to check for defects. What is the probability that the 2 plates selected will be from the same dinner set?

A. 2/7 B. 2/5 C. 2/3 D. 5/6 E. 3/2

39. Of the 20 light bulbs in a box, 2 are defective. An inspector will select 2 light bulbs simultaneously and at random from the box. What is the probability that neither of the light bulbs selected will be defective? Give your answer as a fraction.

40. Suppose a, b, c, d, e are selected randomly from the set {1, 2, 3, 4, 5} and they can repeat. Find the probability that a*b*c*d+e is odd.

A. $\frac{12}{25}$ B. $\frac{27}{125}$ C. $\frac{243}{3125}$ D. $\frac{1632}{3125}$ E. $\frac{1794}{3125}$

第六节. 陷阱与技巧

1. r, s, and t are three consecutive odd integers such that r < s < t.

Quantity A	Quantity B
$r + s + 1$	$s + t - 1$

2.

Quantity A	Quantity B
$x^2 + 1$	$2x - 1$

3. The "reflection" of a positive integer is obtained by reversing its digits. For example, 321 is the reflection of 123. The difference between a five-digit integer and its reflection must be divisible by which of the following?

A. 2 B. 4 C. 5 D. 6 E. 9

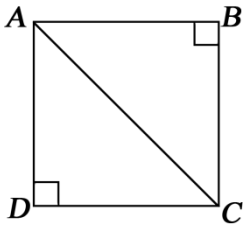
4. If j and k are even integers and j < k, which of the following equals the number of even integers that are greater than j and less than k?

A. $\frac{k-j-2}{2}$ B. $\frac{k-j-1}{2}$ C. $\frac{k-j}{2}$ D. $k-j$ E. $k-j-1$

5. A student made a conjecture that for any integer n, the integer 4n + 3 is a prime number. Which of the following values of n could be used to disprove the student's conjecture? **Indicate all such values.**

A.1 B.3 C.4 D. 6 E. 7

6.



$AD=DC=6$

Quantity A	**Quantity B**
AB	BC

7.

Quantity A	**Quantity B**
22 percent of x	2/9 of x

8.

Quantity A	**Quantity B**
$(a + a^{-1})^2$	$a^2 + a^{-2}$

9. Which of the following pairs of integers have reciprocals whose sum is either less than 1/3 or greater than 1/2? **Indicate all such pairs.**

A. 1 and 14 B. 3 and 12 C. 5 and 10 D. 7 and 8

10. List L consists of the 7 numbers u, -2u, -3u, -4u, -5u, -6u, and -7u, where u≠0.

Quantity A	**Quantity B**
The median of the 7 numbers in list L	u

11. x is a positive integer. k is the remainder when $x^3 - x$ is divided by 3.

Quantity A	**Quantity B**
k	1

12. A certain holiday is always on the fourth Tuesday of Month X. If Month X has 30 days, on how many different dates of Month X can the holiday fall.

A. Four B. Five C. Six D. Seven E. Eight

13. If k is the greatest positive integer such that 3^k is a divisor of 15! then k =

A. 3 B. 4 C. 5 D. 6 E. 7

14.

Quantity A	**Quantity B**
The greatest possible value of $\frac{2}{x-y}$, where 9≤ x ≤12 and -2 ≤ y ≤ 8	2

15. $x^y > 0, xy^2 < 0$

Quantity A	**Quantity B**
x	y

16. The equations $x^2 - 2x - 35 = 0$ and $(x + m)(x - n) = 0$ have the same solutions.

Quantity A	**Quantity B**
m	n

17. What is the sum of all possible solutions to the equation: $\sqrt{2x^2 - x - 9} = x + 1$

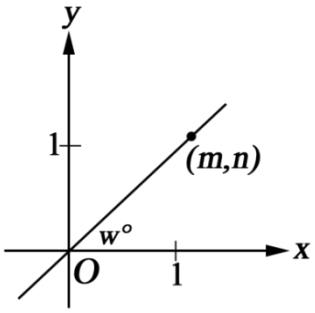
A. -2 B. 2 C. 3 D. 5 E. 6

18. The quadratic function $f(x) = -k^2x^2 - mkx - \frac{1}{16}$, where m, k are constants, does not have any intersection with x-axis. In which of the following interval of m the statement given above does not necessarily hold true?

A. $-\frac{9}{16} < m < -\frac{7}{16}$ B. $-\frac{7}{16} < m < -\frac{5}{16}$ C. $-\frac{1}{16} < m < \frac{1}{16}$

D. $\frac{1}{16} < m < \frac{3}{16}$ E. $\frac{3}{16} < m < \frac{5}{16}$

19.



$w > 45$

Quantity A	**Quantity B**
m + n	2m

20. In the xy-plane, triangular region R is bounded by the lines x = 0, y = 0, and 4x + 3y = 60. Which of the following points lie inside region R? **Indicate all such points.**

A. (2, 18) B. (5, 12) C. (10, 7) D. (12, 3) E. (15, 2)

21. A rectangle is drawn in a standard xy-coordinate plane. If the sides of the rectangle are not parallel to the axes, what is the product of the slope of the four sides?

A. -1 B. 0 C. 1 D. 2

E. It cannot be determined from the information given.

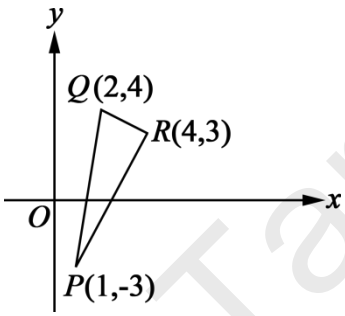
22. $(x + 3)(y - 4) = 0$

Quantity A	**Quantity B**
xy	-12

23. The function f is defined by $f\left(\frac{x+2}{2}\right) = 3x^2 - x + 5$.

Quantity A	**Quantity B**
$f(4)$	75

24.



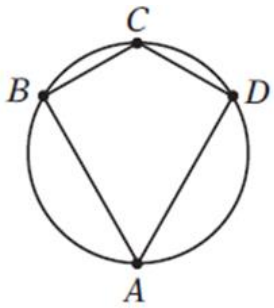
Which of the following statements about triangle PQR shown in the xy-plane are true? **Indicate all such statements.**

A. PQR is a right triangle.
B. The area of PQR is 15/2.
C. PQR is an isosceles triangle.

25. n is an integer, and k is not an integer. $0 < k < n < k+2$

Quantity A	**Quantity B**
n	k+1

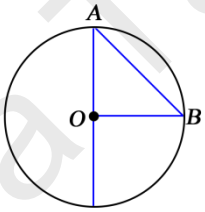
26.



In the figure above, the diameter of the circle is 10.

Quantity A	**Quantity B**
The area of quadrilateral ABCD	40

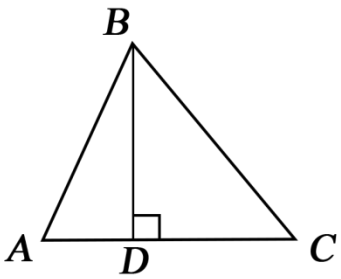
27.



O is the center of the circle

Quantity A	**Quantity B**
Length of AO	Length of AB

28.



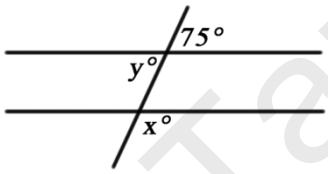
Quantity A	**Quantity B**
$\frac{BD}{AB}$	$\frac{BC}{CD}$

29. If we use some rectangular solids with edges 7cm, 3cm, and 2cm to form a solid cube, what is the least possible length of the edge of the cube?

30. What is the sum of all possible solutions of the equation $|x + 4|^2 - 10|x + 4| = 24$

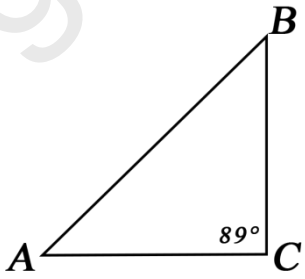
A. -16 B. -14 C. -12 D. -8 E. -6

31.



Quantity A	**Quantity B**
x	y

32.



Quantity A	**Quantity B**
Length of AB	Length of BC

33. List K consists of 16 positive numbers. List M is obtained from list K by multiplying each number in list K by -2

Quantity A	**Quantity B**
The standard deviation of K	The standard deviation of M

34. x is a positive integer. When x is divided by 2, 4, 6 or 8, the remainder is 1.

Quantity A	**Quantity B**
x	24

35. If N is an integer and $99 < N^2 < 200$, then N could have at most how many values?

A. Two B. Four C. Five D. Eight E. Ten

36. In how many different ways can 3 identical green shirts and 3 identical red shirts be distributed among 6 children such that each child receives a shirt?

A. 20 B. 40 C. 216 D. 720 E. 729

37. In a group of 200 workers, 10 percent of the males smoke, and 49 percent of the females smoke.

Quantity A	**Quantity B**
Total number of workers who smoke	59

38. $x^a y^b z^c$ equals the product of 154 and 56, z> $y > x$, $and\ a > b > c$, then what is the value of $a^x b^y c^z$?

A. 1024 B. 2048 C. 8624 D. 22528
E. cannot be determined by the condition given

39. Suppose a, b, c are different integers, and the repeating decimal $0.\overline{abc}$ =m/n, where 0 < m < n < 100, then

Quantity A	**Quantity B**
n	39

第二章.　综合练习 300 题

第一节.　基础练习 130 题

1.

Quantity A	**Quantity B**
The least prime number greater than 24	the greatest prime number less than 28

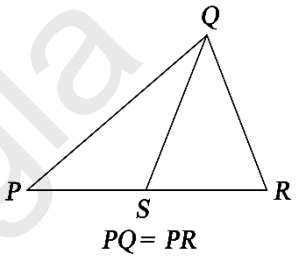
2. Lionel is younger than Maria.

Quantity A	**Quantity B**
Twice Lionel's age	Maria's age

3.

Quantity A	**Quantity B**
54% of 360	150

4.



$PQ = PR$

Quantity A	**Quantity B**
PS	SR

5. $y = 2x^2 + 7x - 3$

Quantity A	**Quantity B**
x	y

6. $y > 4$

Quantity A	**Quantity B**
$\frac{3y+2}{5}$	y

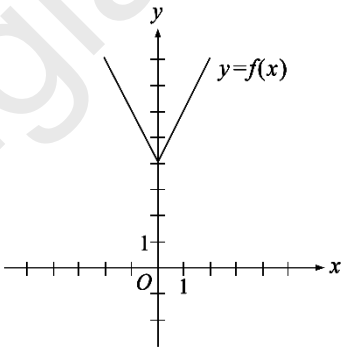
7.

Quantity A	**Quantity B**
$\frac{2^{30}-2^{29}}{2}$	2^{28}

8. If $5x + 32 = 4 - 2x$, what is the value of x?

A. -4 B. -3 C. 4 D. 7 E. 12

9.



The figure above shows the graph of the function f defined by $f(x) = |2x| + 4$ for all numbers x. For which of the following function g, defined for all numbers x. Does the graph of g intersect the graph of f.

A. $g(x) = x - 2$ B. $g(x) = x + 3$ C. $g(x) = 2x - 2$
D. $g(x) = 2x + 3$ E. $g(x) = 3x - 2$

10. A car for 33 miles per gallon using gasoline that close $2.95 per gallon, approximately what was the cost, in dollars, of the gasoline used in driving the car 350 miles?

A. $10 B. $20 C. $30 D. $40 E. $50

11. Which two of the following numbers have a product that is between -1 and 10? **Indicate both of the numbers.**

A. -20 B. -10 C. 2^{-4} D. 3^{-2}

12. Which of the following integers are multiples of both 2 and 3? **Indicate all such integers.**

A. 8 B. 9 C. 12 D. 18
E. 21 F.36

13. One pen costs $0.25 and one marker costs $0.35. At those prices, what is the total cost of 18 pens and 100 markers?

14. Rectangle R has length 30 and width 10, and square S has length 5. The perimeter of S is what fraction of the perimeter of R?

15. D is the decimal form of the fraction 4/11

Quantity A	**Quantity B**
the 25th digit to the right of the decimal point in D	4

16.

Quantity A	**Quantity B**
$\sqrt[3]{270} - \sqrt[3]{10}$	$\sqrt[3]{80}$

17. n is a positive integer, $x = 7n + 2$, and $y = 6n + 3$

Quantity A	**Quantity B**
the ones digit of $x + y$	5

18. $r = 2, s = -7$

Quantity A	**Quantity B**
$(r - s)^4$	$r^4 - s^4$

19. n is an even negative integer

Quantity A	**Quantity B**
$\left(\frac{1}{3}\right)^n$	$(-3)^n$

20. Today the price of a table was reduced by 20 percent from what it was yesterday, and the price of a lamp was reduced by 30 percent from what is was yesterday.

Quantity A	**Quantity B**
The dollar amount of the reduction in the price of the table	The dollar amount of the reduction in the price of the lamp

21. For 5 hours, a photocopier copied at a constant rate of 2 pages every 3 seconds.

Quantity A	**Quantity B**
The number of pages the photocopier copied in the 5 hours	12,000

22. For each integer $n > 1$, let $A(n)$denote the sum of the integers from 1 to n. For example, $A(100) = 1 + 2 + 3 + \cdots + 100 = 5{,}050$. What is the value of $A(200)$?

A. 10,100 B. 15,050 C. 15,150 D. 20,100 E. 21,500

23. Which of the following integers CANNOT by expressed as the sum of two prime numbers?

A. 8 B. 9 C. 10 D. 11 E. 12

24. Which of the following represents the total dollar amount that a customer would have to pay for an item that cost *s* dollars plus a sales tax of 8 percent, in terms of *s*?

A. *s*/0.08 B. *s*/1.08 C. *s*/8 D. 0.08*s* E. 1.08*s*

25. Marie earned \$0.75 for every mile she walked in a charity walkathon. If she earned a total of \$ 18.00 at that rate, how many miles did she walk?

A. 13.5 B. 17.5 C. 21 D. 22.5 E. 24

26. Which of the following operations carried out on both the numerator and the denominator of a fraction will always produce an equivalent fraction? **Indicate all such operations.**

A. Adding 2 B. Multiplying by 5 C. Dividing by 100

27. $\frac{x(x-2)}{(x+3)(x-4)^2} = 0$

Quantity A	**Quantity B**
x	-2

28.

Quantity A	**Quantity B**
$\frac{1}{x}$	$\frac{(x+1)}{x^2}$

29.

Quantity A	**Quantity B**
$\|m + 25\|$	$25 - m$

30. $x > 0$

Quantity A	**Quantity B**
x percent of $100x$	x^2

31. $(4x - 2y)(6x + 3y) = 18$

Quantity A	**Quantity B**
$4x^2 - y^2$	6

32. The total cost of 8 bagels at a bakery is x dollars. At this cost per bagel, which of the following represents the total cost, in dollar, of y bagels?

A.8/xy B. 8x/y C. 8y/x D. xy/8 E. x/8y

33. Which of the following is equal to $\frac{2^{x-y}}{2^{x+y}}$ for all integers *x* and *y*?

A. 4^{-x} B. 4^{-y} C. $4xy$ D. 4^{x} E. 4^{y}

34. How many integers are in the solution set of the inequality $x^2 - 10 < 0$?

A. Two B. Five C. Six D. Seven E. Ten

35. A group of 5,000 investors responded to a survey asking whether they owned stocks and whether they owned bonds. Of the group, 20 percent responded that they owned only one of the two types of investments. If *r* is the number of investors in the group who owns stocks but not bonds, which of the following represents the number of investors in the group who own bonds, but not stocks, in terms of *r*?

A. 5,000-*r* B. 1,000-*r* C. *r*-1,000 D. 1,000*r* E. (0.2)(5,000-*r*)

36. If $\frac{m+n}{4+5} = \frac{m}{4} + \frac{n}{5}$ Which of the following statements must be true?

A. $m = n$ B. $5m = 4n$ C. $5m = -4n$ D. $25m = 16n$ E. $25m = -16n$

37. Machine A, working alone at its constant rate, produces x pounds of peanut butter in 12 minutes. Machine B, working alone at its constant rate, produces x pounds of peanut butter in 18 minutes. How may minutes will it take machines A and B, working simultaneously at their respective constant rates, to produce x pounds of peanut butter?

38. In the xy-plane, one of the vertices of square S is the point (2, 2). The diagonals of S intersect at the point (6, 6)

Quantity A	**Quantity B**
The area of S	64

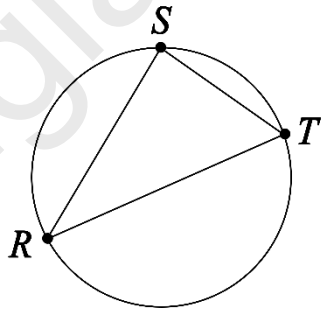
39.

Quantity A	**Quantity B**
the length of a side of a regular pentagon with a perimeter of 12.5	the length of a side of a regular hexagon with a perimeter of 15

40. A line in the xy-plane contains the points (5, 4) and (2, -1).

Quantity A	**Quantity B**
the slope of the line	0

41.



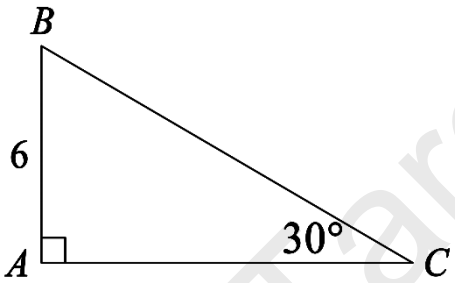
In the figure above, triangle RST is inscribed in a circle, the measure of angle RST is greater than 90°, and the area of the circle is 25π.

Quantity A	**Quantity B**
the length of line segment RT	10

42. A construction company will produce identical, metal supports in the shape of a right triangle with legs of length 3 feet and 4 feet, the three sides of each triangular support are to be constructed of metal stripping, if the company has a total of 6,000 feet of metal stripping and there is no waste of material in the construction of the supports, what is the greatest possible number of supports that the company can produce?

A. 428 B. 500 C. 545 D. 600 E. 1,000

43.



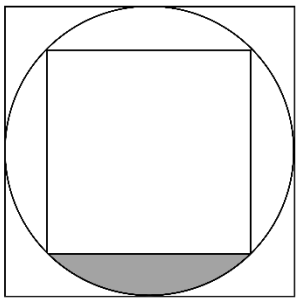
what is the area of triangle ABC shown above?

A. 18 B. 20 C. $12\sqrt{3}$ D. $18\sqrt{3}$ E. 36

44. The volume V of a right circular cylinder is $V = \pi r^2 h$, where r is the radius of the base and h is the height of the cylinder. If the volume of right circular cylinder is 45π and its height is 5, what is the circumference of this base.

A. 3 B. 9 C. 3π D. 6π E. 9π

45.



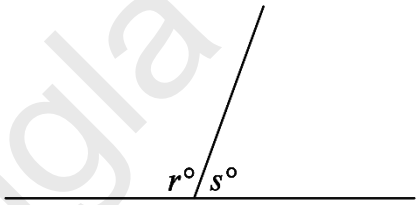
In the figure above, if the square inscribed in the circle has an area of 16, what is the area of the shaded region.

A. 2π-1 B. 2π-4 C. 4π-2 D. 4π-4 E. 8π-4

46. The radius of circle A is r, and the radius of circle B is 3r/4. What is the ratio of the area of circle A to the area of circle B?

A. 1 to 4 B. 3 to 4 C. 4 to 3 D. 9 to 16 E. 16 to 9

47.



In the figure above, if $\frac{r}{r+s} = \frac{5}{8}$, what is the value of r?

48. The average (arithmetic mean) of 4 donations to a charity was $80. Two of the 4 donations were $90 and $60.

Quantity A	**Quantity B**
The average of the other 2 donations	$80

49. **AGE DISTRIBUTION OF EMPLOYEES OF A BUSINESS**

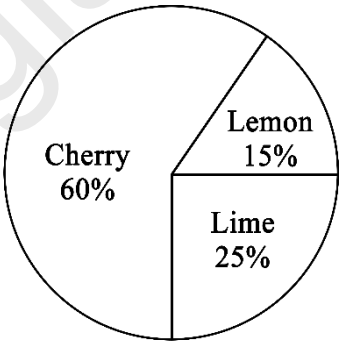
Age Interval	Number of Employees
15–24	17
25–34	24
35–44	26
45–54	21
55–64	18
Total	106

Quantity A	**Quantity B**
the range of the ages of the 20 oldest employees of the business	11 years

50.

Quantity A	**Quantity B**
the sum of the first 7 positive integers	7 times the median of the first 7 positive integers

51.



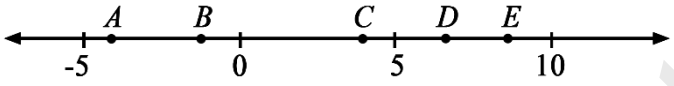
The graph above shows the distribution of three different flavors of hard candies--cherry, lemon, and lime-in a candy jar. If all the lemon candies are removed and no other candies are added or removed, what fraction of the remaining candied in the jar will be lime candies?

A. 1/7 B. 2/9 C. 1/4 D. 5/17 E. 5/12

52. R is a list of 15 consecutive integers, and T is a list of 21 consecutive integers. The median of the integers in list R is equal to the least integer in list T. If the two lists are combined into one list of 36 integers, how many different integers are on the combined list?

A. 25 B. 27 C. 28 D. 32 E. 36

53.



From the 5 points A, B, C, D, and E on the number line above, 3 different points are to be randomly selected. What is the probability that the coordinates of the 3 pints selected will all be positive?

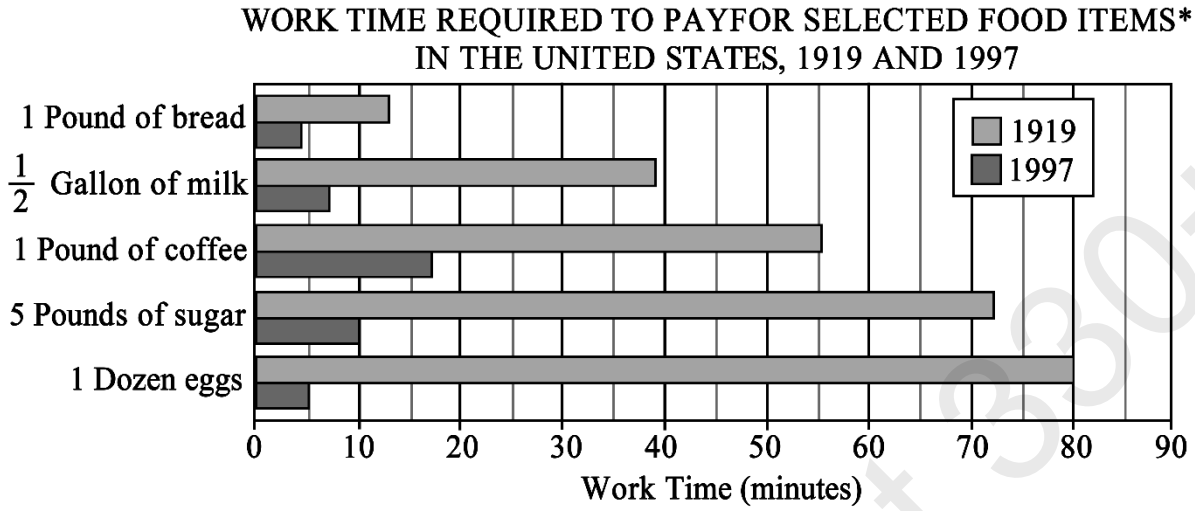
A. 1/10 B. 1/5 C. 3/10 D. 2/5 E. 3/5

54.

City	Population（in thousands）
New York	8,008
Los Angeles	3,695
Chicago	2,896
Houston	1,954
Philadelphia	1,518

The population of the five most populous cities in the United States in April 2000 are listed in the table above. The total population of the United States in April 2000 was 281,422,000. Based on the data shown, the population of the three most populous cities combined was what percent of the total population of the United States in April 2000. **Give your answer to the nearest whole percent.**

Question 55 to 58 are based on the following data.



For each year, the work time, in hours, required to pay for a food item is the average price of the food item divided by the average hourly wage for rank-and-fill manufacturing workers. The work time in the graph is given in minutes.

55. In 1997, at the rates shown in the graph, the work time required to pay for which of the following food item was greatest.

A. 10 pounds of bread B. 5 gallons of milk C. 3 pounds of coffee D. 20 pounds of sugar E. 5 dozen eggs

56. If the average hourly wage of the rank-and-file manufacturing worker in 1919 was \$0.55, which of the following is closest to the average price of 1/2 gallon of milk in 1919?

A. \$0.80 B. \$0.65 C. \$0.50 D. \$0.35 E. \$0.20

57. At the rates shown in the graph, which of the following is closest to the number of hours of work time that was required to pay for 20 kilograms of sugar in 1919? (1 kilogram equals 2.2 pounds, rounded to the nearest 0.1 pound.)

A. 11 B. 14 C. 20 D. 31 E. 53

58. Eight hours of work time paid for approximately how many more dozen eggs in 1997 than it did in 1919?

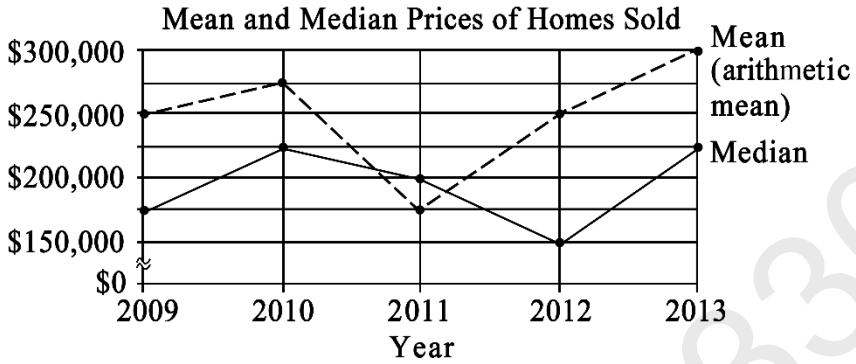
A. 50 B. 70 C. 90 D. 110 E. 130

Question 59 to 62 are based on the following data.

HOMES SOLD IN COUNTY *T*, 2009–2013

Number of Homes Sold

Year	Number
2009	503
2010	351
2011	390
2012	410
2013	290



59. Which of the following is closest to the mean of the prices of the 700 homes sold in 2012 and 2013 combined?

A. $265,000 B. $270,000 C. $275,000 D. $280,000 E. $285,000

60. By approximately what percent did the median price of homes sold in County T decrease from 2011 to 2012

A. 10% B. 15% C. 25% D. 33% E. 50%

61. Based on the information given, which of the following statements about the sum of the prices of all the homes sold in a given year must be true? **Indicate all such statements.**

A. The sum of the prices for 2010 was greater than the sum for 2009
B. The sum of the prices for 2010 was greater than the sum for 2011
C. The sum of the prices for 2009 was greater than the sum for 2011

62. County T collected a tax equal to 3 percent of the price of each home sold in the county in 2009. Approximately how much did County T collect in taxes from all homes sold in 2009?

A. $38,000 B. $260,000 C. $380,000 D. $2,600,000 E. $3,800,000

Question 63 to 65 are based on the following data.

Year	Per Capita Income	Revenue per Student
1930	$6,610	$710
1940	6,960	950
1950	9,540	1,330
1960	12,780	2,020
1970	17,340	3,440
1980	20,150	4,400
1990	24,230	5,890

63. From 1930 to 1990, approximately what was the average increase per year in per capita come?

A. $150 B. $200 C. $250 D. $300 E. $350

64. In 1950 the revenue per student was approximately what percent of the per capita income?

A. 8% B. 11% C. 14% D. 17% E. 20%

65. For how many of the seven years shown was the revenue per student less than 1/5 of the per capita income for the year.

A. one B. Two C. Three D. Four E. Five

66. $x = (z-1)^2 \quad y = (z+1)^2$

Quantity A	**Quantity B**
The average (arithmetic mean) of x and y	z^2

67. x, y and z are the lengths of the sides of a triangle.

Quantity A	**Quantity B**
$x + y + z$	$2z$

68. At a club meeting, there are 10 more club members than nonmembers. The number of club members at the meeting is c.

Quantity A	**Quantity B**
The total number of people at the club meeting	$2c$-10

69. n is a positive integer that is greater than 3 and had d positive divisors.

Quantity A	**Quantity B**
n	2^{d-1}

70. $xy = 8$ and $x = y - 2$

Quantity A	**Quantity B**
y	0

71. The area of circle W is 16π and the area of circle Z is 4π. What is the ratio of the circumference of W to the circumference of Z?

A. 2 to 1 B. 4 to 1 C. 8 to 1 D. 16 to 1 E. 32 to 1

72. In the xy-plane, a quadrilateral has vertices at (-1, 4), (7, 4), (7, -5) and (-1, -5). What is the perimeter of the quadrilateral.

A. 17 B. 18 C. 19 D. 32 E. 34

73.

DISTRIBUTION OF THE
HEIGHTS OF 80 STUDENTS

Height(centimeters)	Number of Students
140-144	6
145-149	26
150-154	32
155-159	12
160-164	4
Total	80

The table above shows the frequency distribution of the heights of 80 students. What is the least possible range of the heights of the 80 students?

A. 15 B. 16 C. 20 D. 24 E. 28

74. Which of the following functions f defined for all numbers x has the property that $f(-x) = -f(x)$ for all numbers x?

A. $f(x) = \frac{x^3}{x^2+1}$ B. $f(x) = \frac{x^2-1}{x^2+1}$ C. $f(x) = x^2(x^2-1)$

D. $f(x) = x(x^3-1)$ E. $f(x) = x^2(x^3-1)$

75. If 10^x equals 0.1 percent of 10^y, where x and y are integers, which of the following must be true?

A. $y = x + 2$ B. $y = x + 3$ C. $x = y + 3$ D. $y = 1{,}000x$ E. $x = 1{,}000y$

76. A car dealer received a shipment of cars, half of which were black, with the remainder consisting of equal numbers of blue, silver, and white cars. During the next month, 70 percent of the black cars, 80 percent of the blue cars, 30 percent of silver cars, and 40 percent of the white cars were sold. What percent of the cars in the shipment were sold during that month.

A. 36% B. 50% C. 55% D. 60% E. 72%

77. If an investment of P dollars is made today and the value of the investment doubles every 7 years, what will be the value of the investment, in dollars, 28 years from today?

A. $8P^4$ B. P^4 C. $16P$ D. $8P$ E. $4P$

78. $x < 0$

Quantity A	**Quantity B**
x^5	x^4

79.

Quantity A	**Quantity B**
$(x+4)(y+3)$	$(x+3)(y+4)$

80. $\bar{b}$ represents the decimal in which the digit b is repeated without end.

Quantity A	**Quantity B**
$0.\bar{3} + 0.\bar{7}$	1.0

81. A company plans to manufacture two types of hammers, type R and type S. The cost of manufacturing each hammer of type S is \$0.05 less than twice the cost of manufacturing each hammer of type R.

Quantity A	**Quantity B**
The cost of manufacturing 1,000 hammers of type R and 1,000 hammers of type S	the cost of manufacturing 1,500 hammers of type S

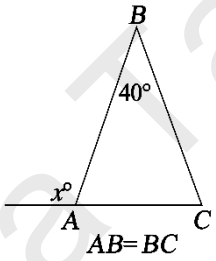
82.

Quantity A	Quantity B
$\frac{\left(\frac{1}{4}\right)^{-1}+\left(\frac{1}{4}\right)^{-2}+\left(\frac{1}{4}\right)^{-3}}{4}$	21

83. The radius of circle A is 12 greater than the radius of circle B.

Quantity A	Quantity B
The circumference of circle A minus the circumference of circle B	72

84.



$AB = BC$

Quantity A	Quantity B
x	120

85. In right triangle ABC, the ratio of the lengths of the two legs is 2 to 5. If the area of triangle ABC is 20, what is the length of the hypotenuse?

A. 7 B. 10 C. $4\sqrt{5}$ D. $\sqrt{29}$ E. $2\sqrt{29}$

86. According to surveys at a company, 20 percent of the employees owned cell phones in 1994, and 60 percent of the employees owned cell phones in 1998. From 1994 to 1998, what was the percent increase in the fraction of employees who owned cell phones?

A. 3% B. 20% C. 30% D. 200% E. 300%

87. Three pumps, P, R, and T, working simultaneously at their respective constant rates, can fill a tank in 5 hours. Pumps P and R, working simultaneously at their respective constant rates, can fill the tank in 7 hours. How many hours will it take pump T, working alone at its constant rate, to fill the tank?

A. 1.7 B. 10.0 C. 15.0 D. 17.5 E. 30.0

88. The perimeter of a flat rectangular lawn is 42 meters. The width of the lawn is 75 percent of its length. What is the area of the lawn, in square meters?

A. 40.5 B. 96 C. 108 D. 192 E. 432

89. If x and y are integers and $x = \frac{(2)(3)(4)(5)(7)(11)(13)}{39y}$, which of the following could be the value of y?

A. 15 B. 28 C. 38 D. 64 E. 143

90. Of the 40 specimens of bacteria in a dish, 3 specimens have a certain trait. If 5 specimens are to be selected from the dish at random and without replacement, which of the following represents the probability that only 1 of the 5 specimens selected will have the trait?

A. $\frac{C_5^1}{C_{40}^3}$ B. $\frac{C_5^1}{C_{40}^5}$ C. $\frac{C_{40}^3}{C_{40}^5}$ D. $\frac{C_3^1 C_{37}^4}{C_{40}^3}$ E. $\frac{C_3^1 C_{37}^4}{C_{40}^5}$

91. Two different positive integers x and y are selected from the odd integers that are less than 10. If z = x + y and z is less than 10, which of the following integers could be the sum of x, y, and z? **Indicate all such integers.**

A. 8 B. 9 C. 10 D. 12 E.14
F.15 G.16 H.18

92. Of the students in a school, 20 percent are in the science club and 30 percent are in the band. If 25 percent of the students in the school are in the band but are not in the science club, what percent of the students who are in the science club are not in the band?

A. 5% B. 20% C. 25% D. 60% E. 75%

93. $y < -6$

Quantity A	**Quantity B**
y	-5

94. x is an integer and $23 < x < 27$

Quantity A	**Quantity B**
The median of the five integers 23, 24, 26, 27 and x	25

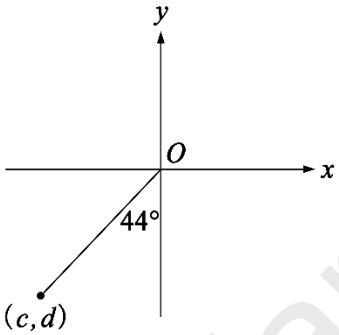
95. r and t are consecutive integers and $p = r^2 + t$

Quantity A	**Quantity B**
$(-1)^p$	-1

96. The sum of the annual salaries of the 21 teachers at School X is $781,200. Twelve of the 21 teachers have an annual salary that is less than $37,000.

Quantity A	**Quantity B**
the average (arithmetic mean) of the annual salaries of the teachers at School X	the median of the annual salaries of the teachers at School X

97.



Quantity A	**Quantity B**
c	d

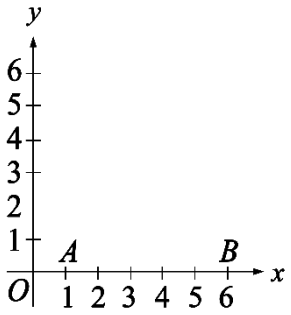
98. $x > 0$ and $x \neq 1$

Quantity A	**Quantity B**
$(2x^{-4})(3x^2)$	$\frac{24x}{4x^2}$

99.

Quantity A	**Quantity B**
the length of a leg of an isosceles right triangle with area R	the length of a side of a square with area R

100.



Points A and B are shown in the xy-plane above. Point C (not shown) is above the x-axis so that the area of triangle ABC is 10. Which of the following could be the coordinates of C? **Indicate all such coordinates.**

A. (0,4) B. (1,3) C. (2,5) D. (3,4) E. (4,5)

101.

AVERAGE RATING OF PRODUCT *X*
GIVEN BY THREE GROUPS OF PEOPLE

Group	Number of People in Group	Average Rating
A	45	3.8
B	25	4.6
C	30	4.2

Each of the people in three groups gave a rating of Product X on a scale from through 5. For each of the groups, the table above shows the number of people in the group and the average (arithmetic mean) of their ratings. What is the average of the ratings of the product given by the 100 people in the three groups combined? **Give your answer to the nearest 0.1.**

102. The first term in a certain sequence is 1, the 2nd term in the sequence is 2, and, for all integers $n \geq 3$, the nth term in the sequence is the average (arithmetic mean) of the first n–1 terms in the sequence. What is the value of the 6th term in the sequence? **Give your answer as a fraction.**

Question 103 to 106 are based on the following data.

SIGHTINGS OF SELECTED BIRD SPECIES
IN PARK *H* IN 1999, BY SEASON

Species	Number of sightings			
	Winter	Spring	Summer	Fall
Cardinal	30	18	11	20
Goldfinch	6	12	6	9
Junco	12	0	0	6
Nuthatch	8	2	0	4
Robin	6	12	28	18
Sparrow	20	19	23	22
Wren	0	18	30	12

103. In the winter, 2/3 of the cardinal sightings, 1/2 of the junco sightings, and 1/4 of the sparrow sightings were in January. What fraction of the total number of sightings of these three bird species in the winter were in January?

A. 1/4 B. 1/3 C. 1/2 D. 2/3 E. 3/4

104. For which of the following bird species is the standard deviation of the numbers of sightings shown for the four seasons least?

A. Cardinal B. Junco C. Robin D. Sparrow E. Wren

105. Which of the following is closest to the average (arithmetic mean) number of cardinal sightings for the 4 seasons?

A. 12 B. 14 C. 16 D. 18 E. 20

106. By what percent did the number of wren sightings increase from spring to summer?

Give your answer to the nearest whole percent.

107. $w > 1$

Quantity A	**Quantity B**
$7w - 4$	$2w + 5$

108. Which of the following numbers is farthest from the number 1 on the number line?

A. -10 B. -5 C. 0 D. 5 E. 10

109. $6 < x < 7$

$y = 8$

Quantity A	**Quantity B**
$\frac{x}{y}$	0.85

110. A certain jar contains 60 jelly beans—22 white, 18 green, 11 yellow, 5 red, and 4 purple. If a jelly bean is to be chosen at random, what is the probability that the jelly bean will be neither red nor purple?

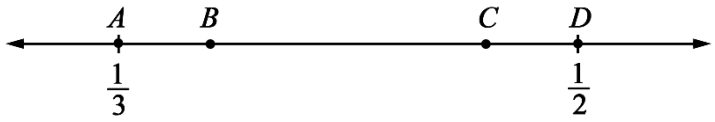
A. 0.09 B. 0.15 C. 0.54 D. 0. 85 E. 0.91

111. An office has 6 employees. The manager must create a committee consisting of 3 employees.

Quantity A	**Quantity B**
Number of different committees possible	40

112. A theater sells children's tickets for half the adult ticket price. If 5 adult tickets and 8 children's tickets cost a total of $81, what is the cost of an adult ticket?

113.



Points A, B, C, and D are on the number line above, and AB=CD=1/3(BC). What is the coordinate of C?

A. 13/30 B. 9/20 C. 11/24 D. 7/15 E. 29/60

114. The integers x and y are greater than 1. If (4x)(7y) = 756, what is the value of x + y ?

115. If $xy^2 = 12$ and $xy = 4$, then x =

A. 1 B. 2 C. √3 D. 2/3 E. 4/3

116. In the xy-plane, triangular region R is bounded by the lines x = 0, y = 0, and 4x + 3y = 60. Which of the following points lie inside region R?

Indicate all such points.

A. (2,18) B. (5,12) C. (10.7) D. (12,3) E. (15,2)

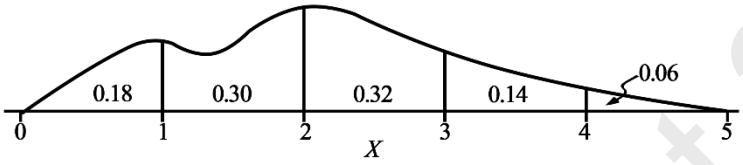
117. At the beginning of a trip, the tank of Diana's car was filled with gasoline to half of its capacity. During the trip, Diana used 30 percent of the gasoline in the tank. At the end of the trip, Diana added 8 gallons of gasoline to the tank. The capacity of the tank of Diana's car was x gallons. Which of the following expressions represent the number of gallons of gasoline in the tank after Diana added gasoline to the tank at the end of the trip? **Indicate all such expressions.**

A. $\frac{x}{2} - \frac{3x}{20} + 8$ B. $\frac{7x}{20} + 8$ C. $\frac{3x}{20} + 8$ D. $\frac{x}{2} + \frac{3x}{20} - 8$ E. $\frac{7x}{20} - 8$

118. How many integers are there in the set $-4 < x^2 + 5x < 14$?

A. 0 B. 1 C. 2 D. 3 E. 4

119.



The figure above shows the probability distribution of a continuous random variable X. For each of the five intervals shown, the figure gives the probability that the value of X is in that interval. What is the probability that 1 < X < 4 ?

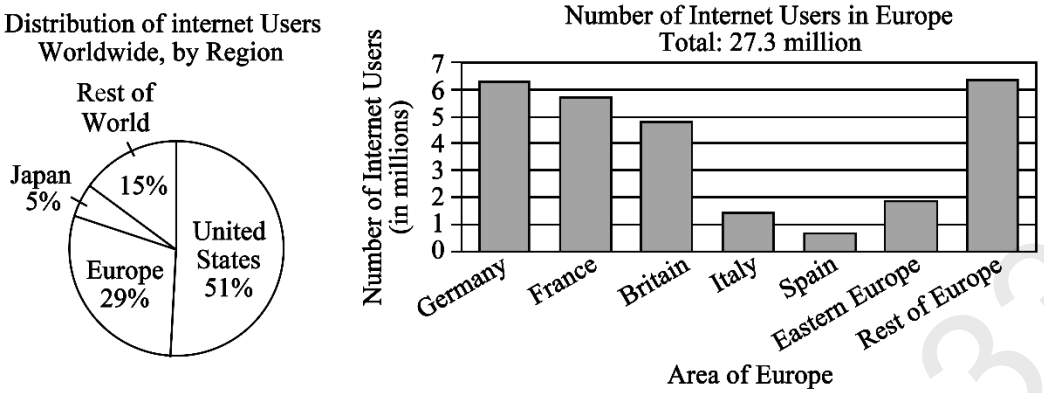
120. Hal has 4 girl friends and 5 boy friends. In how many different ways can Hal invite 2 girls and 2 boys to his birthday party?

A. 54 B. 60 C. 72 D. 120 E. 240

121. If a and b are the two solutions of the equation $x^2 - 5x + 4 = 0$, what is the value of $\left(\frac{1+a}{a}\right)\left(\frac{1+b}{b}\right)$?

Question 122 to 125 are based on the following data.

INTERNET USE IN YEAR *X*



122. Which of the following is closest to the percent of Internet users in Europe who were in countries other than Germany, France, Britain, Italy, and Spain?

A. 30% B. 34% C. 38% D. 42% E. 46%

123. Approximately what was the range of the numbers of Internet users in the seven areas of Europe shown in the bar graph?

A. 6.5 million B. 5.5 million C. 3.5 million D. 3.0 million E. 2.5 million

124. The number of Internet users in the United States was approximately how many times the number of Internet users in Italy?

A. 5 B. 15 C. 20 D. 25 E. 35

125. Based on the information given, which of the following statements about Internet use in year X must be true? **Indicate all such statements.**

A. The United States had more Internet users than all other countries in the world combined.
B. Spain had fewer Internet users than any country in Eastern Europe.
C. Germany and France combined had more than 1/3 of the Internet users in Europe.

126. If $-1 < x < y < 0$, which of the following shows the expressions xy, x^2y , and xy^2 listed in order from least to greatest?

A. xy , x^2y , xy^2 B. xy , xy^2 , x^2y C. xy^2 , xy , x^2y

D. xy^2 , x^2y , xy E. x^2y , xy^2 , xy

127. Which of the following is closest to $\sqrt{2.3 \times 10^9}$?

A. 50,000 B. 150,000 C. 500,000 D. 1,500,000 E. 5,000,000

128. The relationship between temperature C, in degrees Celsius, and temperature F, in degrees Fahrenheit, is given by the formula $F = \frac{9}{5}C + 32$. If a recipe calls for an oven temperature of 210 degrees Celsius, what is the oven temperature in degrees Fahrenheit?

A. 320 B. 350 C. 410 D. 420 E. 500

129. Each year, the members of a book club select novels and nonfiction books to read. The club meets 3 times to discuss each novel and 5 times to discuss each nonfiction book they select.

Last year, the club met 52 times and discussed 12 books. How many novels did the club discuss last year?

A. 2 B. 4 C. 5 D. 7 E. 14

130. The equations $x^2 - 2x - 35 = 0$ and $(x + m)(x - n) = 0$ have the same solutions.

Quantity A	**Quantity B**
m	n

第二节. 真•170

1. In a graduating class of 236 students, 142 took algebra and 121 took chemistry. What is the greatest possible number of students that could have taken both algebra and chemistry?

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

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

3. At a certain university, 60% of the professors are women, and 70% of the professors are tenured. If 90% of the professors are women, tenured, or both, then what percent of the men are tenured?

A. 25 B. 37.5 C. 50 D. 62.5 E. 75

4. In the game of Dubblefud, red chips, blue chips and green chips are each worth 2, 4 and 5 points respectively. In a certain selection of chips, the product of the point values of the chips is 16,000. If the number of blue chips in this selection equals the number of green chips, how many red chips are in the selection?

A. 1 B. 2 C. 3 D. 4 E. 5

5. The decorating committee for a dance plans to fringe the 3-inch-wide end of a streamer by making small cuts every 1/16 inch. How many cuts must be made to fringe the end?

A. 45 B. 46 C. 47 D. 48 E. 49

6. Which of the following is closest to the average (arithmetic mean) of the 9 changes in the value of imports between consecutive years from 2000 to 2009?

A. $260 million B. $320 million C. $400 million D. $480 million E. $640 million

VALUE OF IMPORTS TO AND EXPORTS FROM COUNTRY *T*, 2000–2009
(in United States dollars)

*1 billion = 1,000,000,000

7. List K consists of the numbers -10, -5, 0, 5, and 10. Which of the following lists of numbers have the same range as the numbers in list K? Indicate all such lists.

A. -15, -1, 0, 1, 15 B. -7, -4, -2, 1, 13 C. 0, 1, 2, 5, 8, 10
D. 2, 3, 5, 15, 19, 22 E. 4, 5, 6, 24

8. The table below shows the frequency distribution of the values of a variable Y. What is the mean of the distribution? Give your answer to the nearest 0.01.

Y	Frequency
$\frac{1}{2}$	2
$\frac{3}{4}$	7
$\frac{5}{4}$	8
$\frac{3}{2}$	8
$\frac{7}{4}$	9

9. During an experiment, the pressure of a fixed mass of gas increased from 40 pounds per square inch (psi) to 50 psi. Throughout the experiment, the pressure, P psi, and the volume, V cubic inches, of the gas varied in such a way that the value of the product PV was constant.

Quantity A	**Quantity B**
the volume of the gas when the pressure was 40 psi	1.2 times the volume of the gas when the pressure was 50 psi

10. $N=824^x$ where x is a positive integer.

Quantity A	**Quantity B**
the number of possible values of the units digit of N	4

11. The distribution of the numbers of hours that students at a certain college studied for final exams have a mean of 12 hours and a standard deviation of 3 hours. Which of the following numbers of hours are within 2 standard deviations of the mean of the distribution? Indicate all such numbers.

A. 2 B. 5 C. 10 D. 14 E. 16

12. a and b are primes. a+b=12

Quantity A	**Quantity B**
b	8

13. A and B are independent events, and the probability that both events occur is 1/2. Which of the following could be the probability that event A occurs? Indicate all such probabilities.

A. 0 B. 1/4 C. 1/2 D. 3/4 E. 1

14. Last year Leo bought two paintings. This year he sold them for $2,000 each. On one, he made a 25% profit, and on the other he had a 25% loss. What was his net loss or profit?

A. He broke even.
B. He lost less than $100.
C. He lost more than $100.
D. He earned less than $100.
E. He earned more than $100.

15. The system of equations has how many solutions? $3x - 6y = 9,\ 2y - x - 3 = 0$

A. None B. Exactly 1 C. Exactly 2 D. Exactly 3 E. Infinitely many

16. Events A and B are independent. The probability that events A and B both occur is 0.6.

Quantity A	**Quantity B**
The probability that event A occurs	0.3

17. A-town and B-ville are connected by a straight, 420-mile road. At noon, Atu left A-town for Bville, and Brek left B-ville for A-town. If Atu travels at 56 miles per hour and Brek travels at 49 miles per hour, how many miles apart will Atu and Brek be 1 hour before they meet?

18. 16,000 has how many positive divisors?

19. At a sale, the cost of each tie was reduced by 20 percent and the cost of each belt was reduced by 30 percent.

Quantity A	**Quantity B**
The percent reduction on the total cost of 1 tie and 2 belts	25%

20. In a data set of 10,000 numbers varying from 20 to 80, the number 62 is the 60^{th} percentile and the number 74 is the n^{th} percentile.

Quantity A	**Quantity B**
n	70

21. Mike, Scott, Jim, Kate and Pete each have a different number of assignments this month. Pete has fewer assignments than Kate, Kate has more assignments than Mike, Mike has more assignments than Jim, and Jim has more assignments than Scott. Which of the following could be the person who has the median number of assignments this month for the five people listed? Indicate all such answers.

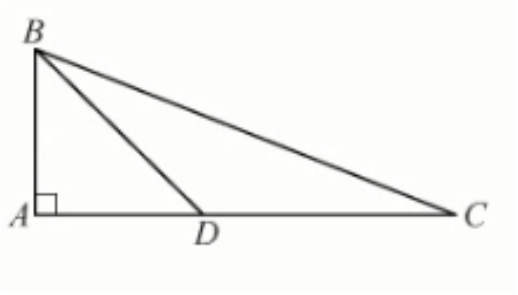
A. Mike B. Scott C. Jim D. Kate E. Pete

22. A certain brand of dishwashing liquid was sold in two different bottle sizes. The small bottle was sold with 2/5 as many ounces of liquid as the large bottle and was sold at a price that was 1/2 the price of the large bottle.

Quantity A	**Quantity B**
The price per ounce of the liquid in the small bottle	The price per ounce of the liquid in the large bottle

23.

Quantity A	**Quantity B**
The measure of angle BDC	120



24.

Quantity A	**Quantity B**
The area of a triangular region with perimeter 8	8

25. A jar contains exactly 10 dimes and x quarters and no other coins. If a coin is randomly selected from the jar, the probability that a quarter is selected is 0.6. What is the value of x.

A. 5 B. 6 C. 8 D.12 E. 15

26. If a square region with side x and a circular region with radius r have the same area, then x must be how many times as great as r?

A. $\frac{1}{\pi}$ B. $\frac{1}{\sqrt{\pi}}$ C. $\sqrt{\pi}$ D. π E. π^2

27. The population of Country X for 1980 was p. The population of Country X increased by 3.8 percent in each of the next two years.

Quantity A	**Quantity B**
The population of Country X for 1982.	1.076p

28. Last Monday a certain store sold 17 wrenches at x dollars each. Last Tuesday the store reduced its prices and sold an additional 8 wrenches at 0.5x dollars each. Which of the following is equal to the average (arithmetic mean) price, in dollars, of the 25 wrenches that the store sold last Monday and Tuesday?

A. 0.68x B. 0.73x C. 0.76x D. 0.81x E. 0.84x

29. Of the students in a certain group, 22 percent are juniors and 26 percent are seniors.

Quantity A	**Quantity B**
The ratio of the number of juniors in the group to the number of seniors in the group.	4/5

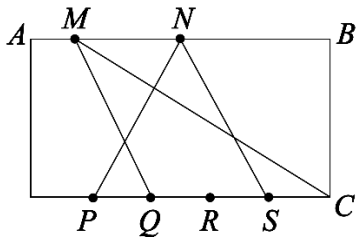
30. The area of a circular region is 5π

Quantity A	**Quantity B**
The diameter of the circular region	$\sqrt{20}$

31. Magdalena took 1 hour to complete a task that had 60 steps. She took 20 minutes to complete the first 30 steps of the task.

Quantity A	**Quantity B**
The average number of seconds per step that Magdalena took to complete the remaining 30 steps.	80

32.



In rectangle ABCD, side DC is divided into five equal segments by points P, Q, R and S.

Quantity A	**Quantity B**
The area of ΔMCQ	The area of ΔNSP

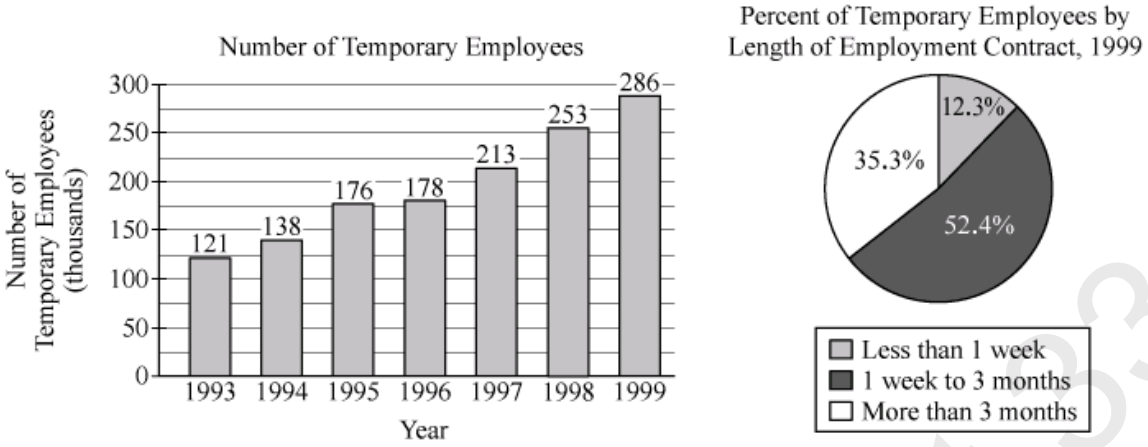
33. If x postage stamps were divided evenly among 4 boys, each boy would receive y postage stamps. If the x postage stamps were divided evenly among 6 boys, each boy would receive z postage stamps. If y - z =25, what is the value of x?

34. If 1 kilometer is approximately 0.62 mile, what is the approximate speed, in kilometers per hour, of a car that is traveling at a speed of 50 miles per hour?

A. 31 B. 41 C. 61 D. 71 E. 81

Question 35 to 37 are based on the following data.

TEMPORARY EMPLOYMENT IN GERMANY, 1993–1999



35. Which of the following is closest to the percent increase in the number of temporary employees from 1993 to 1999?

A. 36% B. 58% C. 136% D. 158% E. 236%

36. In 1999 approximately how many of the temporary employees had an employment contract with a length of at most 3 months?

A. 185,000 B. 150,000 C. 101,000 D. 35,000 E. 19,000

37. In 1998 the ratio of the number of female temporary employees to the number of male temporary employees was 1 to x, where x>0. In terms of x, what was the number, in thousands, of female temporary employees in 1998?

A. 253(x -1) B. 253(x+1) C. 253/x D. 253/(x -1) E. 253/(x +1)

38. $z*10^k = 6*10^m$, m = k +2

Quantity A	**Quantity B**
z	60

39. A newspaper ad stated: "Deduct an additional 50 percent of the already-reduced price of shoes and you'll save 60 percent of the original price" By what percent had the original price of shoes already been reduced?

A. 10% B. 20% C. 30% D. 40% E. 50%

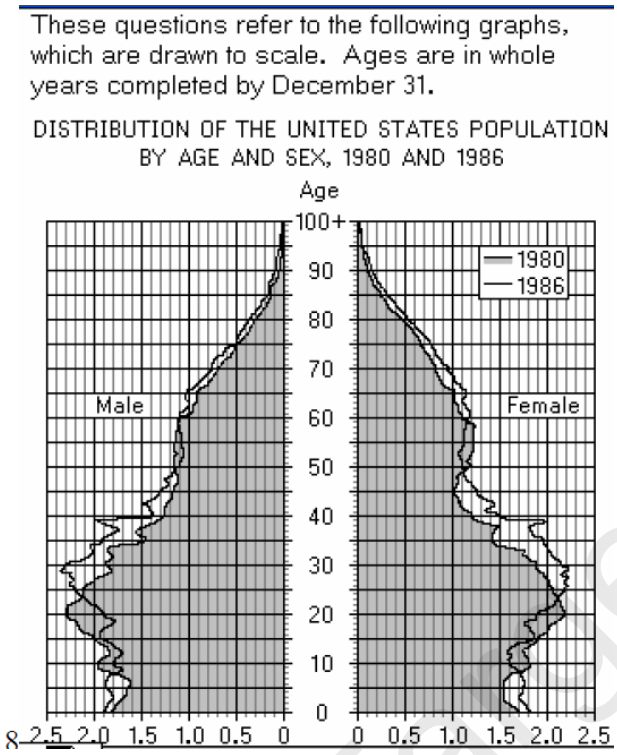
40. The phone extensions of a certain company run consecutively from 3000 to 3799. The phone extensions from 3020 to 3039 belong to the marketing department. If a company phone extension is chosen at random, what is the probability that the chosen extension will belong to the marketing department?

A. 0.01 B. 0.015 C. 0.02 D. 0.025 E. 0.03

41. List L consists of 27 consecutive odd integers.

Quantity A	**Quantity B**
The average (arithmetic mean) of the numbers in List L	The median of the numbers in list L

Question 42 to 44 are based on the following data.



42. Approximately how many more 10-year-old children were there in 1980 than in 1986?

A. 100,000 B. 200,000 C. 300,000 D. 400,000 E. 1000,000

43. The population of females was greater in 1980 than in 1986 for approximately what percent of the ages from 0 to 100 years?

A. 15% B. 25% C. 55% D. 75% E. 85%

44. The "combined age" of a group of people is the sum of the ages of all of the people in the group. Which of the following groups had the greatest combined age in 1986?

A. 20-year-old males B. 20-year-old females C. 60-year-old males
D. 60-year-old females E. 80-year-old females

PERCENT OF THE 300 PEOPLE IN GROUP 1 AND THE 400 PEOPLE IN GROUP 2 WHO HAVE SELECTED AILMENTS

Respiratory Ailment	Percent of people in Group 1 Who Have Ailment	Percent of People in Group 2 Who Have Ailment
Allergic sensitivity to endotxins	14%	21%
Asthma(allergic)	3%	4%
Asthma(nonallergic)	2%	3%
Hay fever	4%	10%
Sneezing and itchy eyes	8%	11%
Wheezing(allergic)	5%	6%
Wheezing(nonallergic)	2%	5%

45. What is the ratio of the number of people in group 2 with the ailment sneezing and itchy eyes to the total number of people in both groups with the ailment sneezing and itchy eyes?

46. In a probability experiment, G and H are independent events. The probability that G will occur is r, and the probability that H will occur is s, where both r and s are greater than 0.

Quantity A	**Quantity B**
the probability that either G will occur or H will occur, but not both	r+s –rs

47. A positive integer is a palindrome if it reads exactly the same from right to left as it does from left to right. For example, 5 and 66 and 373 are all palindromes. How many palindromes are there between 1 and 1,000, inclusive?

48. How many integers between 1 and 10^{21} are such that the sum of their digits is 2?

A. 190 B. 210 C. 211 D. 230 E. 231

49. In a group of 45 children, 60 percent of the children are boys, and 60 percent of the children are left-handed.

Quantity A	**Quantity B**
Number of boys who are left-handed	8

50. $m=10^{32}+2$. When m is divided by 11, the remainder is r.

Quantity A	**Quantity B**
r	3

51. Sixty-eight people are sitting in 20 cars and each car contains at most 4 people. What is the maximum possible number of cars that could contain exactly 1 of the 68 people?

A. 2 B. 3 C. 4 D. 8 E. 12

52.

APPARENT FAHRENHEIT TEMPERATURES
DUE TO WIND-CHILL FACTOR
(corresponding to actual temperatures and wind speeds)

WIND SPEEDS (mile per hour)	ACTUAL TEMPERATURES (degrees Fahrenheit)				
	-10	0	10	20	30
5	-15	-5	7	16	27
10	-34	-22	-9	3	16
15	-45	-31	-18	-5	9
20	-53	-39	-24	-10	4
25	-59	-44	-29	-15	1
30	-64	-49	-33	-18	-2
35	-67	-52	-35	-20	-4
40	-69	-53	-37	-21	-5

If the actual temperature is 13 degrees Fahrenheit and the wind speed is 14 miles per hour, then the apparent temperature could be:

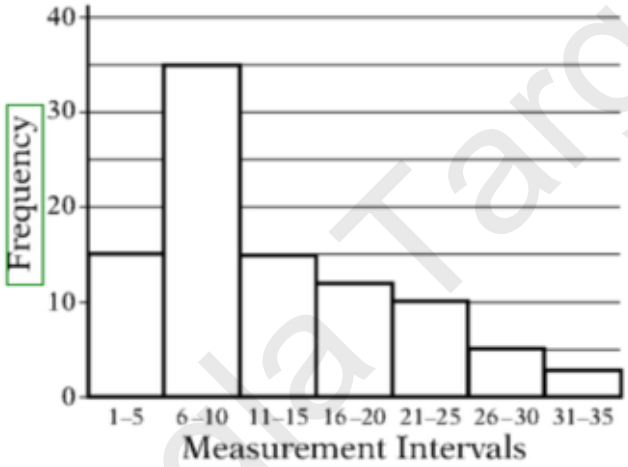
A. 5 degrees Fahrenheit B. -12 degrees Fahrenheit C. -20 degrees Fahrenheit
D. -25 degrees Fahrenheit E. -32 degrees Fahrenheit

53. Which of the following can be inferred from the table?

I. The apparent temperature for an actual temperature of 20 degrees Fahrenheit and a wind speed of 15 miles per hour is the same as that for an actual temperature of 30 degrees Fahrenheit and a wind speed of 40 miles per hour.
II. At a constant wind speed, as the actual temperature increases, the difference between the actual and the apparent temperatures also increases.
III. At a constant actual temperature of -10 degrees Fahrenheit, the apparent temperature decreases at a constant rate as the wind speed increases.

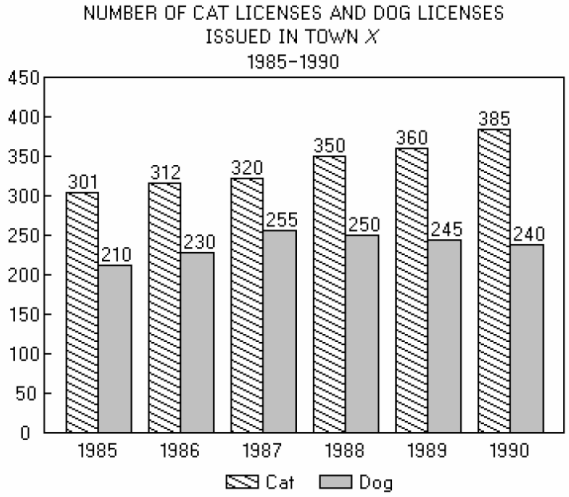
A. I only B. II only C. I and III only D. II and III only E. I, II and III

54. In the course of an experiment, 95 measurements were recorded, and all of the measurements were integers. The 95 measurements were then grouped into 7 measurement intervals. The graph above shows the frequency distribution of the 95 measurements by measurement interval.



Quantity A	**Quantity B**
The average (arithmetic mean) of the 95 measurements	The median of the 95 measurements

55.



According to the graph, which of the following statements must be true?

I.For each of the years 1986 through 1990, the number of cat licenses issued was greater than that of the previous year.

II. In Town X more households had dogs in 1986 than in 1985.

III. For at least one of the years shown, the number of cat licenses issued was more than 1.5 times the number of dog licenses issued.

A. I only B. II only C. III only D. I and II E. I and III

56. n is a positive integer, $x = 7n + 2$, and $y = 6n + 3$

Quantity A	**Quantity B**
the ones digit of x+y	5

57. If $a < b < 0$, which of the following numbers must be positive? Indicate all such numbers.

A. a-b B. $a^2 - b^2$ C. ab D. a^2b E. a^2+ab^2

58. Eight points are equally spaced on a circle. If 4 of the 8 points are to be chosen at random, what is the probability that a quadrilateral having the 4 points chosen as vertices will be a square?

A. 1/70 B. 1/35 C. 1/7 D. 1/4 E. 1/2

59. S = {1, 4, 7, 10} T = {2, 3, 5, 8, 13} x is a number in set S, and y is a number in set T.

Quantity A	Quantity B
The number of different possible values of the product xy	20

60. In a single line of people waiting to purchase tickets for a movie, there are currently 10 people behind Shandra. If 3 of the people who are currently in line ahead of Shandra purchase tickets and leave the line, and no one else leaves the line, there will be 8 people ahead of Shandra in line. How many people are in the line currently?

61. From 2011 to 2012, Jack's annual salary increased by 10 percent and Arnie's annual salary decreased by 5 percent. If their annual salaries were equal in 2012, then Arnie's annual salary in 2011 was what percent greater than Jack's annual salary in 2011? Give your answer to the nearest 0.1 percent.

62. For a certain distribution, the measurement 12.1 is 1.5 standard deviations below the mean, and the measurement 17.5 is 3.0 standard deviations above the mean. What is the mean of the distribution?

A. 13.8 B. 13.9 C. 14 D. 14.1 E. 14.2

Question 63 to 65 are based on the following data.

ANNUAL PERCENT CHANGE IN DOLLAR AMOUNT OF SALES AT FIVE RETAIL STORES FROM 2006 TO 2008

Store	Percent Change from 2006 to 2007	Percent Change from 2007 to 2008
P	10	-10
Q	-20	9
R	5	12
S	-7	-15
T	17	-8

63. If the dollar amount of sales at Store P was $800,000 for 2006, what was the dollar amount of sales at that store for 2008?

A. $727,200 B. $792,000 C. $800,000 D. $880,000 E. $968,000

64. At Store T, the dollar amount of sales for 2007 was what percent of the dollar amount of sales for 2008? Give your answer to the nearest 0.1 percent.

65. Based on the information given, which of the following statements must be true? Indicate all such statements.

A. For 2008 the dollar amount of sales at Store R was greater than that at each of the other four stores.
B. The dollar amount of sales at Store S for 2008 was 22 percent less than that for 2006.
C. The dollar amount of sales at Store R for 2008 was more than 17 percent greater than that for 2006

66. Set A has 50 members and set B has 53 members. At least 2 of the members in set A are not in set B. Which of the following could be the number of members in set B that are not in set A? Indicate all such numbers.

A. 53 B. 5 C. 13 D. 25 E. 50

67. For a certain probability experiment, the probability that event A will occur is 1/2 and the probability that event B will occur is 1/3. Which of the following values could be the probability that the event A ∪ B (that is, the event A or B, or both) will occur? Indicate all such values.

A. 1/3 B. 1/2 C. 3/4

68. In a factory, machine A operates on a cycle of 20 hours of work followed by 4 hours of rest, and machine B operates on a cycle of 40 hours of work followed by 8 hours of rest. Last week, the two machines began their respective cycles at 12 noon on Monday and continued until 12 noon on the following Saturday. On which days during that time period was there a time when both machines were at rest? Indicate all such days.

A. Monday B. Tuesday C. Wednesday D. Thursday E. Friday

69. In the xy-plane, line k has slope 2 and passes through the point (3, r).

Quantity A	**Quantity B**
r	3

70.

Quantity A	**Quantity B**
The number of 3-digit integers all of whose digits are even	The number of 3-digit integers all of whose digits are odd

71. In a certain state, each license plate consists of either three digits (between 0 and 9, inclusive) followed by two letters or three letters followed by two digits. For example, 055-XY, 123-PP, and AAA-70 are all acceptable plates. How many different license plates can the state issue?

72. If c and d are odd positive integers, which of the following could be odd? Indicate all such expressions.

A. c^d B. c^{d+1} C. $(c+1)^{d+1}$ D. $(c+d)^{c+d}$ E. $\frac{c^d}{d^c}$

73. If x>0, which of the following expressions are equal to 3.6 percent of 5x/12? Indicate all such expressions.

A. 3 percent of 20x B. x percent of 3/2 C. 3x percent of 0.2
D. 0.05 percent of 3x E. 3x/200

74. A: {71, 73, 79, 83, 87} B: {57, 59, 61, 67}

If one number is selected at random from set A, and one number is selected at random from set B, what is the probability that both numbers are prime?

A. 9/20 B. 3/5 C. 3/4 D. 4/5 E. 1

75. A knockoff website requires users to create a password using letters from the word MATRIX. If each password must have at least 4 letters and no repeated letters are allowed, how many different passwords are possible?

76. x and y are integers greater than 5. x is y percent of x^2.

Quantity A	**Quantity B**
x	10

77. If n is a positive integer, then n+ denotes a number such that n < n+< n +1.

Quantity A	**Quantity B**
20+/4+	5+

78. If n is a positive odd integer and $k=n^3+2n$, what is the value of $(-1)^k - (-1)^{k+1}$?

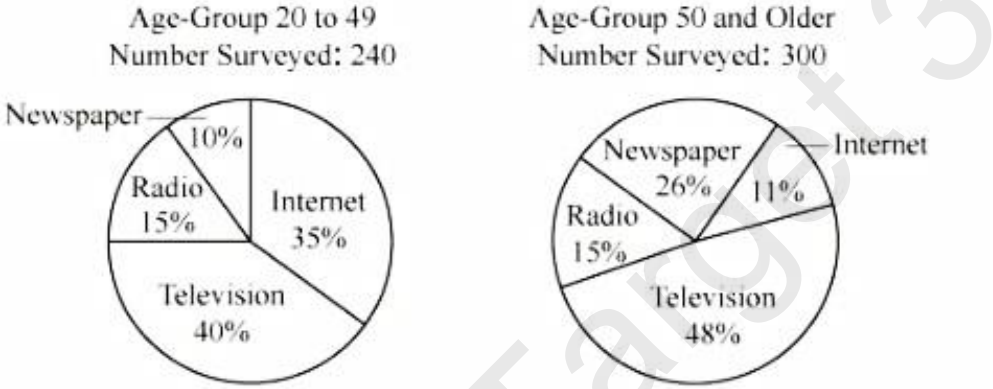
A. -2 B. -1 C. 0 D. 1 E. 2

79. A veterinarian has 70 clients who own cats, dogs, or both. Of these clients, 36 own cats, including 20 clients who own both cats and dogs. Which of the following statements must be true? Indicate all such statements.

A. There are 54 clients who own dogs.
B. There are 34 clients who own dogs but not cats.
C. There are 16 clients who own cats but not dogs.

Question 80 to 82 are based on the following data.

Survey* of preferred method to obtain news, by age-group



Each person surveyed indicated one of the four methods as his or her preferred method to obtain news.

80. What fraction of the people in the age-group 20 to 49 indicated newspaper or the Internet as their preferred method to obtain news?

81. Which of the following is closest to the percent of all the people survey who indicated the Internet as their preferred method to obtain news?

A. 18.8% B. 21.7% C.23.0% D.33.3% E.46.0%

82. For the age-group 50 and older, the number of people who indicated the Internet as their preferred method to obtain news is approximately what percent less than the number of people who indicated radio?

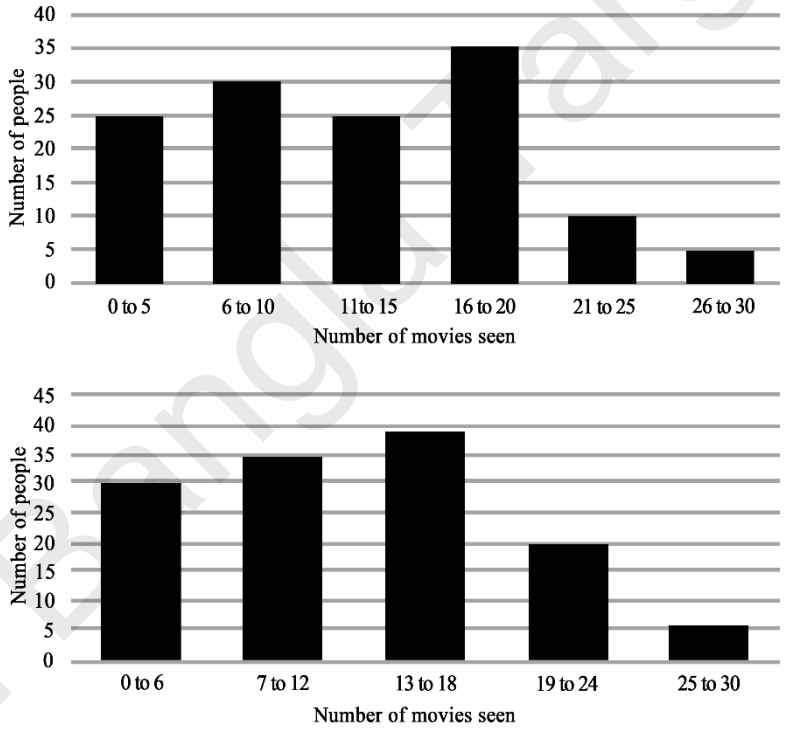
A. 12% B. 27% C. 36% D. 45% E. 50%

83. The table shows the number of pages in each of 5 textbooks. What is the greatest possible value of x for which the average (arithmetic mean) number of pages of the 5 textbooks is equal to the median number of pages of the 5 textbooks?

Textbook	Number of Pages
A	510
B	480
C	490
D	520
E	x

84.

Quantity A	**Quantity B**
The greatest possible value of $\frac{2}{x-y}$, where $9 \leq x \leq 12$ and $-2 \leq y \leq 8$	2



85. In a survey, 130 people were asked how many movies they had seen in the preceding year. Their responses varied from 0 to 30 movies. The graphs above show two different summaries of the same survey results. How many people responded that they had seen 11 or 12 movies?

A. 10 B. 12 C. 15 D. 20 E. 23

86. The width and the length of a rectangular piece of plywood are 4 feet and 8 feet, respectively. Along one edge of the plywood, a strip x inches wide and 8 feet long is removed. Then, along an edge perpendicular to the 8-foot edge, a strip x inches wide is removed. For what value of x will the remaining rectangular piece have width and length in the ratio of 2 to 5? (1 foot = 12 inches)

87. If x is a positive integer such that the units digit of x^3 is 3, what is the units digit of x^{15}?

A. 1 B. 3 C. 5 D. 7 E. 9

88. $x = 2, y = 3, z = 5$

Quantity A	**Quantity B**
$x^{-1}yz^{-2}$	$(\frac{xz}{y})^{-2}$

89. x is an integer greater than 3.

Quantity A	**Quantity B**
The number of even factors of 2x	The number of odd factors of 3x

90. According to a tax rate formula for a certain year, the amount of tax owed by an individual whose annual income was between $31,850 and $77,100 was equal to a base tax of $4,386 plus 24 percent of the annual income that exceeded $31,850. According to this formula, what was the amount of tax owed by an individual whose annual income that year was $42,000?

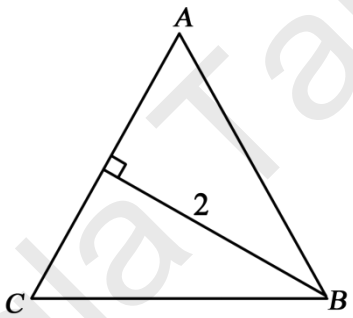
91. The reciprocal of $x - 2$ is $x + 2$

Quantity A	**Quantity B**
x	3

92. x > 0

Quantity A	**Quantity B**
The area of a square region with diagonal of length $\sqrt{2}$x	The area of a circular region with diameter of length x

93.



ABC is an equilateral triangle.

Quantity A	**Quantity B**
The length of AB	$2\sqrt{3}$

94. $\frac{1}{2} < r < 1$

Quantity A	**Quantity B**
2r	1/r

Question 95 to 97 are based on the following data.

A survey of 550 male managers and 650 female managers was conducted. All 1,200 managers identified whether, for each of six characteristics, the characteristic is important to consider when hiring a new employee. For each of the six characteristics, the percent of managers surveyed who identified that characteristic as important to consider is given in the following table.

SURVEY RESULTS

Characteristic	Percent
Work experience	72%
Proficiency in English	68%
Ability to follow directions	65%
Specific occupational skill	60%
Computer expertise	58%
Appropriate attire and behavior	55%

95. Which of the following statements about the managers surveyed must be true? **Indicate all such statements.**

A. Less than 55 percent were male managers.
B. Of the male managers, more identified work experience as an important characteristic to consider than identified proficiency in English.
C. Less than 60 percent of the male managers identified specific occupational skill as important to consider.

96. The number of managers surveyed who identified work experience as an important characteristic to consider was approximately what percent greater than the number who identified appropriate attire and behavior as an important characteristic to consider?

A. 15% B. 20% C. 25% D. 30% E. 35%

97. If 48 percent of the managers surveyed identified both ability to follow directions and computer expertise as important characteristics to consider, what percent of the managers surveyed identified neither of these characteristics as important to consider?

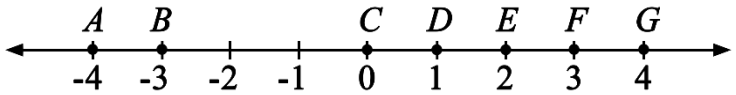
A. 15% B. 18% C. 23% D. 25% E. 28%

98. On his trip to the airport, Grant drove a total of 9 miles. His average speed on the trip was x miles per hour, where $30 \leq x \leq 35$. Which of the following could be the total number of minutes that Grant took to make the trip? Indicate all such numbers of minutes.

A. 15 B. 16 C. 17 D. 18 E. 19

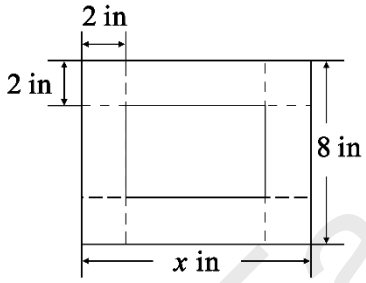
99. The average (arithmetic mean) of the coordinates of the 7 labeled points on the number line is how much greater or less than the median of the coordinates of the 7 labeled points?

A. 4/7 greater B. 3/7 greater C. 1/2 greater D. 3/7 less E. 4/7 less



100. The thin rectangular sheet of metal shown in the figure is 8 inches wide and x inches long. An open box is to be made by cutting a 2-inch square from each corner of the sheet of metal and then folding up the sides. If the volume of the box is to be 48 cubic inches, what is the value of x?

A. 6 B. 8 C. 10 D. 12 E. 14



101. $a > 0$

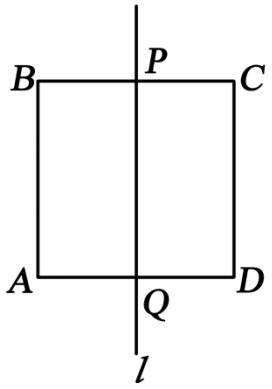
Quantity A	**Quantity B**
$(a + a^{-1})^2$	$a^2 + a^{-2}$

102. In a neighborhood consisting of 2,000 homes, 80 percent of the homes are valued at $325,000 or less. Which of the following statements about the values of the homes in the neighborhood must be true? Indicate all such statements.

A. The average (arithmetic mean) value is at most $325,000.
B. The median value is at most $325,000.
C. At most 400 homes have values greater than $325,000.

103. In square ABCD, point P is the midpoint of side BC and point Q is the midpoint of side AD. Point E (not shown) is located on line l and triangle BCE is equilateral.

Quantity A	**Quantity B**
The length of PQ	The length of PE



104. On a certain map, 1 centimeter represents 5 kilometers. On the map, region X has an area of 6.4 square centimeters.

Quantity A	**Quantity B**
The actual area of region X	150 square kilometers

105. $x > 0$

Quantity A	**Quantity B**
The area of a circle whose circumference is $8\pi x$	The area of a circle with radius $4x$

106. Ben has 30 pencils in a box. Each of the pencils is one of 5 different colors, and there are 6 pencils of each color. If Ben selects pencils one at a time from the box without being able to see the pencils, what is the minimum number of pencils that he must select in order to ensure that he selects at least 2 pencils of each color?

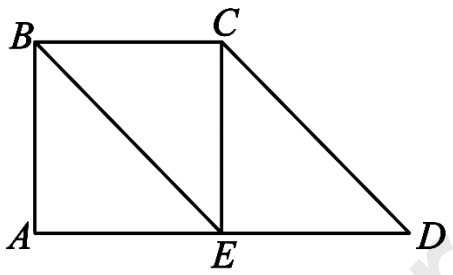
A. 24 B. 25 C. 26 D. 27 E. 28

107. In a plane, points P and Q are 20 inches apart. If point R is randomly chosen from all the points in the plane that are 20 inches from P, what is the probability that R is closer to P than it is to Q?

A. 0 B. 1/4 C. 1/3 D. 1/2 E. 2/3

108. ABCE is a square, and BCDE is a parallelogram.

Quantity A	**Quantity B**
The area of square ABCE	The area of parallelogram BCDE



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

A. 108 B. 119 C. 128 D. 135 E. 143

110. Suppose n is a two-digit positive integer with units digit 5 and tens digit u. Now, if $E = \frac{n^2-25}{100}$, then express E in terms of u.

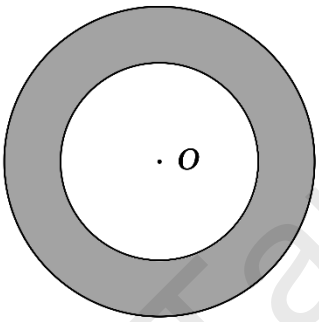
A. $u+1$ B. u^2+1 C. u^2-u D. u^2+u E. u^2+u+1

111. n is a positive integer with exactly two different divisors greater than 1, how many positive factors does n^2 have?

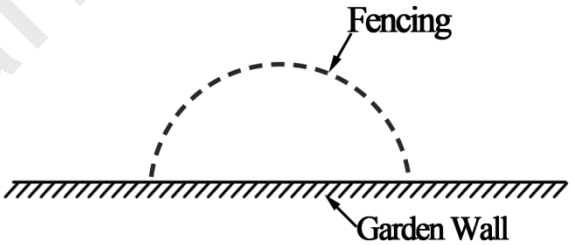
A. 4 B. 5 C. 6 D. 8 E. 9

112. The figure shows two concentric circles, each with center O, the larger circle has radius 3r, and the smaller circle has radius 2r.

Quantity A	**Quantity B**
The area of the smaller circular region	The area of the shaded region



113.

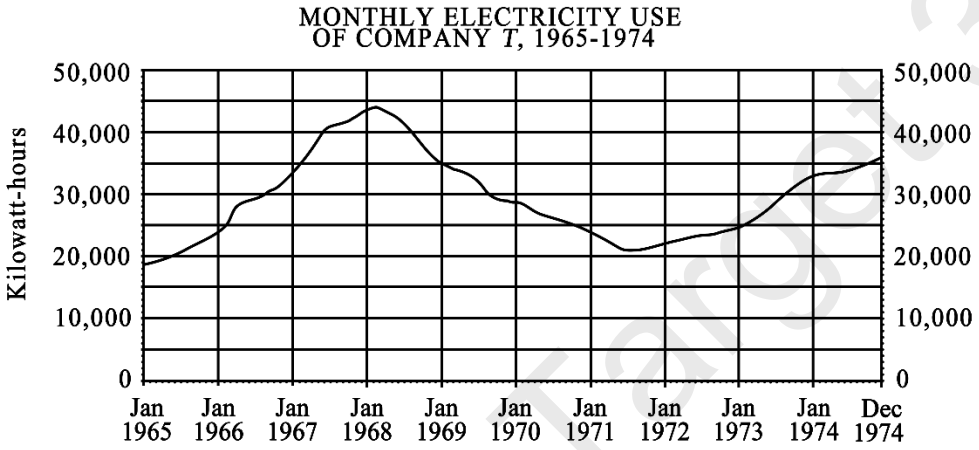


The figure above represents a semicircular garden that is enclosed by 20 feet of fencing and a straight garden wall. What is the area, in square feet, of the garden?

A. 20/π B. 50/π C. 100/π D. 200/π E. 400/π

114. A code containing only the digits 0 and 1 can be 2 or 4 digits in length. If the first digit must be 1, how many different codes of this type are possible?

A. 8 B. 10 C. 16 D. 20 E. 36



115. Approximately how many kilowatt-hours of electricity did Company T use during the entire year of 1971?

A. 190,000 B. 210,000 C. 230,000 D. 250,000 E. 270,000

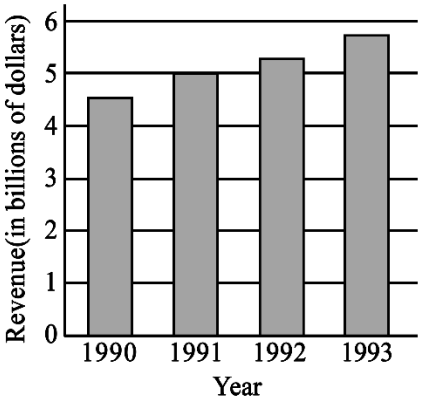
116. A flat, rectangular flower bed with an area of 2,400 square feet is bordered by a fence on three sides and by a walkway on the fourth side. If the entire length of the fence is 140 feet, which of the following could be the length, in feet, of one of the sides of the flower bed? Indicate all such lengths

A. 20 B. 30 C. 40 D. 60 E. 80

Question 117 to 120 are based on the following data.

SELECTED DATA FOR GREETING CARD SALES

Annual Revenue from All Greeting Card Sales, 1990–1993



Number of Greeting Cards Sold for Ten Occasions in 1993

Occasion	Number of Cards
Christmas	2.4 billion
Valentine's Day	900 million
Easter	158 million
Mother's Day	155 million
Father's Day	102 million
Graduation	81 million
Thanksgiving	42 million
Halloween	32 million
St. Patrick's Day	18 million
Jewish New Year	12 million
Total	3.9 billion

Note: 1 billion = 1,000,000,000

117. In 1993 the number of Valentin's Day cards sold was approximately how many times the number of Thanksgiving cards sold?

A.20 B.30 C.40 D.50 E.60

118. In 1993 a card company that sold 40 percent of the Mother's Day cards that year priced its cards for that occasion between $ 1.00 and $ 8.00 each. If the revenue from sales of the company's Mother's Day cards in 1993 was r million dollars, which of the following indicates all possible values of r?

A.155<r<1,240 B.93<r<496 C.93<r<326 D.62<r<744 E.62<r<496

119. Approximately what was the percent increase in the annual revenue from all greeting card sales from 1990 to 1993

A.50% B.45% C.39% D.28% E.20%

120. In 1993 the average (arithmetic mean) price per card for all greeting cards sold was $1.25. For which of the following occasions was the number of cards sold in 1993 less than the total number of cards sold that year for occasions other than the ten occasions shown? Indicate all such occasions.

A. Christmas B. Valentine's Day C. Easter
D. Mother's Day E. Father's Day F. Graduation
G. Thanksgiving H. Halloween

121.

Quantity A	Quantity B
The number of primes that are divisible by 9	The number of primes that are divisible by 19

122. Sid intended to type a seven-digit number, but the two "3" he meant to type did not appear. What appeared instead was the five-digit number 52115. How many different seven-digit numbers could Sid have meant to type?

A. 10 B. 16 C. 21 D. 24 E. 27

123. To obtain an FHA mortgage for $50,000 or more, the home buyer must have a down payment equal to 4 percent of the first $25,000 of the mortgage amount and 5 percent of the portion in excess of $25,000. At settlement the buyers pay a mortgage-insurance premium equal to 3 percent of the mortgage amount. What is the maximum FHA mortgage, if any, a buyer can obtain if the buyer has only $6,000 available for the down payment and insurance premium?

A. $62,500 B. $71,875 C. $78,125 D. $125,000
E. The home buyer cannot obtain an FHA mortgage.

124. In a quality-control test, 50 boxes-each containing 30 machine-parts were examined for defective parts. The number of defective parts was recorded for each box, and the average (arithmetic mean) of the 50 recorded numbers of defective parts per box was 1.12. Only one error was made in recording the 50 numbers: "1" defective part in a certain box was incorrectly recorded as "10".

Quantity A	Quantity B
The actual average number of defective parts per box	0.94

125.

Quantity A	Quantity B
the number of two-digit positive integers for which the units digit is not equal to the tens digit	80

126. When the decimal point of a certain positive decimal number is moved six places to the right, the resulting number is 9 times the reciprocal of the original number. What is the original number?

127. The greatest of the 21 positive integers in a certain list is 16. The median of the 21 integers is 10. What is the least possible average (arithmetic mean) of the 21 integers?

A. 4 B. 5 C. 6 D. 7 E. 8

128. In a certain medical group, Dr. Schwartz schedules appointments to begin 30 minutes apart, Dr. Ramirez schedules appointments to begin 25 minutes apart, and Dr. Wu schedules appointments to begin 50 minutes apart. All three doctors schedule their first appointments to begin at 8:00 in the morning, which are followed by their successive appointments throughout the day without breaks. Other than at 8:00 in the morning, at what times before 1:30 in the afternoon do all three doctors schedule their appointments to begin at the same time? Indicate all such times

A. 9:30 in the morning B. 10:30 in the morning C. 11:30 in the morning
D. 12:00 noon E. 1:00 in the afternoon

129. If $x + |x| + y = 7$ and $x + |y| - y = 6$, then $x + y =$

A. -1 B. 1 C. 3 D. 5 E. 13

130. If x + y ≠ 0, which of the following is a solution to the inequality: $\frac{x^2-y^2-1}{x+y} > \frac{-1}{x+y}$

A. x=3 and y =7 B. x=-3 and y =7 C. x=-11 and y =-9 D. x=9 and y =-6
E. x=-20 and y =-24 F. x=12 and y =9 G. x=-2 and y =16

131. How many points (x, y) lie on the line segment between (22, 38/3) and (7, 53/3) such that x and y are both integers?

A. 4 B. 5 C. 7 D. 8 E. 9

132. If x and y are positive integers, and 1 is the greatest common divisor of x and y, what is the greatest common divisor of 2x and 3y?

A. Cannot be determined B. 1 C. 2 D. 5
E. 6

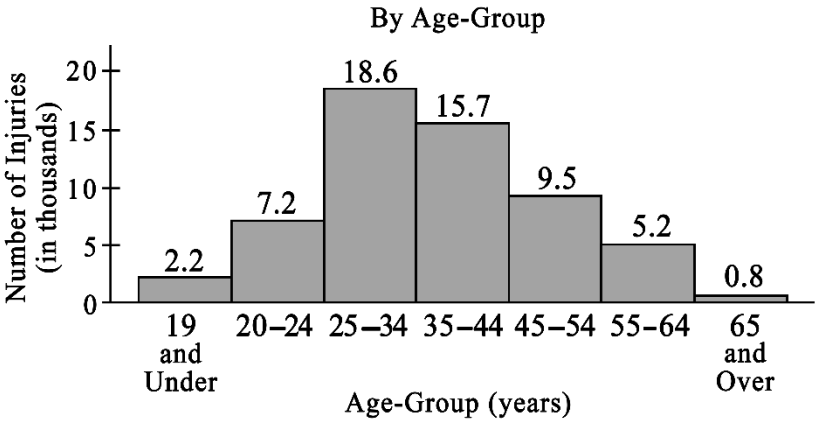
133. Set T consists of the integers from 11 through 100, inclusive.

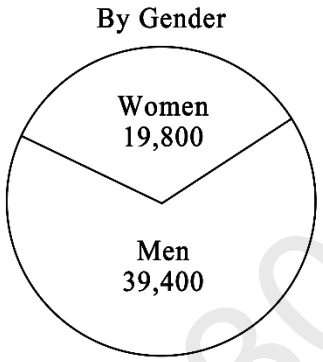
Quantity A	**Quantity B**
4 times the number of integers in set T that are multiples of 4	5 times the number of integers in set T that are multiples of 5

134. $f(x) = 4x^2 + 28x + 49$, for x

Quantity A	**Quantity B**
The number b such that $f(b)$ is the minimum value of f	-3

Question 135 to 137 are based on the following data.





135. How many of the age-groups each accounted for more than 15 percent of the total number of occupational injuries in State X in 1998?

A. One B. Two C. Three D. Four E. Five

136. In 1998, if one-half of the occupational injuries in the combine 34-and-under age-groups were incurred by men, what was the number of occupational injuries incurred by men in the combined 35-and-over age-groups?

A. 33,500 B. 31,900 C. 30,500 D. 25,400 E. 21,700

137. For the 55-64 age-group in 1998, the average (arithmetic mean) number of work-hours lost per occupational injury was 48.5. If a workweek is 40 work-hours, which of the following is closets to the total number of workweeks lost due to occupational injuries in the 55-64 age group in 1998?

A. 4,500 B. 5,200 C. 5,500 D. 5,900 E. 6,300

138. A rectangular solid P has height 2c and a base of width a and length b. Two other rectangular solids, Q and R, each have height c and bases of width a and length b. Which of the following represents the amount by which the sum of the surface areas of Q and R exceeds the surface areas of P?

A. 2ab B. 4ab C. 2ab + 2bc D. 2ab + 4ac E. 2ab +4ac +4bc

139. The area of a circle with radius a is less than the area of a square with sides of length ka. Which of the following could be the value of k? Indicate all such values.

A. 4/3 B. 5/3 C. 6/3 D. 7/3

140.

Quantity A	**Quantity B**
(77*78*79*80*81*82*83)^1/7	80

141. How many integers between 360 and 630 are there such that they have odd number of divisors?

A. 3 B. 4 C. 5 D. 6 E. 7

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

A. 8 B. 9 C. 10 D. 11 E. 12

143. x and n are positive integers, such that $7x = 10^n - 1$. What is the 99th smallest possible value of n?

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

A. 600 B. 700 C. 900 D. 2,100 E. 4,900

145.

Quantity A	**Quantity B**
0.05 percent of 4000	1/200 of 4000

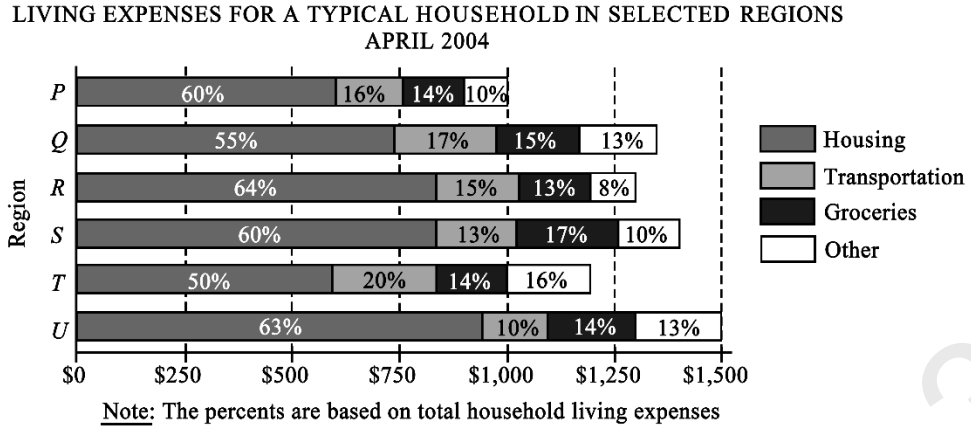
146. In a certain sock drawer, there are 4 pairs of black socks, 3 pairs of gray socks and 2 pairs of orange socks. If socks are removed at random without replacement, what is the minimum number of socks that must be removed in order to ensure that two socks of the same color have been removed?

A. 4 B. 7 C. 9 D. 10 E. 11

147. In a certain sequence of numbers, each term after the first term is found by multiplying the preceding term by 2 and then subtracting 3 from the product. If the 4th term in the sequence is 19, which of the following numbers are in the sequence? Indicate all such numbers.

A. 5 B. 8 C. 11 D. 16 E. 35

Question 148 to 150 are based on the following data.



148. In April 2004 the dollar amount of the Housing expense in region Q was less than the dollar amount of the Housing expense in which of the other regions? **Indicate all such regions.**

A. P B. R C. S D. T E. U

149. In region P, the expense in the category Other was what fraction of the total of the expense in the three non-housing categories?

A. 1/10 B. 1/6 C. 1/5 D. 1/4 E. 1/3

150. For the region in which the range of the dollar amounts of the four expense categories was least, what percent of total living expense was the Transportation expense in that region?

A. 10% B. 15% C. 16% D. 17% E. 20%

151. The table shows the frequency distribution of the random variable X. What is the median of the distribution of the values of X?

A. 1.0 B. 1.8 C. 2.0 D. 2.5 E 3.0

X	Frequency
0	6
1	11
2	18
3	23
4	15

152. In the xy-plane, a circle is centered at the point (-4,3) and passes through the origin. What is the area of the circle?

A. 9π B. 12π C. 16π D. 20π E. 25π

153. How many positive integers less than 10,000 are such that the product of their digits is 210?

A. 24 B. 30 C. 48 D. 54 E. 72

154. What is the nearest value of $\frac{0.16667\times0.83333\times0.33333}{0.22222\times0.66667\times0.12500}$?

A. 2.00 B. 2.40 C. 2.43 D. 2.49 E. 3.43

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

156. If r and s are positive integers, each greater than 1, and if 11(s-1) =13(r-1), what is the least possible value of (r+s)?

A. 2 B. 11 C. 20 D. 24 E. 26

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

A. $\frac{1}{6}$ B. $\frac{1}{5}$ C. $\frac{1}{3}$ D. $\frac{2}{5}$ E. $\frac{2}{3}$

158. Which of the following could be the sum of three consecutive integers?

A. 29 B. 46 C. 57 D. 92 E. 100

159. f, g, h are consecutive prime numbers such that f < g < h

Quantity A	**Quantity B**
f + g + h	3g

160. k is a positive integer and 225 and 216 are both divisors of k. If k = $2^a3^b5^c$, where a, b and c are positive integers, what is the least possible value of a + b + c?

A. 4 B. 5 C. 6 D. 7 E. 8

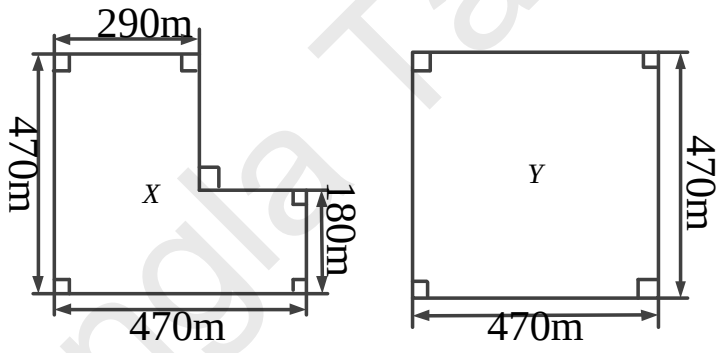
161. The average of three different positive integers is 6.

Quantity A	**Quantity B**
The product of the three integers	25

162. If the tens digit x and the units digit y of a positive integer n are reversed, the resulting integer is 9 more than n. What is y in terms of x?

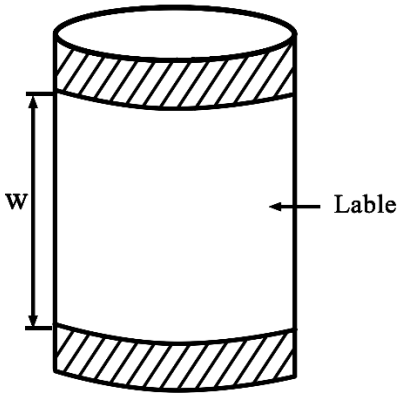
A. 10 - x B. 9 - x C. x + 9 D. x - 1 E. x + 1

163. Fields X and Y are to be enclosed with fencing that costs $ 24 per meter.



Quantity A	**Quantity B**
The cost of the fencing needed to enclose X	The cost of the fencing needed to enclose Y

164. A rectangular label is attached to a right circular cylinder with radius r. The label which encircles the cylinder without overlap, has width w and an area equal to the area of the base of the cylinder.



Quantity A	**Quantity B**
w	*r*

165. A rectangular rug covers half of a rectangular floor that is 9 feet wide and 12 feet long. If the dimensions of the rug are in the same ratio as those of the floor, how many feet long is the rug?

A. 6 B. $\frac{21}{2}$ C. $2\sqrt{7}$ D. $6\sqrt{2}$ E. $4\sqrt{6}$

166. If the areas of three of the faces of a rectangular solid are 6, 10 and 15, what is the volume of the solid?

A. 30 B. 90 C. 150 D. 300 E. 450

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

A. $41,600 B. $47,000 C. $52,000 D. $61,000 E. $75,000

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

A. 7 B. 8.5 C. 10

169. A linen shop has a certain tablecloth that is available in 8 sizes and 10 colors. What is the maximum possible number of different combinations of size and color.

A. 9 B. 18 C. 40 D. 80 E. 90

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

A. $\frac{1}{10}$ B. $\frac{4}{9}$ C. $\frac{1}{2}$ D. $\frac{3}{5}$ E. $\frac{2}{3}$

第三章. 补充真题 100 题

第一节. 2020 年 6 月更新【“微臣留美”公众号回复“新 100 题解析”】

1. $\sqrt{108} = a\sqrt{b}$, where a and b are positive integers.

Quantity A	Quantity B
the number of the possible values of $a + b$	3

2. x<y, and the median of {x, y, 120} is 100.

Quantity A	Quantity B
x	90

3. List A contains 3 numbers, x, x+2, 2x, and x>2, which of the following statistics if given can individually provide sufficient additional information to determine the value of x? Indicate all such statistics.
   A. arithmetic mean
   B. median
   C. range

4. List A contains 15 numbers. 8 numbers in the list are greater than 50.4, and 8 numbers in the list are less than 54.6.

Quantity A	Quantity B
the median of the list	52.5

5. There are 7 positive integers in the list. The median of the list is 10, and the average of the list is 9. The unique mode is 2. What is the greatest possible value of the largest number in this list?
   A. 22
   B. 23
   C. 24
   D. 25
   E. 26

6. The sum of ten different positive integers is 101. What is the greatest possible value of the maximum among the integers?

7. Integer x is the product of four different prime numbers. When x is divided by 77, the quotient is a multiple of 5, the remainder is 0. What could be the quotient when x is divided by 7? Indicate all such values.
   A. 110
   B. 220
   C. 330
   D. 440
   E. 550

8. x is a positive integer, k is the remainder when $x^2 - x$ is divided by 2.

Quantity A	**Quantity B**
k	0

9. If a and b are positive integers, $a^2 + b^2 = 145$, what could be the value of $a + b$? Indicate all such values.
   A. 13
   B. 14
   C. 15
   D. 16
   E. 17

10. $x^2 + y^2 = 52$, x and y are integers such that x>y.

Quantity A	**Quantity B**
x	4

11. 2≤r<s≤6, r and s are integers, what is the greatest possible value of $\frac{r+s}{rs}$? Give your answer as a fraction.

$$\frac{\square}{\square}$$

12. x and y are integers, 4≤x<7<y≤12, what is the range of $(x - y)^2$?

$$\square$$

13. x, n, k are all integers, $0 < x < 10^7$, $x = n^k$, the unit digit of x is 5. Integer x is a square of one integer as well as a cube of one integer. What is the value of x?

$$\square$$

14. n, p, k are all integers, $n^p = 10k + 3$. What could be the value of n? Indicate all such values.
    A. 11
    B. 12
    C. 15
    D. 17
    E. 19

15. The lengths of two sides of a triangle are respectively 3 and 4, and all the angles of the triangle are less than 90 degree.

Quantity A	**Quantity B**
the length of the third side	2

16. For all numbers x and y, the operation $\odot$ is defined by $x \odot y = x - 2y$

Quantity A	**Quantity B**
$1 \odot (2 \odot 3)$	$[-(1 \odot 2)] \odot 3$

17. For all integers R, R* is defined by swapping the units digit and the hundreds digit of R. R's units digit is 2 more than its hundreds digit.

Quantity A	**Quantity B**
R*-R	200

18. What is the units digit of $32^{19} - 32$?

19. what is the units digit of $2^{2020} + 3^{2020} + 5^{2020} + 7^{2020}$?

20. What is the units digit of $4^{32} - 3^{32}$?

21. n is a positive integer, $a = 7^n$, $b = 9^n$, what could be the value of the sum of the units digit of a and the units digit of b? Indicate all such values.
    A. 10
    B. 12
    C. 14
    D. 16

22. What is the product of the units digit of 7^{34} and the units digit of 6^{30}?

23. What is the tens digit of 2007^{2007}?

24. What is the remainder when 9^{78} is divided by 5?

25. What is the remainder when 345606^2 is divided by 20?

26. k is the remainder when $3 + 3^2 + 3^3 + 3^4 + 3^5 + 3^6$ is divided by 6.

Quantity A	**Quantity B**
k	0

27. a and b are positive odd numbers, what could be the units digit of ab+1? Indicate all such values?
    A. 0
    B. 1
    C. 2
    D. 3
    E. 4
    F. 5

28. An infinite list maintains the following pattern {1, -2, 3, -4, 5, -6…}. What is the sum of the first 99 numbers in the list?

29. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 1$, $C_2 = 1$, and $C_n = 0.2C_{n-1}$ for each integer n greater than 2.

Quantity A	**Quantity B**
C_6	$25^3 * 0.2^{10}$

30. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 1$, $C_2 = 2$, and $C_n = C_{n-1} + C_{n-2}$ for each integer n greater than 2. Which of the following could be the number in the sequence? Indicate all such numbers.

A. 8
B. 15
C. 21
D. 24
E. 34

31. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 4$, $C_2 = 2$, and $C_n = C_{n-1} + C_{n-2}$ for each integer n greater than 2. How many numbers in the first 60 terms of this sequence are divisible by 3?

32. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = -5$, $C_2 = 4$, and $C_n = C_{n-1} - C_{n-2}$ for each integer n greater than 2. What is the value of $C_1 + C_2 + C_3 + \ldots + C_{100}$?

33. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 2$, $C_2 = 5$, and $C_n = C_{n-1}/C_{n-2}$ for each integer n greater than 2. What is the value of C_{135}?

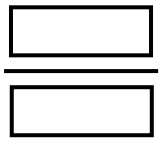
34. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 2$, $C_2 = 3$, and $C_n = C_{n-1} * C_{n-2}$ for each integer n greater than 2.

Quantity A	**Quantity B**
C_8	$2^8 * 3^{13}$

35. The sequence of numbers $C_1, C_2, C_3, \ldots C_k \ldots$ is defined by $C_k = \frac{1}{\sqrt{k+1}+\sqrt{k+2}}$ for each integer k greater than 0. What is the sum of the first 60 numbers of this sequence?

36. How many integers between 1 and 1000 (inclusive) are there such that the integer is not either a multiple of 3 or a multiple of 7?

37. If one number is chosen at random from the first 1,000 positive integers, what is the probability that the number chosen has at least one digit with the number 6? Give your answer as a fraction.

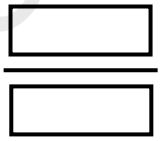


38. How many 3-digit integers between 100 and 900 (inclusive) are there such that both the sum of the first two digits and the sum of the last two digits of the integer are 7?

39. A set consists of some 3-digit integers, all in the form of $\overline{JKL}$, where J, K, L are all non-zero digit; and the 2-digit integers $\overline{JK}$ and $\overline{KL}$ can be divisible by 9. How many such integers are in this set?

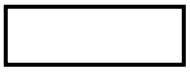
40. n is a 3-digit integer, and all of the digits of n are chosen from {7, 8, 9}, non-repeatedly. What is the sum of all possible integer n?

41. n is a 3-digit integer, and all of the digits of n are chosen from {1, 2, 7}. The digits can repeat. What is the probability that n is divisible by 4? Give your answer as a fraction.



42. How many 3-digit positive integers with units digit 2 are a square of an integer?

43. Integer N is obtained by concatenate the first 500 positive integers, that is N equals to 12345678910…499500. How many digits does N have?



44. There are 100 white balls, 100 red balls, and 100 green balls in the box. If we select balls one at a time from the box without being able to see the balls, what is the minimum number of balls that we must select in order to ensure that we select at least 4 balls of the same color?

45. Set A has 31 members.

Quantity A	**Quantity B**
The number of set A's subsets that have odd number of members	2^{16}

46. x is an integer greater than 1.

$$N = (15)^x(4)^{x-1}$$

Quantity A	**Quantity B**
The tens digit of N	0

47. x >0

Quantity A	**Quantity B**
x^{11}	x^9

48. Working simultaneously at their respective constant rates, machines J, K, and L manufacture a total of 8,000 boxes in 2 hours. Machine J, working alone at its constant rate, completes the same job in 5 hours.

Quantity A	**Quantity B**
The time required for machines K and L to complete the job, working simultaneously at their respective constant rates	3 hours

49. 1 < 2x+1 < 3

Quantity A	**Quantity B**
$(x^2 - 5) - (x - 5)$	0

50. $(n - 5)(m - 10) = 0$

Quantity A	**Quantity B**
n + m	15

51. Set X consists of all positive integers n for which $0 < n^2 < 10$

Quantity A	**Quantity B**
The range of the numbers in set X	2

52. Inez cashed a check for $1,490 at a bank and received only $50 bills, $20 bills, and $5 bills. If Inez received at least one $50 bill, at least one $20 bill, and at least one $5 bill, what is the least possible number of bills she could have received?

A. 30 B. 31 C. 32 D. 33 E. 34

53. How many different positive 7-digit integers begin with 555 and end with 22?

A. 18 B. 20 C. 81 D. 90 E. 100

54. A bag contains 5 quarters, 10 nickels, and 15 dimes. If 4 of these coins are to be picked at random from the bag, without replacement, what is the probability of getting 4 quarters?

A. $\frac{5}{30}$ B. $\frac{4}{30}$ C. $\frac{5}{5,481}$ D. $\frac{4}{5,481}$ E. $\frac{1}{5,481}$

55. A certain painting was sold in 1975 and then again in 1994. If the selling price of the painting was $2,400,000 in 1975 and $3,360,000 in 1994, what was the percent increase in the selling price of the painting from 1975 to 1994?

( )%

56.

If $x>0$, what is the least positive integer n for which $\frac{8x}{n}$ is less than 0.5 percent of x?

57.

The first term of an infinite sequence is 4, and each term after the first term is 7 greater than the preceding term. What is the 64th term of the sequence?

A. 188 B. 431 C. 445 D.448 E. 452

58. The 50 students in an art class were given an assignment to visit two museums, A and B. During the week after the assignment was given, 25 of the students visited Museum A and 10 of those 25 students also visited Museum B.

    Which of the following statements individually provide(s) sufficient additional information to determine how many of the students visited Museum B during that week?

    Indicate all such statements.

    A. During that week, 20 of the students did not visit either museum.
    B. During that week, the number of students who visited both museums was twice the number of students who visited only Museum B.
    C. During that week, the number of students who did not visit either museum was twice the number of students who visited both museums.

59. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 5$, and $C_n = 2 * C_{n-1}$ for each integer n greater than 1.

Quantity A	**Quantity B**
C_8	C_{21}/C_{13}

60. The sequence of numbers $C_1, C_2, C_3, \ldots C_n \ldots$ is defined by $C_1 = 1$, and $C_n = \frac{1}{7} * C_{n-1}$ for each integer n greater than 1.

Quantity A	**Quantity B**
C_{12}	$49^7 \times C_{26}$

61. For a certain probability experiment, the probability that event A will occur is 0.6, and the probability that event B will occur is 0.8. Which of the following values could be the probability that both the event A and the event B will occur? Indicate all such values.
    A. 0.1
    B. 0.4
    C. 0.48
    D. 0.6
    E. 0.8

62. List A: 12, 13, 16, 19, 20
    List B: 12, 15, 16, 17, 20

Quantity A	**Quantity B**
the standard deviation of List A	the standard deviation of List B

63.

Quantity A	Quantity B
The standard deviation of all the even numbers between 8 and 44 (inclusive)	The standard deviation of all the odd numbers between 23 and 59 (inclusive)

64. x and y are integers, and $x < y$. If $x^2 + y^2$ is even, which of the following integers must be even? Indicate all such integers.
    A. xy
    B. $x + y$
    C. $y - x$
    D. $x^2 + y$

65. List A contains k consecutive integers, where k is an odd number. If the median of List A is m, which of the following statements are true? Indicate all such statement.
    A. The sum of List A is odd.
    B. The least integer in List A is m-[(k-1)/2].
    C. The greatest integer in List A is m+[(k+1)/2].

66. n is an integer greater than 1. Which of the following must be the value of k if $n(n^2 - 1)$ is divisible by k? Indicate all such values.
    A. 3
    B. 4
    C. 5
    D. 6
    E. 7

67. List A contains a certain number of consecutive integers including 2. The sum of all the integers in List A is 11.

Quantity A	Quantity B
the number of integers in List A	10

68. 7^n is a positive integer whose units digit is 9. Which of the following can be the value of n?
    A. 200
    B. 201
    C. 202
    D. 203
    E. 204
    F. 205
    G. 206

69. The units digit of 23^n is 7, where $8 < n < 13$, what is the value of n?

70. N is a 3-digit positive integer whose tens digit is x and whose units digit is y, which of the following integers must be a factor of $N - 100x - y$? **Indicate all such integers.**
    A. 2
    B. 3
    C. 4
    D. 5
    E. 6

71. Let S be the set of all integers between 1 and 1000 (inclusive) that are divisible by 3. How many integers in S cannot be divisible by 5?

72. n is a 3-digit integer, and all of the digits of n are chosen from {6, 7}. The digits can repeat. What is the number of all possible n between 600 and 770 (inclusive)?

73. A certain code contains five letters, including one A, two B, and 2 C. In how many possible ways can we create the codes?

74. A regular n-side polygon and a regular (n+1)-side polygon have (2n+1) interior angles in total.

Quantity A	**Quantity B**
The median of (2n+1) interior angles	90

75.

x-1, x, x+4

Quantity A	**Quantity B**
The average (arithmetic mean) of the three numbers listed above	The median of the three numbers listed above

76. All of the students in a biology club went on at least one of the two field trips sponsored by the club. 75 percent of the students went on only one of the field trips and 9 students went on both of the field trips.

Quantity A	**Quantity B**
The number of students who went on only one field trip	18

77. a is a positive integer

x is a remainder when 15a is divided by 6

Quantity A	**Quantity B**
x	2

78. The function f is defined for all numbers x by $f(2x) = x^2 - 2x + 8$

Quantity A	**Quantity B**
$f(6)$	12

79. 0<p<q

Quantity A	**Quantity B**
$\frac{p}{q} + \frac{1}{p}$	1

80. Louise and Rick received a total of $660 for picking strawberries. If the ratio of the amount of money that Louise received to the amount of money that Rick received was 7 to 4, how much money did Louise receive?

A. $180 B. $260 C. $380 D. $420 E. $440

81. The five values of variable t are 10, 20, 30, 40, and 50. Variable R is defined by R=100-5t for all values of t. How much greater is the range of the five values of R than the range of the five values of t?

A. 140 B. 160 C. 180 D. 220 E. 250

82. If x<0 and 0<y<1, the value of which of the following algebraic expressions is greatest?

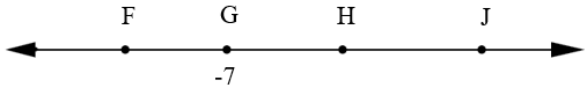
A. xy^2 B. x^2y C.x^2y^2 D. $\frac{x^2}{y}$ E. $\frac{x}{y^2}$

83. A group of people will be seated at a circular table with a radius of 1 meter. If each person will be allocated at least 75 centimeters along the edge of the table, what is the greatest possible number of people that can be seated at the table?

A. 4 B. 8 C. 10 D. 12 E. 15

84. Henry swarm a distance of 400 meters in a time that was between 3 minutes 50 seconds and 4 minutes. Which of the following values could be his average speed, in meters per second, for the 400 meters?

A.1.52 B.1.60 C.1.68 D.1.70 E. 1.75



85. On the number line above, G is the midpoint of line segment FJ, GH=18 and HJ=39. What is the coordinate of point F?

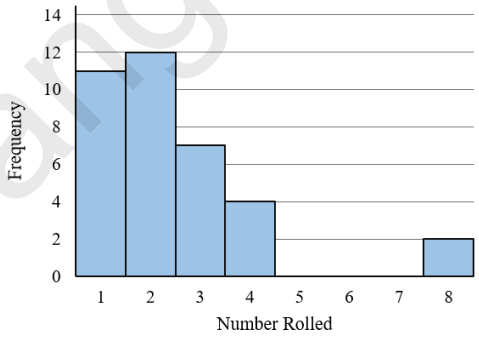
86. If xy>0 and yz<0, which of the following CANNOT be ture?

A. x<0 and y<0
B. x>0 and y>0
C. x>0 and z>0
D. x>0 and z<0
E. y<0 and z>0

87. Which of the follow expressions are equivalent to $(a+b)^2+10-4(a+b)$?
Indicate all such expressions.

A.$(a+b)^2+6(a+b)$
B.$a^2+2ab+b^2+10-4a-4b$
C.$10+(a+b)(a+b-4)$

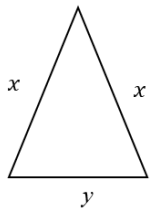
88.



Each of the eight faces of an octahedron is labeled with a different number form 1 to 8. The octahedron was rolled 36 times, and the results are shown in the graph above, where the “Number Rolled” is the number on the top face of the octahedron after it was rolled. If the octahedron is to be rolled 4 additional times, what is the greatest possible value of the average (arithmetic mean) of the 40 number rolled?

A. 2.5 B. 3.0 C. 3.5 D. 4.0 E. 4.5

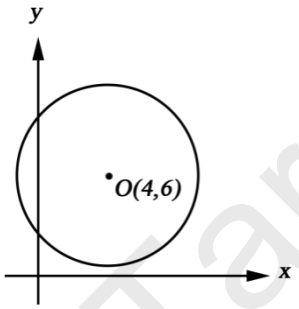
89.



In the triangle, if x = 30, then all possible values of y are the values between

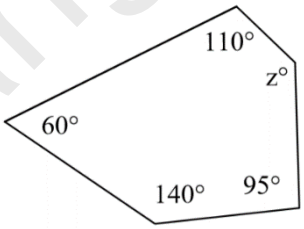
A. 0 and 30 B. 0 and 60 C. 30 and 45 D. 45 and 60 E. 30 and 60

90.



(4,6) is the center of the circle above.

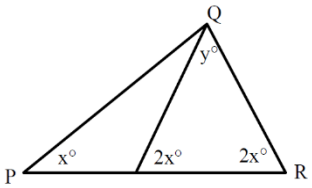
Quantity A	**Quantity B**
The radius of the circle	6



91.

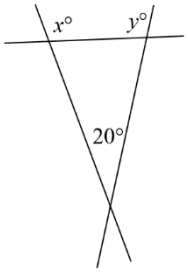
Quantity A	**Quantity B**
z	120

92.



In the figure above, if y=32, what is the degree measure of angle PQR?

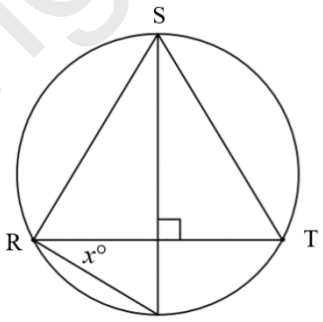
A. 37° B. 64° C. 69° D. 74° E. 106°



93.

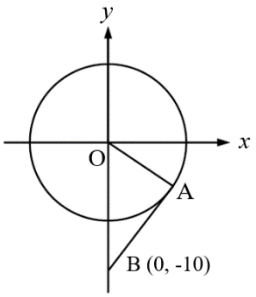
Quantity A	**Quantity B**
$x+y$	200

94.



RST is an equilateral triangle that is circumscribed by the circle.

Quantity A	**Quantity B**
x	30



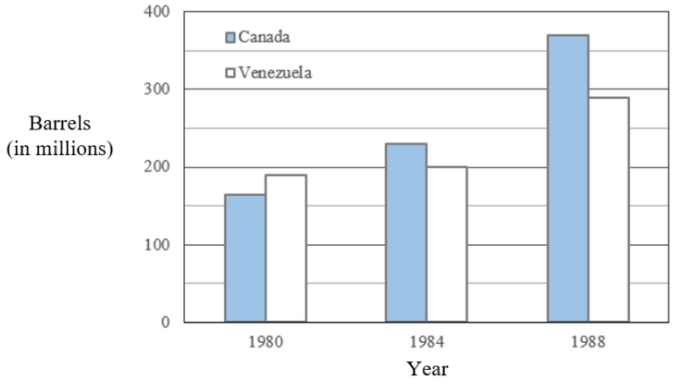
95.

In the *xy*-place shown, the circle has center *O* , and line segment *AB* is tangent to the circle at point *A*. If *AB* has length 8, what is the area of the circular region?

A.12π B. 24π C. 36π D. 64π E. 72π

Question 96 to 98 are based on the following data.

Petroleum Exports for Canada and Venezuela in 1980, 1984, and 1988



96. For the three years shown, total Canadian petroleum exports exceeded total Venezuelan petroleum exports by approximately how many million barrels?

A. 25 B. 85 C. 130 D. 180 E. 260

97.

1 barrel = 42 gallons

1 billion = 1,000 million

Which of the following is closest to Canada’s petroleum exports in 1980, in billions of gallons?

A. 7 B. 5 C. 4 D. 0.7 E. 0.4

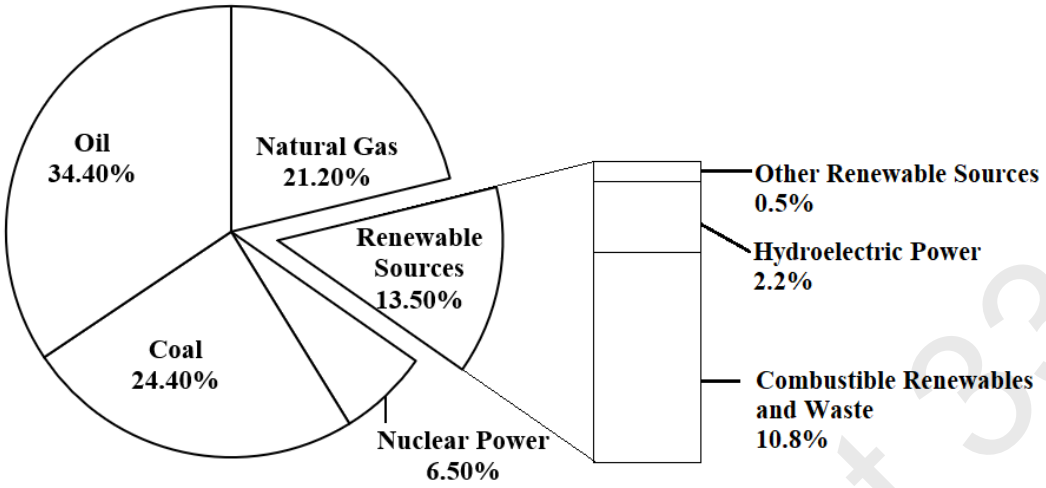
98.

Canada and Venezuela increased their combined petroleum exports by approximately what percent from 1984 to 1988?

A. 50% B. 70% C. 80% D. 100% E. 150%

Question 99 to 101 are based on the following data.

World Primary Energy Supply, by Source, in 2003



99. Based on the information given, which of the following pairs of energy sources accounted for more than one-half of the world primary energy supply?
Indicate all such pairs.
A. Coal and oil
B. Natural gas and oil
C. Natural gas and nuclear power
D. Natural gas and renewable sources

100. What was the ratio of the amount of energy from the Other Renewable Sources category to the amount of energy from the Nuclear Power category?

A. $\frac{1}{13}$ B. $\frac{1}{7}$ C. $\frac{1}{6}$ D. $\frac{4}{13}$ E. $\frac{9}{13}$

101. Energy from hydroelectric power was approximately what percent of energy from all renewable sources?

A. 2% B. 10% C. 16% D. 22% E. 30%

参考答案

精选 200 题答案

算数答案

1-5	ABC	A	B	D	C	**6-10**	C	E	11	B	BCD
11-15	D	E	A	E	A	**16-20**	C	E	C	C	D
21-25	18	C	B	A	D	**26-30**	C	E	6.75	AC	C
31-35	C	0	A	D	C	**36-40**	C	B	B	D	A

应用题与图表题答案

1-5	6000	A	E	E	8	**6-10**	B	B	126	A	15.8%
11-15	D	C	E	C	902	**16-20**	A	E	8/29	A	A
21-25	A	B	C	C	2500	**26-30**	E	D	A	C	E
31-35	A	ABC	D	C	5%	**36-39**	D	C	A	E	

代数答案

1-5	C	B	D	C	-2	**6-10**	ABCDEH	D	B	B	A
11-15	E	E	C	A	12	**16-20**	-2	D	8/9	A	B
21-25	C	3/4	AD	D	E	**26-30**	A	C	0.25	AC	16/9

几何答案

1-5	B	B	FG	E	216	**6-10**	C	B	C	E	B
11-15	AD	E	ACE	π	B						

数据分析答案

1-5	41	C	CD	E	AB	**6-10**	A	A	E	D	C
11-15	E	B	A	A	C	**16-20**	7	C	C	E	D
21-25	C	A	B	1440	2433600	**26-30**	C	CE	210	C	D
31-35	D	D	D	D	B	**36-40**	D	B	A	153/190	E

陷阱与技巧答案

1-5	B	A	E	A	BD	**6-10**	D	D	A	ACD	D
11-15	B	D	D	C	D	**16-20**	B	D	A	A	BD
21-25	C	D	A	AB	D	**26-30**	D	D	B	42	D
31-35	D	D	D	D	E	**36-40**	A	C	E	D	

基础 130 答案

1-5	A	D	A	D	D	**6-10**	B	C	A	E	C
11-15	BC 或 CD	CDF	$39.5	20/80	B	**16-20**	C	D	A	A	D
21-25	C	D	D	E	E	**26-30**	BC	A	B	D	C
31-35	B	D	B	D	B	**36-40**	E	7.2	C	C	A
41-45	B	B	D	D	B	**46-50**	E	112.5	A	D	C
51-55	D	C	A	5	B	**56-60**	D	A	C	B	C
61-65	BC	E	D	C	E	**66-70**	A	A	C	D	D
71-75	A	E	B	A	B	**76-80**	D	C	B	D	A
81-85	A	C	A	B	E	**86-90**	D	D	C	B	E
91-95	ADG	E	B	D	C	**96-100**	A	A	D	A	AD
101-105	4.1	3/2	C	D	E	**106-110**	67	D	A	D	D
111-115	B	9	D	12	E	**116-120**	BD	AB	E	0.76	B
121-125	2.5	A	B	E	AC	**126-130**	E	A	C	B	B

真 • 170 答案

1-5	121	B	E	A	C	**6-10**	E	BDE	1.29	A	B
11-15	CDE	B	CDE	C	A	**16-20**	A	105	32	D	D
21-25	ACE	A	D	B	E	**26-30**	C	A	E	A	C
31-35	C	C	300	E	C	**36-40**	A	E	A	B	D
41-45	C	D	B	D	11/17	**46-50**	B	108	E	A	C
51-55	C	B	A	A	E	**56-60**	D	BC	B	B	22
61-65	15.8%	B	B	108.7%	C	**66-70**	ABCDE	BC	CE	D	B
71-75	2433600	ABE	BE	B	1800	**76-80**	C	D	A	ABC	45%
81-85	B	B	550	C	A	**86-90**	16	B	B	D	6822
91-95	B	A	B	D	A	**96-100**	D	D	BCD	E	C
101-105	A	BC	A	A	C	**106-110**	C	E	C	E	D
111-115	B	B	D	B	E	**116-120**	BCDE	A	E	D	CDEFGH
121-125	B	C	C	C	A	**126-130**	0.003	C	BE	C	DEF
131-135	B	A	A	B	C	**136-140**	D	E	A	CD	B
141-145	E	D	594	A	B	**146-150**	A	ACE	BCE	D	E
151-155	E	E	D	D	4	**156-160**	E	D	C	D	E
161-165	A	E	C	B	D	**166-170**	A	C	ABC	D	D

补充 100 题答案

1-5	A	D	ABC	D	E	**6-10**	56	A	C	AE	D
11-15	5/6	60	15625	D	A	**16-20**	A	B	6	3	5
21-25	ABD	54	4	1	16	**26-30**	C	ACE	50	C	ACE
31-35	15	13	2.5	C	$\sqrt{62}-\sqrt{2}$	**36-40**	572	271/1000	7	9	5328
41-45	2/9	0	1392	10	A	**46-50**	C	D	A	B	D
51-55	C	E	E	E	40	**56-60**	1601	C	ABC	A	C
61-65	BCD	A	C	BCD	B	**66-70**	AD	A	CG	11	AD
71-75	267	6	30	D	A	**76-80**	A	D	B	D	D
81-85	B	D	B	CD	-64	**86-90**	C	BC	B	B	B
91-95	A	C	C	C	C	**96-100**	B	A	A	AB	A
101	C										