必
GRE

2023 陈诚数学600

2022-2023最新真题

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GRE必考词小程序

GRE必考词是一款专为GRE考生量身定制的背单词小程序。包含多本词汇书、提供间隔重复的复习方法、详细的解释、每个单词的真实示例以及自定义计划的功能。密切贴合GRE考法的复习机制、助你轻松掌握GRE单词。

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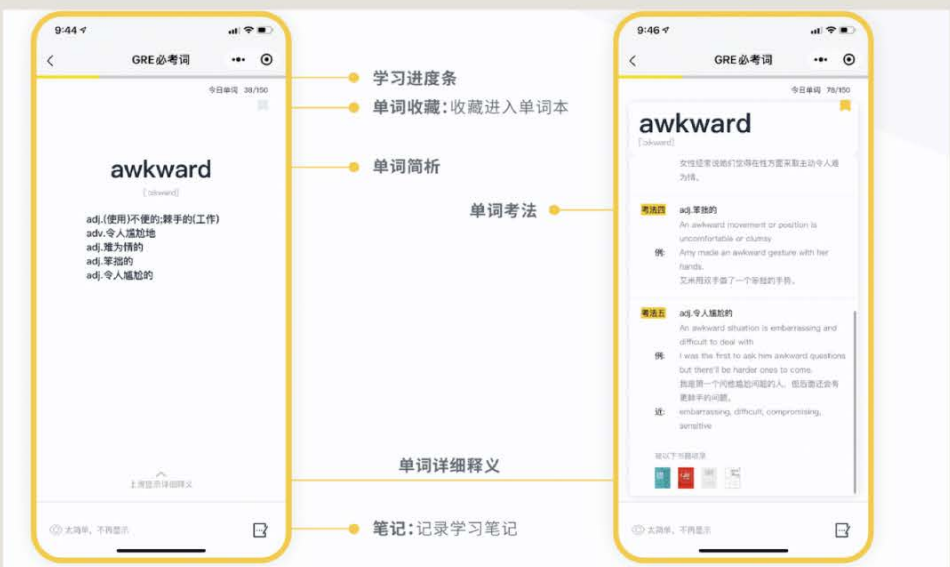
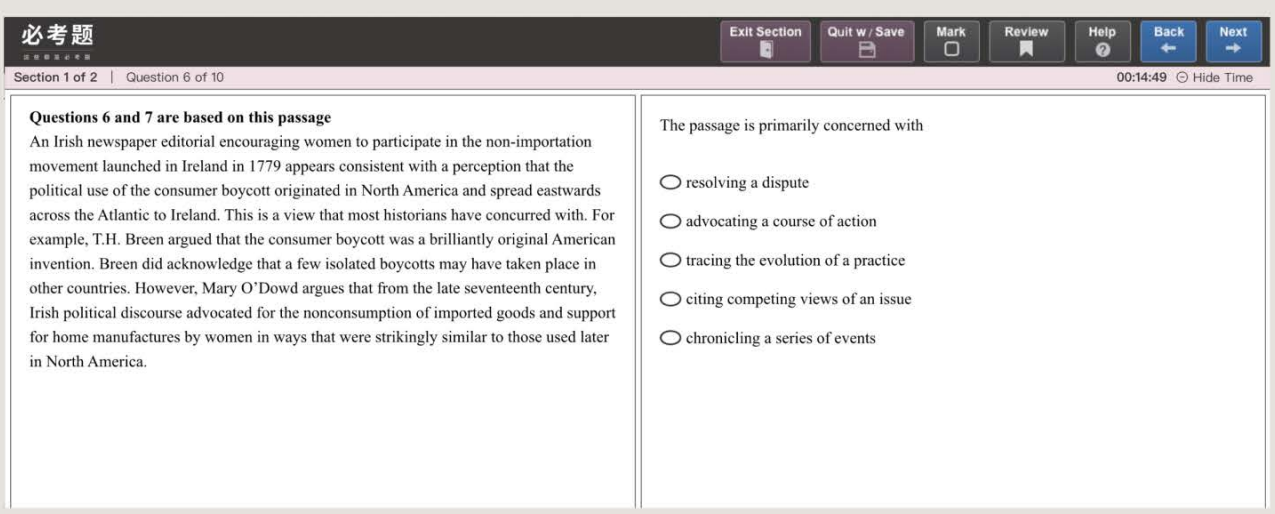


GRE必考题模考平台

GRE必考题开发了独家GRE模拟考试系统，1比1还原真实考场场景，帮助学生提前适应考试氛围，把握考试节奏。完成测试后，系统会自动生成一份成绩报告，进一步帮助学生了解自己的模考表现。



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GRE暑期全程班

课程特色

- Office Hour 及时答疑
- 3个月内 无限回看
- 还原全真 模考系统
- 名师授课 攻克难点
- 实战新题 趋势预测
- 提供全套 备考资料

课时安排

- GRE系统扫盲课
- 10课时数学直播
- 附赠6课时作文录播
- 12课时填空直播
- 12课时阅读直播
- 7天Verbal刷题课

课程表

GRE必考题全程班[北美]

日期	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
课程	GRE群内文字开营	GRE开营仪式	填空一	数学一	阅读一	作文录播一	阅读二
上课时间	美东 21:00-21:30 美中 20:00-20:30 美西 18:00-18:30	美东 21:00-21:30 美中 20:00-20:30 美西 18:00-18:30	美东 21:30-23:30 美中 20:30-22:30 美西 18:30-20:30	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00
单词课安排		单词List1-2	单词List3-4	单词List5-6	单词List7-8	单词List9-10	单词List1-10
日期	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
课程	单词大冲关 第一轮 + Office Hour	填空二	数学二	数学三	填空三	作文录播二	休息
上课时间		美东 21:30-23:30 美中 20:30-22:30 美西 18:30-20:30	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:30-23:30 美中 20:30-22:30 美西 18:30-20:30	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	
单词课安排	复习List1-10	单词List11-12	单词List13-14	单词List15-16	单词List17-18	单词List19-20	单词List11-20
日期	Day 14	Day 15	Day 16	Day 17	Day 18	Day 19	Day 20
课程	单词大冲关 第二轮 + Office Hour	阅读三	数学四	填空四	阅读四	作文录播三	休息
上课时间		美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:30-23:30 美中 20:30-22:30 美西 18:30-20:30	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	
单词课安排	复习List11-20	单词List21-22	单词List23-24	单词List25-26	单词List27-28	单词List29-30	单词List21-30
日期	Day 21	Day 22	Day 23	Day 24	Day 25	Day 26	Day 27
课程	单词大冲关 第三轮 + Office Hour	阅读五	填空五	阅读六	填空六	数学五	模考训练日
上课时间		美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:30-23:30 美中 20:30-22:30 美西 18:30-20:30	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	美东 21:30-23:30 美中 20:30-22:30 美西 18:30-20:30	美东 21:00-23:00 美中 20:00-22:00 美西 18:00-20:00	
单词课安排	复习List21-30	单词复习1-6	单词复习7-12	单词复习13-18	单词复习19-24	单词复习25-30	
日期	Day 28	Day 29	Day 30	Day 31	Day 32	Day 33	Day 34
课程	阅读刷题 (录播)	填空刷题 (录播)	阅读刷题 (录播)	填空刷题 (录播)	阅读刷题 (录播)	填空刷题 (录播)	阅读刷题 (录播)
上课时间	3篇短文章+2篇中文章 (不限时)	20双空题专项+10道综合训练 (不限时)	10道逻辑单题, explanation+weaken (不限时)	20道三空训练+10道综合训练 (不限时)	2篇短文章+1篇中文章+1篇长文章 (不限时)	20道六选二专项+10道综合训练 (不限时)	2篇短文章+1篇中文章+1篇长文章 (不限时)

GRE Verbal实战刷题班

为已经掌握方法、备考进入**中期阶段**的同学们量身定制，在短期内实现**实战练习、巩固方法、冲刺出分**。

填空

- 660道填空
- 24套单项模考
- 60+小时的名师视频 三个月无限回看
- 全套实战题讲义

阅读

- 101篇阅读+模考
- 60道逻辑单题
- 60+小时的名师视频 三个月无限回看
- 全套实战题讲义

序言

必考题教研组每年都会帮助成千上万名学生准备 GRE 考试，其中绝大多数学生都会跟我们说同一句话“如果准备时间足够，我肯定能考好。”但问题的关键恰恰就是：**准备时间一定是不够的**。

海外研究生是一个综合型的项目，学生要上高压的专业课，要刷高或者急提 GPA，要实习拓人脉，要科研做实验，要跟教授 meeting 又 meeting 求一封推荐信，海本的同学还要加上人在国外的种种不便。为了申请到梦校的研究生项目，同学们对每一个环节的精益求精都在挤压备考 GRE 的时间。这使得 GRE 备考势必是要打成闪电战，而非持久战。那么 GRE 这场闪电战，我们真的能赢得漂亮吗？当然可以！GRE 必考题成千上万的学员以亲身经历总结出的必胜公式：**高分=正确的方法+高效的刷题**。

- 正确的方法: GRE 必考题教研组老师根据多年的教学经验, 千锤百炼总结出了填空逻辑解题法,双线阅读法等被无数课上的学生验证过的高效出分思路。
- 高效的刷题: 我们又怎么帮助到同学们呢？

GRE 题库浩如烟海，全刷完是不可能的，而且题库中很多题目因为陈旧或不具代表性等原因已经早就不会出现在目前的考试中了。网上的资料鱼龙混杂，不仅题目陈旧而且答案还可能存在错误，同学们在错误的土地上再怎么耕耘也无法结出饱满的果实。GRE 必考题教研组的名师团队处理了 2020-2023 上半年考场中出现的所有 Quant 题目，我们的目标就是：**精校+精简**。让学生在最短的时间内，通过最少题量的练习，达到最好的学习效果。通过老师们的精选严校，和技术团队对题目出现频率、出现时间、出现概率的反复运算和预测，最终确定了**《GRE 必考题数学冲刺 600 题》中 600 道题目**。所有的题目由 2020-2023 上半年考场回忆的最新题以及反复出现的高频题组成，涵盖了所有考点以及由老师逐一确认参考答案，学生不仅能够通过做题掌握 GRE 的出题思路，还有很大概率在之后的考试中遇到原题。

我们不敢说 GRE 数学备考只用这一本资料就能打天下，但这本资料一定可以成为大家的保命功法，节省掉你东拼西凑囤资料，大海捞针筛资料，做了大量无效题目走弯路的时间。有些相遇注定就是为了离别，希望大家拿起这本书，好好学习，不负韶华, 因为努力的时光都会是限量版; 放下这本书的时候，愿你们出分顺利，前程似锦, 一起顶峰相见。

Section 01

1. A safe contains 2 bags of coins and 4 bags of paper money. The total value of the money in the 6 bags is $1,200.

Quantity A	Quantity B
The total value of the money in the bags that contain coins	$401

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.

2. R is a function defined as R(a, b)= $\sqrt{b-a}$, for all real numbers a and b, where a<b.

Quantity A	Quantity B
R(-3, -1)	1.8

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.

3.

$$27-k=\frac{k-17}{4}$$

Quantity A	Quantity B
k	19

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.

4.

11, 21, 15, 9, 3, 17, x

In the list shown, x is a positive integer.

Quantity A	Quantity B
The median of the integers in the list	13

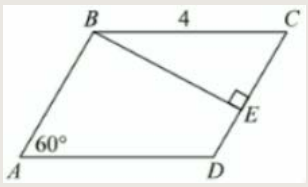
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

5. The finite sets R, S, and T have the same number of elements. The number of elements in the set $R \cup T$ is less than the number of elements in the set $S \cup T$.

Quantity A	Quantity B
The number of elements in the set $R \cap T$	The number of elements in the set $S \cap T$

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.

6.



ABCD is a parallelogram.

Quantity A	Quantity B
CE	2

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.

7.

Quantity A	Quantity B
The 50th digit to the right of the decimal point in the decimal expansion of $\frac{2}{7}$	The 50th digit to the right of the decimal point in the decimal expansion of $\frac{3}{7}$

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.

8.

Quantity A	Quantity B
$\frac{\sqrt[3]{48+\sqrt[3]{512}}}{10-12\sqrt[3]{5}}$	$\frac{\sqrt[3]{6+\sqrt[3]{2}}}{5-6\sqrt[3]{5}}$

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.

9. A telephone call from City X to City Y costs $3.00 for the first 3 minutes and $0.75 per minute for each minute after the first 3 minutes. At this rate, a call from City X to City Y that costs $12.00 is how many minutes long?

A. 4
B. 9
C. 12
D. 15
E. 16

10.

A={6, 9, 12, 15}

B={-1, -4, -7, -10}

If a number x is to be selected from set A and a number y is to be selected from set B, what is the range of all possible values of x+y?

A. 9
B. 16
C. 18
D. 19
E. 21

11. A continuous random variable R has a mean of 69 and a standard deviation of 11. What is the value of R that is 0.5 standard deviation below the mean?

A. 47
B. 57.5
C. 58
D. 63.5
E. 68.5

12. x, y, z, u, v, w, and t are seven nonzero integers. Which of the following values can be the number of these seven integers that are negative if xyz=uvwt?
Indicate **all** such values.

A. Three
B. Four
C. Five

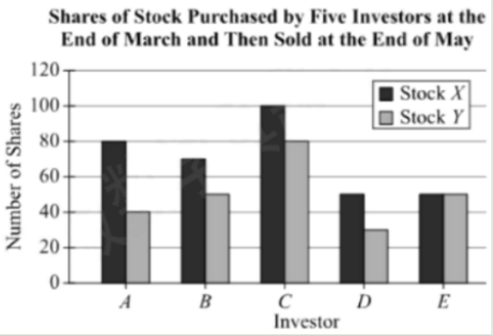
13. In a survey, 300 people were asked which candidate they had decided to vote for in an upcoming election. Of those surveyed, 35 percent responded that they had decided to vote for Candidate A, 42 percent responded that they had decided to

vote for Candidate Band the remaining 23 percent responded that they were undecided about which candidate to vote for. What fraction of those surveyed responded that they had decided which candidate they would vote for in the election?

$$\frac{\square}{\square}$$

Questions 14 and 16 are based on the following data

Selected Information for Stocks *X* and *Y*



Note: The prices and the numbers of shares are multiples of 10.

14. Another investor, F, purchased a total of 180 shares of Stock X and Stock Y at the end of March and then sold all the shares at the end of June. earning a total profit of S600.How many shares of Stock X did Investor F purchase? (Note: Profit equals selling price minus purchase price.)

_____shares

15. For how many of the months shown was 7 times the end-of-month price of Stock Y greater than 2 times the end-of-month price of Stock X?

A. One
B. Two
C. Ten
D. Eleven
E. Twelve

16. For Investor A, the sum of the prices of all the shares of Stock X and Stock Y purchased at the end of March was p percent less than the sum of the prices of all the shares of Stock X and Stock Y sold at the end of May. Which of the following

is closest to the value of p?

A. 0.0
B. 1.2
C. 1.7
D. 6.5
E. 7.0

17. If n is an integer such that $12n-n^2>35$, what is the value of n?

n=_____

18. Asmaa is mixing two types of coffee beans. She will mix x kilograms of coffee beans costing 6 euros per kilogram with y kilograms of coffee beans costing 30 euros per kilogram. If the final mixture will contain8 kilograms of coffee beans costing 16.5 euros per kilogram what is the value of x?

A. 4.5
B. 5.0
C. 5.5
D. 6.0
E. 6.5

19.

The figure shows a square in which each of four interior line segments connects the midpoint of a side to a vertex of the square. The area of the shaded region is what fraction of the area of the square?

A. $\frac{1}{6}$

B. $\frac{1}{5}$

C. $\frac{\sqrt{5}}{10}$

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

E. $\frac{\sqrt{3}}{6}$

20. A piece of wood is in the shape of a right rectangular prism with a square base, where the length of each side of the base is 2 feet and the height of the prism is 0.1 foot. A construction worker placed one of the square faces of the piece of wood on a horizontal surface and made a hole vertically through the wood from the top square face to the bottom square face, where the hole was in the shape of a right circular cylinder with a radius of 0.75 foot and a height of 0.1 foot. Which of the following is closest to the surface area, in square feet, of the piece of wood after the hole was made?

A. 4.5
B. 5.7
C. 6.1
D. 7.5
E. 9.2

Section 02

1. y is a positive even integer.

Quantity A	Quantity B
x+y	x+1

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.

2. -4<x<2 and -2<x<4

Quantity A	Quantity B
|x|	2

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.

3.

List K: 4, x, 5, 8, 5

For the five numbers in list K, the median is greater than the average (arithmetic mean).

Quantity A	Quantity B
x	3

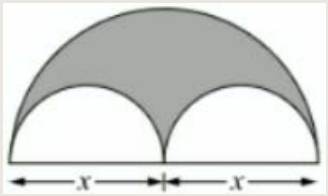
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

4. x≠y and y≠0

Quantity A	Quantity B
$\frac{x+y}{y}$	$\frac{x^2-y^2}{xy-y^2}$

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.

5.



The three arcs are semicircles.

Quantity A	Quantity B
The area of the shaded region	The sum of the areas of the two unshaded semicircular regions

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.

6.

$$|x| \geqslant \frac{1}{2}$$

Quantity A	Quantity B
x^{-2}	x^{-4}

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.

7. In a survey, 60 percent of those surveyed use long-distance company R, and 20 percent of those who use company R subscribe to an internet service.

Quantity A	Quantity B
The percent of those surveyed who do not subscribe to any internet service	50%

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.

8. In pentagon ABCDE, the sum of the measures of interior angles A, B, and C is 270 degrees.

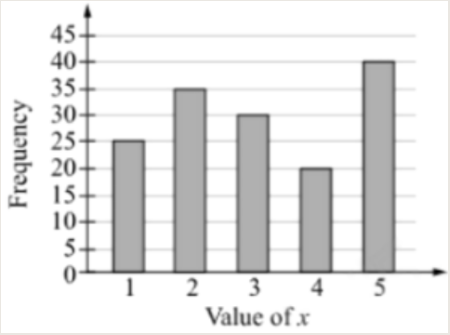
Quantity A	Quantity B
The sum of the measures of interior angles D and E in the pentagon	270 degrees

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.

9. At the post office, Sonia purchased mailing envelopes priced at $3.50 each including tax and postcards priced at $1.25 each, including tax. She paid for the envelopes and postcards with a $20.00 bill and received $2.25 in change. How many postcards did Sonia purchase?

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

10.



The variable x takes on the values 1, 2, 3, 4, or 5. The graph shows the frequency distribution for 150 values of x. Which of the following is closest to the average (arithmetic mean) of the 150 values?

A. 2.9
B. 3.1
C. 3.3
D. 3.5
E. 3.7

11. How many different positive three-digit integers are there that have an odd hundreds digit?

A. 400
B. 405
C. 495
D. 500
E. 1,000

12. N is a 3-digit integer with tens digit t and units digit u. If 621<N<685 and N is a multiple of 3, which of the following must also be a multiple of 3?

A. t+u
B. t-u
C. tu
D. t^u
E. u^t

13. A local store combined two consecutive discounts into a single discount. If the two consecutive discounts were 20 percent off the retail price and then 40 percent off the discounted price. what is the single discount off the retail price that is equivalent to the two consecutive discounts?

_____%

Questions 14 and 16 are based on the following data

Actions that Affect Computer Security:
a Survey of 250 Companies

Action Cited	Percent That Cited the Action	Total Amount of Losses Due to the Action Cited (in millions)
Financial fraud	14%	$19.2
Insider abuse of Internet access	82%	$10.6
Laptop theft	56%	$6.5
Sabotage	24%	$4.8
Theft of proprietary information	20%	$48.1
Unauthorized access	40%	$50.2
Virus attack	66%	$16.6
Total	-	$156.0

14. For the seven actions listed in the table, what is the range of the numbers of companies that cited the actions?

A. 130
B. 140
C. 150
D. 160
E. 170

15. Which of the following is closest to the amount by which the average (arithmetic mean) dollar amount of losses due to the actions cited exceeds the median dollar amount of the losses?

A. $5,400,000
B. $5,700,000
C. $6,000,000
D. $6,200,000
E. $6,600,000

16. The dollar amount of losses due to financial fraud was what percent greater, to the nearest whole percent, than the dollar amount of losses due to virus attack?

A. 5%
B. 6%
C. 11%
D. 16%
E. 21%

17. If p and r are integers such that $x^2+px-72=(x+r)(x-18)$ for all values of x, what is the value of p?

p=_____

18. If the area of a square is 20, the length of its diagonal is

A. $2\sqrt{5}$
B. $2\sqrt{10}$
C. $5\sqrt{2}$
D. $5\sqrt{3}$
E. $5\sqrt{10}$

19. On his trip home, Pat bicycled $\frac{2}{3}$ of the distance, then got a flat tire and walked the remaining distance. If he spent 3 times the amount of time walking that he spent bicycling, his average bicycling speed was how many times as fast as his average walking speed?

A. 2
B. 3
C. 4
D. 6
E. 9

20. A research report states that the average (arithmetic mean) of 120 measurements was 72.5, the greatest of the 120 measurements was 92.8 and the range of the 120 measurements was 51.6. The information given above is sufficient to determine the value of which of the following statistics? Indicate **all** such statistics.

A. The least of the 120 measurements
B. The median of the 120 measurements
C. The standard deviation of the120 measurements
D. The sum of the 120 measurements

Section 03

1. In State X, the average (arithmetic mean) number of dog licenses issued per working day for the 22 working days last July was 4.5 and the average number of dog licenses issued per working day for the 24 working days last August was 2.5.

Quantity A	Quantity B
The average number of dog licenses issued per day in State X for the 46 working days last July and last August combined	3.5

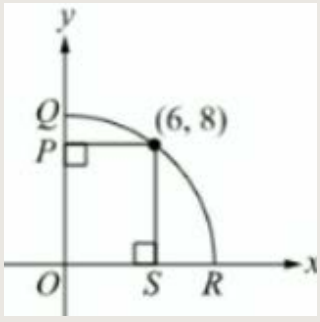
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

2. The value of $\boxed{x}\boxed{y}$ is defined as $\frac{x}{y}+\frac{y}{x}$ for all nonzero numbers x and y.

Quantity A	Quantity B
The value of $\boxed{\frac{2}{3}}\boxed{\frac{1}{4}}$	3

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.

3.



In the xy-plane, QR is an arc of the circle that has center O and passes through the point

(6, 8).

Quantity A	Quantity B
The length of SR	3

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.

4. In the xy-plane, n is the number of points on the graph of the equation $3x^2+5y^2=9$ when y=1.

Quantity A	Quantity B
n	2

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.

5.

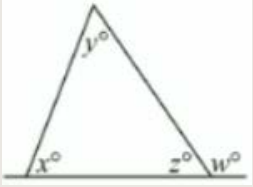
$20 < 4x < 32$

$8 < x+4 < 11$

Quantity A	Quantity B
x	6

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.

6.



$y+z=110$

Quantity A	Quantity B
w	110

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.

7.

$a_1,a_2,a_3,...,a_n,...$

In the sequence shown, $a_1=1$ and for all integers $n \geqslant 2$.

$a_n=2a_{n-1}+r,$

where r is a positive integer. The sum of a_1, a_2, and a_3 is 35.

Quantity A	Quantity B
r	7

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.

8. The average (arithmetic mean) of 6 different positive integers is 12 and x is the greatest of these integers, what is the greatest possible value of x?

A. 51
B. 55
C. 57
D. 62
E. 67

9. $n=1!+2!+3!+4!+5!+6!+7!+8!+9!+10!$, What is the remainder when the integer n is divided by 20?

A. 19
B. 18

C. 13
D. 12
E. 9

10. On May 1, 2005, the population of Town Y was twice the population of Town X. On May of the years 2006, 2007, and 2008, the population of Town X was 4 percent greater than it was the preceding May 1. and the population of Town Y was 1 percent greater than it was the preceding May 1. On May 1, 2008, the population of Town X was what fraction of the population of Town Y?

A. $\left(\frac{1.04}{1.01}\right)^3$
B. $2\left(\frac{1.04}{1.01}\right)^3$
C. $\frac{1}{2}\left(\frac{1.04}{1.01}\right)^3$
D. $2\left(\frac{1+3(0.04)}{1+3(0.01)}\right)$
E. $\frac{1}{2}\left(\frac{1+3(0.04)}{1+3(0.01)}\right)$

11.

On the number line. point M (not shown) is between points K and N, and the coordinate of M is x. If the distance from K to M is the average (arithmetic mean) of the distance from K to N and the distance from M to N, what is the value of x?

A. $\frac{2}{7}$
B. $\frac{1}{3}$
C. $\frac{2}{5}$
D. $\frac{1}{2}$

E. $\frac{2}{3}$

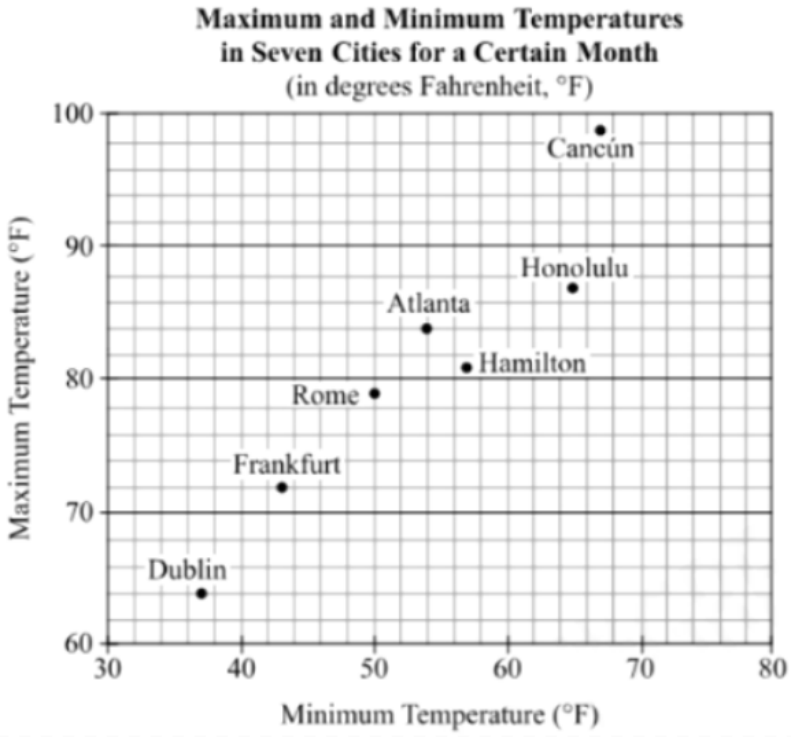
12. P, Q, and R are three points in a plane that are not all on the same line. Which of the following describes the set of all points in the plane that are equally distant from points P, Q, and R?

A. A circle
B. A point
C. A triangle
D. Two lines
E. Three lines

13. The rental on a certain beach house is $1,225 per week during the summer months of June, July, and August, and $110 per day during the rest of the year. Renting the house for 1 week during a summer month is what percent greater than renting the house for 1 week during the rest of the year? Give your answer to the nearest whole percent.

_____%

Questions 14 and 16 are based on the following data



14.

$$T_C = \left(\frac{5}{9}\right)(T_F - 32)$$

The formula above can be used to convert temperatures from degrees Fahrenheit (°F) to degrees Celsius (°C), where T_F is a certain temperature expressed in degrees Fahrenheit and T_C is the same temperature expressed in degrees Celsius. What was the maximum temperature in Atlanta, in degrees Celsius rounded to the nearest degree?

A. 37
B. 35
C. 33
D. 31
E. 29

15. For which city was the maximum temperature equal to the median of the maximum temperatures for the seven cities?

A. Atlanta
B. Cancún

C. Frankfurt
D. Hamilton
E. Rome

16. If a pair of different cities is chosen at random from the seven cities, which of the following is closest to the probability that in the pair chosen, the city with the higher maximum temperature is also the city with the lower minimum temperature?

A. 0.01
B. 0.05
C. 0.07
D. 0.09
E. 0.14

17. In the xy-plane, the lines with equations 2x-y=1 and x-y=c, where c is a constant, intersect at a point with the coordinates (a, b). What is the greatest possible value of c such that both $a \geqslant 0$ and $b \geqslant 0$?

18. Organizations F and G have 20,000 and 30,000 members respectively. The combined membership of the two organizations is 45,000.If one member of organization F is to be randomly selected. what is the probability that the member selected will also be a member of organization G?

A. $\frac{1}{3}$
B. $\frac{1}{4}$
C. $\frac{1}{5}$
D. $\frac{1}{6}$
E. $\frac{1}{9}$

19. **Children's Access to Computers, 1984**

Access to Computer	Percent
At home	15
At school	42
At home and at school	10

According to the data in the table, what percent of the children had access to a computer either at home, at school, or both?

A. 67%
B. 57%
C. 52%
D. 47%
E. 42%

20. If x is an integer and y=3x+2, which of the following integers could be a divisor of y? Indicate **all** such integers.

A. 4
B. 5
C. 6
D. 7
E. 8

Section 04

1.

$x+y=5$

$x-y=-3$

Quantity A	Quantity B
x	y

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.

2.

The perimeter of the figure is 20.

Quantity A	Quantity B
2x	$\frac{10}{3}$

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.

3. A total of 2.200 people attended an awards dinner in a ballroom. The tables in the room were numbered consecutively beginning with 1, and 8 people were seated at each table. If a table had an odd number. it was covered with a red tablecloth; and if a table had an even number. it was covered with a yellow tablecloth.

Quantity A	Quantity B
The number of tables in the ballroom that were covered with a red tablecloth	The number of tables in the ballroom that were covered with a yellow tablecloth

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.

4.

Quantity A	Quantity B
$7^{-4}+7^{-5}$	8^{-5}

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.

5. Set S consists of the multiples of 3 from 9 to 99, inclusive.

Quantity A	Quantity B
The median of the numbers in set S	48

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.

6. In the xy-plane, line ℓ has x-intercept 5 and y-intercept -4, and line k has x-intercept-4 and y-intercept 5.

Quantity A	Quantity B
The slope of line ℓ	The slope of line k

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.

7. x is a 2-digit positive integer that is a multiple of 3, and the units digit of 3x is 7.

Quantity A	Quantity B
x	69

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.

8. Let n be a positive integer and let x and y be nonzero numbers. List Q consists of 2n values whose average (arithmetic mean) is 2x+y. List R consists of 3n values whose average is x+2y. The average of the 5n values in lists Q and R combined is 1.2x+ 1.9y.

Quantity A	Quantity B
$\frac{x}{y}$	1.5

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.

9. For a certain task, an office worker will be paid a total of s dollars for the first 20 hours worked plus t dollars for each hour worked in excess of 20 hours. Which of the following represents the total amount, in dollars, that the office worker will be paid for x hours worked where x is an integer greater than 20?

A. s+tx
B. 20s+tx
C. st(x-20)
D. s+t(x-20)
E. E.20s+t(x-20)

10. Sphere K has radius k, and sphere N has radius n. If the ratio of the surface area of sphere K to the surface area of sphere N is 9 to 4 what is the ratio of k to n? (Note: The surface area of a sphere of radius r is $4\pi r^2$.)

A. 45 to 32
B. 81 to 16
C. 27 to 16
D. 9 to 4
E. 3 to 2

11. If $0 \leqslant n \leqslant 1$ and $0 \leqslant p \leqslant 1$, which of the following statements must be true? Indicate **all** such statements.

A. $0 \leqslant n+p \leqslant 1$
B. $-1 \leqslant n-p \leqslant 1$
C. $0 \leqslant np \leqslant 1$

12. Working at a constant rate, a certain irrigation system takes 3 days to water a level, circular field with a radius of 400 meters. Approximately what is the area, in square meters of the part of the field that is watered each day?

A. 120,000

B. 160,000
C. 170,000
D. 250,000
E. 500,000

13. A certain vase holds 4,286 milliliters of water. If 1 milliliter of water weighs 1 gram, how many kilograms of water does the vase hold?

_____kilograms

Questions 14 and 16 are based on the following data

Population and Motor Vehicle Data for Selected States, 2001

State	Population (in thousands)	Number of Motor Vehicles per 1,000 People	Average Number of Miles Driven per Motor Vehicle	Average Number of Miles Driven per Gallon of Gasoline Used
Alaska	635	941	7,898	11.9
California	34,494	834	10,796	17.6
Florida	16,348	875	10.855	17.3
New Jersey	8,502	776	10,444	14.2
Texas	21,316	673	15,058	15.6

Notes:
(1) Populations and numbers of motor vehicles registered are for the end of 2001.
(2) Miles driven and gasoline used are for the entire year of 2001.

14. For the motor vehicles registered in Texas, approximately what was the average (arithmetic mean) number of miles driven per person in 2001?

A. 10,000
B. 15,000
C. 22,000
D. 26,000
E. 30,000

15. For the total number of miles driven by the motor vehicles registered in Alaska in 2001 approximately how many gallons of gasoline were used?

A. 40 million
B. 56 million
C. 400 million
D. 4,000 million
E. 5,600 million

16. Registered motor vehicles consist of automobiles, buses, and trucks. In New Jersey at the end of 2001 if the number of registered automobiles was 2 times the total number of registered buses and trucks, how many automobiles were registered in New Jersey at the end of 2001? Give your answer to the nearest 100,000.

_____automobiles

17. The operation★is defined by x★y=$\frac{y}{x+1}$ for all numbers x and y, where x≠-1.

For what value of x is x★1=$\frac{7}{10}$?

Give your answer as a fraction.

x=$\frac{\square}{\square}$

18. The cover price of Magazine X is $2.25 per copy. Last week a total of n copies of Magazine X were sold, of which 60 percent were sold at the cover price and the rest were sold for 25 percent less than the cover price. What is the total revenue, in dollars. from sales of Magazine X last week, in terms of n?

A. 1.575n
B. 1.80n
C. 2.0n
D. 2.025n
E. 2.25n

19. A continuous random variable R has a mean of 60 and a standard deviation of 15. What is the value of R that is 0.5 standard deviation above the mean?

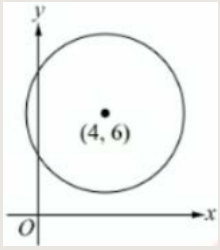
A. 60.5
B. 67.5
C. 75
D. 75.5
E. 90

20. The standard deviation of the values in a data set is 8. The least value in the data set is 3.25 standard deviations below the mean. and the greatest value in the data set is 4.5 standard deviations above the mean. What is the range of the values in the data set?

A. 10
B. 26
C. 36
D. 48
E. 62

Section 05

1.



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

Quantity A	Quantity B
The radius of the circle	6

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.

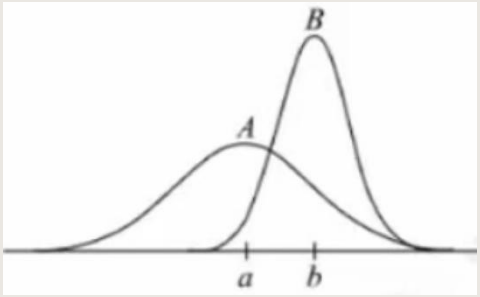
2. For each nonzero number x the function g is defined by $g(x)=\frac{1-x}{x}$.

c<-2

Quantity A	Quantity B
g(c)	g(-c)

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.

3.



The figure shows two normal distributions, A and B with means a and b, respectively.

Quantity A	Quantity B
The standard deviation of distribution A	The standard deviation of distribution B

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.

4.

$$8k-5m=15$$
$$2k+m=15$$

Quantity A	Quantity B
k	m

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.

5.

a is a positive integer.
x is the remainder when 15a is divided by 6.

Quantity A	Quantity B
x	2

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.

6. Thirty percent of the members of Group G are also members of Group H. Twenty percent of the members of Group H are also members of Group G.

Quantity A	Quantity B
The total number of members of Group G	The total number of members of Group H

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.

7. The lengths of the three sides of triangle T are 9, 12, and 16.

Quantity A	Quantity B
The measure of the interior angle of T opposite the side with length 16	90°

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.

8.

$$\sqrt{y^2} = 8$$

Quantity A	Quantity B
3^{2y}	3^{-2y}

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.

9. At an art auction $\frac{1}{3}$ of the pictures were sold during the first hour and $\frac{1}{2}$ of the remaining pictures were sold during the second hour. What fraction of the pictures remained unsold at the end of the two hours?

A. $\frac{3}{5}$

B. $\frac{2}{3}$

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

D. $\frac{1}{3}$

E. $\frac{1}{6}$

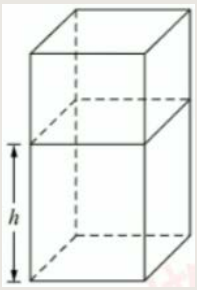
10. The average (arithmetic mean) of the numbers on a certain list is 30. Each of the numbers on the list is doubled and the result is then appended to the original list producing a new list that contains twice as many numbers as the original. What is the average of the numbers on the new list?

A. 40
B. 45
C. 50
D. 55
E. 60

11. Set M is composed of all 3-digit positive multiples of 7. What is the range of the numbers in set M?

A. 882
B. 885
C. 889
D. 894
E. 896

12.



The figure represents the interior of a rectangular tank with a volume of 175 cubic feet and a base area of 17.5 square feet. The tank contains 105.0 cubic feet of water, which fills the tank to a level of h feet above the bottom. The water level in the tank is to be raised 2.4 feet by adding water to the tank. The volume of additional water will be what fraction of the total volume of water in the tank after the water is added?

A. $\frac{1}{3}$

B. $\frac{2}{5}$

C. $\frac{2}{7}$

D. $\frac{3}{5}$

E. $\frac{3}{4}$

13. The Mountaineering Club has 90 members. If 50 percent of the members are 30 years old or younger and 20 percent of the members are 50 years old or older, how many of the members are older than 30 years and younger than 50 years?

_____members

Questions 14 and 16 are based on the following data

Note: The Smiths total bank account balance is equal to the total of their checking account balance and their savings account balance.

14. The Smiths' checking account balance was greater than $1,000 on the first day of how many months in 2000?

A. Three
B. Four
C. Six
D. Eight
E. Nine

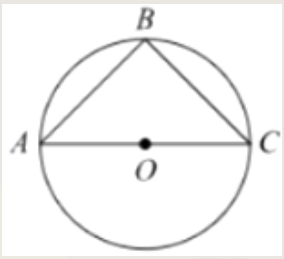
15. The Smiths total bank account balance on January 1, 2000, was 1.5 times their total bank account balance on December 1,1999. Their total bank account balance on December 1,1999, was $600 more than it was on November 1,1999. If the Smiths total bank account balance on November 1,1999, was x dollars, then x satisfies which of the following equations?

A. 1.5(x-600)=1,600
B. 1.5(x+600)=1,600
C. 1.5(x-600)=2,400
D. 1.5x+600=2,400
E. 1.5(x+600)=2,400

16. The Smiths total bank account balance increased by approximately what percent from April 1 to July 1, 2000?

A. 25%
B. 43%
C. 57%
D. 75%
E. 113%

17.



In the figure above, the center of the circle is O and AB=BC. If the ratio of the area of triangle ABC to the area of semicircle ABC is x to π, what is the value of x?

x=_____

18. If x is an integer greater than 2, which of the following must be a positive number?

A. -1-x
B. -2x
C. -2^x
D. x^{-2}
E. $-x^2$

19. One-half of 8^{150} is equal to which of the following?

A. 2^{149}
B. 2^{150}
C. 2^{219}
D. 2^{300}

E. 2^{449}

20.

Brand	Price per Loaf	Number of Loaves Sold
A	$4.00	12
B	$2.00	N
C	$1.00	8

The table above shows the prices of three brands of bread and the corresponding numbers of loaves sold yesterday at a local market. If the average (arithmetic mean) price per loaf of all the loaves sold yesterday was greater than $2.50, which of the following could be the value of n? Indicate **all** such values.

A. 7
B. 9
C. 11
D. 13
E. 15

Section 06

1. In triangle ABC the altitude from vertex B to side AC is of length h, and in triangle RST the altitude from vertex S to side RT is of length h+r, where r>0. The areas of the two triangular regions are equal.

Quantity A	Quantity B
The length of side AC	The length of side RT

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.

2. n is a positive integer and k=10,000n.

Quantity A	Quantity B
The sum of the digits of n	The sum of the digits of k

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.

3. The median of the five measurements in set X is 65 and the median of the five measurements in set Y is 75. All ten measurements in sets X and Y are between 60 and 80.

Quantity A	Quantity B
The median of the ten measurements in sets X and Y combined	70

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.

4. An area of 4 square yards is equal to an area of x square feet. (1yard=3feet)

Quantity A	Quantity B
x	36

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.

5.

$r=(2^3)(3^4)(5^6)$

$s=(11^3)(13^4)(17^6)$

Quantity A	Quantity B
The number of different positive factors of r	The number of different positive factors of s

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.

6.

$x>0$

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

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.

7.

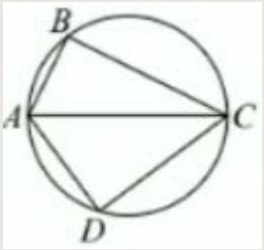
Quantity A	Quantity B
$(1.5+z)^2-\frac{1}{4}$	$(1.25+z)^2+\frac{3}{4}$

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.

8. Last Saturday a cyclist started a 40-kilometer trip at 9 o'clock in the morning and rode at an average speed of 20 kilometers per hour for 45 minutes. The cyclist stopped to rest for x minutes and then rode at an average speed of 30 kilometers per hour until the trip was completed at 11 o'clock in the morning. What is the value of x?

A. 35
B. 25
C. 20
D. 15
E. 10

9.



In the figure, quadrilateral ABCD is inscribed in the circle and line segment AC is a diameter of the circle. The measure of angle BCD is x degrees, and the measure of angle BAD is y degrees. What is the value of y in terms of x?

A. 2x
B. 90+x
C. 180-x

D. 180-2x
E. 360-2x

10. An investor purchased two properties, A and B. The investor later sold property A at a selling price that was 20 percent more than the purchase price of A, and the investor sold property B at a selling price that was 40 percent less than the purchase price of B. If the combined purchase price of properties A and B was $200,000 and the combined selling price was $210,000, what was the selling price of property A?

A. $160,000
B. $170,000
C. $180,000
D. $190,000
E. $200,000

11. If x=2y+1, and y=2w, where w, x, and y are integers, which of the following must be an odd integer?

A. xy+w
B. xy+w+1
C. (x+y)w
D. wy+x
E. wx+y

12.

S={1, 2, 3, 4, 6}
T={1, 2, 3, 6, 8}

From set S, an integer is chosen and called sand from set T an integer is chosen and called t. The product of the two integers s and t is called p. What is the total number of different values of p that can be determined in this way?

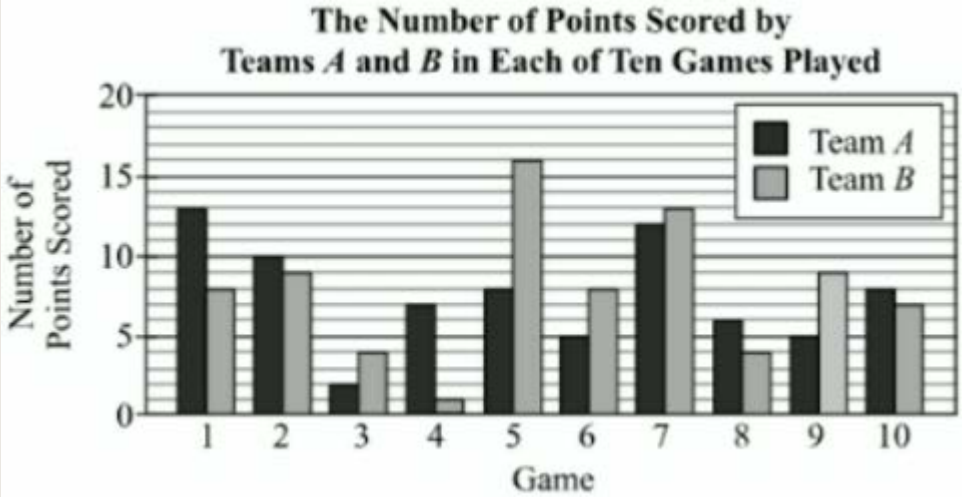
A.5
B.9
C.14

D.18
E.25

13. A local store combined two consecutive discounts into a single discount. If the two consecutive discounts were 20 percent off the retail price and then 40 percent off the discounted price. what is the single discount off the retail price that is equivalent to the two consecutive discounts?

_____%

Questions 14 and 16 are based on the following data



14. In what percent of the games for which the difference in the number of points scored by the two teams was equal to 1 point did team A score more points than team B?

A. 20%
B. 30%
C. $33\frac{1}{3}\%$
D. 50%
E. $66\frac{2}{3}\%$

15. Two of the ten games will be selected at random, without replacement. What is the probability that both of the games selected will be games in which team A scored more points than team B?

A. $\frac{2}{9}$

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

C. $\frac{5}{18}$

D. $\frac{1}{3}$

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

16. The number of games in which team B scored at least 50 percent more points than team A was what fraction of the number of games in which team B scored more points than team A?

A. $\frac{1}{5}$

B. $\frac{2}{5}$

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

D. $\frac{3}{5}$

E. $\frac{4}{5}$

17.

x	5	3	1	-1
f(x)	-7	-3	1	5

The table above shows the values of f(x) for selected values of x, where f(x) is a linear function. What is the value of f(-10)?

18. For all integers x greater than 1, the function p(x) is defined as the number of different prime factors of x. What is the vale or $\frac{p(12)}{p(9)}$?

A. $\frac{2}{3}$

B. $\frac{4}{3}$

C. $\frac{3}{2}$

D. 2

E. 3

19.

-14, -11, -7, 9, 10, 13

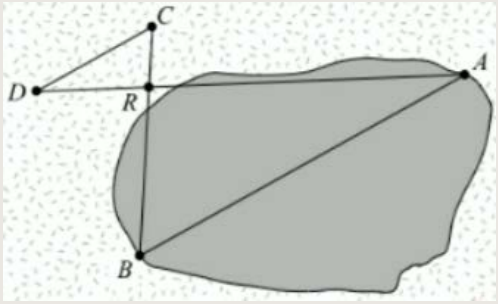
Which of the following statements are true for the list of six numbers above?
Indicate **all** such statements.

A. The standard deviation is greater than the median.

B. The range is greater than the median.

C. The product of the six numbers is negative.

20.



The figure above represents a pond and the nearby land that surrounds it. Lucia plans to measure the distance across the pond from point A to point B. First, she will measure the distance from a rock on land at point R to point D on line AR. Next, she will measure the distance, along a line parallel to line AB, from point D to point C, which lies on line BR. Of the following, which additional measurement will be sufficient to determine the distance from A to B?

A. The distance from A to R
B. The distance from B to R
C. The distance from C to R
D. The measure of angle ARB
E. The measure of angle DAB

Section 07

1. Of the students in class M, 2 percent dropped the class. Of the students in class N8 percent dropped the class.

Quantity A	Quantity B
The number of students that dropped class M	The number of students that dropped class N

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.

2.

$2x+1=9$

Quantity A	Quantity B
x	5

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.

3.

$x>0$ and $y<0$

Quantity A	Quantity B
xy	y^2

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.

4.

$$\frac{x+y}{2}=5 \text{ and } \frac{x+y+z}{3}=4$$

Quantity A	Quantity B
z	3

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.

5. The random variables A and B are each normally distributed, where A has a mean of 3 and a standard deviation of 2, and B has a mean of 5 and a standard deviation of l.

Quantity A	Quantity B
The percent of the values of A that are between 4 and 6	The percent of the values of B that are between 4 and 6

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.

6. Each of the lists S and T consists of 5 numbers. For each integer k from 1 to 5, the kth number in list S is 3k-1 and the kth number in list T is 2k+17.

Quantity A	Quantity B
The standard deviation of the numbers in list S	The standard deviation of the numbers in list T

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.

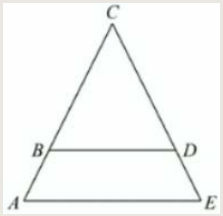
7.

$x < x^3 < x^2$

Quantity A	Quantity B
x^5	x^7

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.

8.



In the figure above, triangle ACE is similar to triangle BCD. The height of ACE corresponding to the base AE is 7 and the height of BCD corresponding to the base BD is k. The area of BCD is equal to the area of trapezoid ABDE.

Quantity A	Quantity B
k	5

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.

9. A list consists of six distinct positive integers less than or equal to 10. Which of the following CANNOT be the median of the six integers?

A. 3
B. 4
C. 5.5
D. 6
E. 7.5

10. When the positive integer m is divided by 5, the remainder is 2. Which of the following integers could be the remainder when m is divided by 15? Indicate **all** such integers.

A. 2
B. 5
C. 7
D. 8
E. 10
F. 12

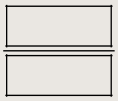
11. In a certain trivia game, each contestant answers 20 questions and earns or loses points as follows. The contestant earns 10 points for each correct answer and loses 2 points for each incorrect answer. If the contestant begins the game with 0 points, which of the following CANNOT be the total number of points that the contestant has after answering the 20 questions?

A. 80
B. 104
C. 124
D. 140
E. 152

12. In triangle ABC, the length of side AB is 13, the length of side B is 14, and the length of side AC is 15. What is the length of the altitude from vertex A to side BC?

A. 10
B. 10.5
C. 11
D. 11.5
E. 12

13. In the xy-plane, what is the x-intercept of the line 12x+3y=8?
Give your answer as a fraction.



Questions 14 and 16 are based on the following data

Population and Motor Vehicle Data for Selected States, 2001

State	Population (in thousands)	Number of Motor Vehicles per 1,000 People	Average Number of Miles Driven per Motor Vehicle	Average Number of Miles Driven per Gallon of Gasoline Used
Alaska	635	941	7,898	11.9
California	34,494	834	10,796	17.6
Florida	16,348	875	10.855	17.3
New Jersey	8,502	776	10,444	14.2
Texas	21,316	673	15,058	15.6

Notes:

(1)Populations and numbers of motor vehicles registered are for the end of 2001.

(2)Miles driven and gasoline used are for the entire year of 2001

14. At the end of 2001approximately how many more motor vehicles were registered in California than in Texas?

A. 160,000
B. 2,100,000
C. 8,900,000
D. 11,000,000
E. 14,400,000

15. At the end of 2001, which of the following states had the median number of motor vehicles registered for the five states shown?

A. Alaska
B. California
C. Florida
D. New Jersey
E. Texas

16. At the end of 2017the population of Texas was 34 percent greater than the population of Florida. Which of the following statements individually provide(s) sufficient additional information to conclude that at the end of 2017 the population of Florida was less than 21 million? Indicate **all** such statements.

A. At the end of 2017, the population of Texas exceeded the population of Florida by less than 7 million.
B. From the end of 2001 to the end of 2017, the population of Texas increased by more than 6 million.
C. From the end of 2001 to the end of 2017, the population of Texas increased by less than 8 million.

17. On January 1 Rahul deposited $1000 into a savings account that pays interest at an annual rate of 2 percent compounded annually, and $4,000 into a savings account that pays interest at an annual rate of 3 percent compounded annually. The total amount of interest paid by the two accounts at the end of the first year will be what percent of the total amount that Rahul deposited into the two accounts?

_____%

18. Three concentric circles form the boundaries of the three sections of a certain garden: an innermost circular section, a middle ring-shaped section and an outermost ring-shaped section. The area of the outermost section is 5 times the area of the middle section. If the radii of the two smaller circles are 10 meters and30 meters, what is the radius, in meters, of the largest circle?

A. 63
B. 67
C. 70
D. 75
E. 150

19. Let S be the set of integers from 1 to 10. How many subsets of S contain at least one even integer and at least one odd integer?

A. 25
B. 31
C. 62
D. 252
E. 961

20. Working alone at their respective constant rates, pumps A, B, and C, can fill a certain empty swimming pool with water in 3 hours, 4.5 hours, and 12 hours respectively. Pumps A and B began working simultaneously to fill the empty pool. Pump B stopped working at the same time that pump C started working to fill the pool. If the empty pool was filled in 2 hours in how many minutes after pump B stopped working was the pool filled?

A. 40
B. 48
C. 60
D. 66
E. 80

Section 08

1.

$k > 0$ and $m < 0$

Quantity A	Quantity B
$\lvert -k+m \rvert$	$k-m$

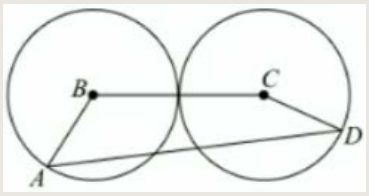
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

2. The average (arithmetic mean) of 20 numbers is 53. When one of the numbers is discarded, the average (arithmetic mean) of the remaining numbers is 54.

Quantity A	Quantity B
The discarded number	50

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.

3.



The two circles have centers at B and C, respectively, and are mutually tangent. Each circle has radius r.

Quantity A	Quantity B
The perimeter of quadrilateral ABCD	8r

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.

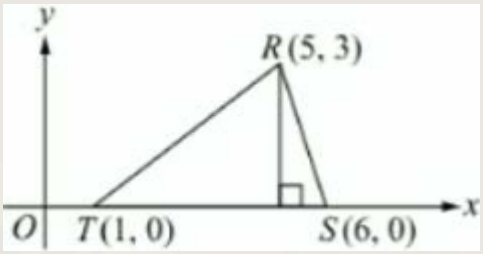
4.

$x^2 \neq 1$

Quantity A	Quantity B
$\frac{1}{x-1}-\frac{1}{x+1}$	$\frac{2}{x^2-1}$

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.

5.



The figure shows triangle TRS in the xy-plane.

Quantity A	Quantity B
The length of TR	The length of TS

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.

6. m is an odd integer greater than 1.

Quantity A	Quantity B
The greatest prime factor of 2m	The greatest prime factor of m^2

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.

7. 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

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.

8. A total of 500 tickets to a play were sold at prices ranging from $20 to $100 each. The average (arithmetic mean) price per ticket was $60.

Quantity A	Quantity B
The number of tickets sold for at most $60 each	The number of tickets sold for at least $60 each

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.

9. A dog show features four breeds consisting of 3 poodles 3 German shepherds, 3 boxers, and 2 Irish setters. If the winning group will consist of one dog from each breed how many different winning groups are possible?

A. 11
B. 20
C. 44
D. 54
E. 432

10. If x is an integer and the sides of a triangle are x+3, 2x, and x+5, respectively, which of the following could NOT be the perimeter of the triangle?

A. 16
B. 20
C. 28
D. 30
E. 32

11. The cost C, in dollars, to remove p percent of a certain pollutant from a lake is estimated by using the formula $C = \frac{500,000p}{100 - p}$. According to this estimate, how much more would it cost to remove 99 percent of the pollutant than it would cost to remove 90 percent?

A. $50,000
B. $500,000
C. $4,500,000
D. $45,000,000
E. $450,000,000

12. Set M consists of all the different integers n that satisfy |n-5|<3. What is the median of the numbers in set M?

A. 3.5
B. 4
C. 4.5
D. 5
E. 5.5

13. In a group of 100 adults, each owns a DVD player a CD player or both. If 60 adults own a DVD player and 70 adults own a CD player how many adults own both?

Questions 14 and 16 are based on the following data

Fifty government officials rated 12 proposals for a public works program. Each proposal received an individual rating of 1, 2, 3, 4 5, 6, or 7 from each official. For each proposal the sum of the 50 ratings and the median rating are listed in the table below.

Summary Data for Proposal Ratings

Proposal Number	Sum of 50 Ratings	Median Rating
1	164	3.0
2	125	3.0
3	311	6.0
4	229	5.0
5	252	4.5
6	232	4.0
7	303	6.0
8	95	2.0
9	130	3.0
10	236	4.0
11	204	4.0
12	263	5.5

14. Approximately what percent of the proposals have a median rating of 4.0 or less?

A. 33%
B. 42%
C. 50%
D. 58%
E. 70%

15. For proposal number 2, the average (arithmetic mean) rating is how much greater or less than the median rating?

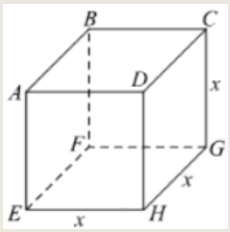
A. 0.5 greater
B. 2.5 greater
C. 0.5 less
D. 2.5 less

E. Neither greater nor less

16. How many of the proposals must have received at least one rating of 5, 6, or 7?

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

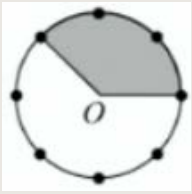
17.



The cube shown above has edges of length x where x is an integer. The length of diagonal AG (not shown) is 10.39, to the nearest 0.01. What is the value of the integer x?

x=_____

18.



The circle above has center O and circumference 16π. If the eight points indicated on the circle are equally spaced, what is the perimeter of the shaded region?

A. $8+4\pi$
B. $8+6\pi$
C. $16+4\pi$
D. $16+6\pi$
E. $16+8\pi$

19. Eugene and Penny started a job in sales on the same day. Eugene's sales for the first month were r dollars and each month after the first his sales for that month were twice his sales for the preceding month. Penny's sales for the first month were 10r dollars. and each month after the first her sales for that month were 10r dollars more than her sales for the preceding month. Which of the following statements are true? Indicate **all** such statements.

A. The dollar amount of Penny's sales for the second month was 10 times that of Eugene's sales for that month.
B. The dollar amount of Penny's sales for the fourth month was 5 times that of Eugene's sales for that month.
C. The dollar amount of Eugene's sales for the eighth month was greater than that of Penny's sales for that month.

20. $(2.82\times10^{-51})-(3.96\times10^{-49})=$

A. -3.9318×10^{-49}
B. -1.7804×10^{-51}
C. -1.14×10^{-100}
D. 1.7804×10^{-51}
E. 3.9318×10^{-49}

Section 09

1. The median of 35 measurements is 18.

Quantity A	Quantity B
The sum of the 35 measurements	625

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.

2.

-8, -3, 5, 8, 3, 5....

In the sequence, each term after the first two terms is the absolute value of the difference of the two preceding terms.

Quantity A	Quantity B
The first number to occur three times in the sequence	3

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.

3. A bowl contains jelly beans, 10 percent of which are green and the rest are blue. To this bowl n green jelly beans and 10n blue jelly beans will be added, where n>0.

Quantity A	Quantity B
After the 11n jelly beans are added to the bowl, the percent of the jelly beans in the bowl that will be green	10%

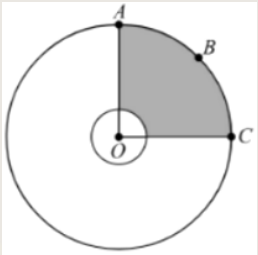
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

4. The reciprocal of x-2 is x+2.

Quantity A	Quantity B
x	3

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.

5.



The two circles in the figure shown have a common center at O, the area of the shaded region is 40π, and the measure of angle AOC is 90°.

Quantity A	Quantity B
The circumference of the smaller circle	The length of arc ABC

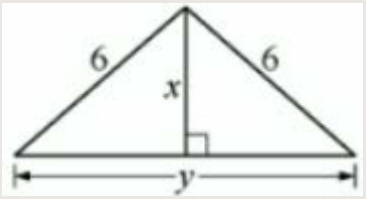
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

6. a and b are negative, and (a+b)(a-b)<0.

Quantity A	Quantity B
a	b

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.

7.



Quantity A	Quantity B
$4x^2+y^2$	144

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.

8. On each of 3 tests Tina received a score between 0 and 100, inclusive. If her average (arithmetic mean) score on the tests was 75, what is the greatest possible difference between her highest and lowest test scores?

A. 30
B. 40
C. 50
D. 60
E. 75

9. Which of the following statements are true for all integers a and b?
Indicate **all** such statements.

A. $(-1)^{ab}=(-1)^a+(-1)^b$
B. $(-1)^{a+b}=(-1)^a+(-1)^b$
C. $(-1)^{a+b}=(-1)^a(-1)^b$

10.

$$(5^3)w+(5^2)x+5y+z=264$$

In the equation shown, w, x, y, and z are nonnegative integers and each is less than 5. What is the value of w+x+y+z?

A. 5
B. 6
C. 8
D. 10
E. 12

11.

Color	Number of Cards	Labels
Red	3	K, S, W
Blue	3	S, W, H
Green	3	W, H, N

In a set of cards. each card is colored one of three colors and each card is labeled with one letter as indicated in the table. If one card is to be selected at random from the set, what is the probability that the selected card will be blue or labeled with the letter W?

A. $\frac{2}{9}$
B. $\frac{3}{9}$
C. $\frac{4}{9}$
D. $\frac{5}{9}$
E. $\frac{6}{9}$

12. The area of rectangular region R is 50 percent greater than the area of rectangular region S. If the length of R is 25 percent greater than the length of S, then the width of R is what percent greater than the width of S?

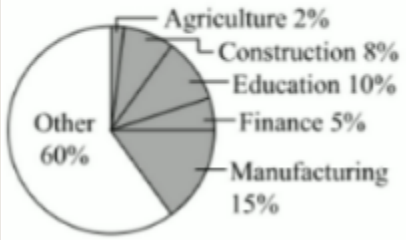
A. 20%
B. 25%
C. 75%
D. 120%
E. 125%

13. When an even integer k is rounded to the nearest 10, the result is 530. What is the greatest possible value of k?

Questions 14 and 16 are based on the following data

Employment in Region X by Sector of the Economy

Percent Distribution of People Currently Employed



Predicted Changes in Number of People Employed According to Projection A and Projection B

Sector of Economy	Projection A	Projection B
Agriculture	+10,000	+5,000
Construction	+20,000	+10.000
Education	-5.000	+15.000
Finance	+5,000	+20,000
Manufacturing	+15,000	-5,000

14. The number of people currently employed in agriculture is what percent of the total number of people currently employed in the five sectors shaded in the graph?

A. 2%
B. 2.5%
C. 5%
D. 10%
E. 40%

15. If the average (arithmetic mean) annual salary of the people currently employed in agriculture is $35,000 and if the average annual salary of the people currently employed in construction is $45,000, what is the average annual salary of the people currently employed in agriculture and construction combined?

A. $37,500
B. $40,000
C. $40,500
D. $42,500

E. $43,000

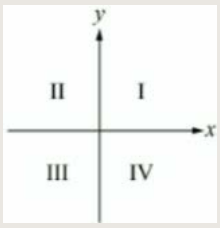
16. If the predicted change, according to projection A, in the number of people employed in education is a 4 percent decrease, then the predicted change, according to projection B, in the number of people employed in finance is what percent increase?

_____%

17. Michael, Kim, Glenda, and Ian all own DVDs, and no DVD is owned by two or more of them. Michael owns $\frac{1}{2}$ of the number of DVDs that Kim owns. Glenda owns $\frac{1}{3}$ of the number of DVDs that Ian owns. If Kim and Ian own the same number of DVDs, what is the ratio of the total number of DVDs that Michael and Glenda own to the total number of DVDs that Kim and Ian own?
Give your answer as a fraction.

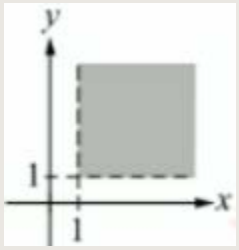
$$\frac{\square}{\square}$$

18.

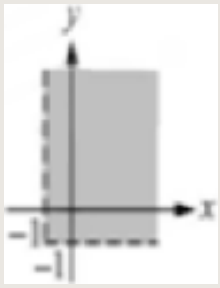


Which of the following shaded regions represents the set of all points (a, b) in the xy-plane above such that (a+1, b+1) is in quadrant I? (Note that a point on an axis is not in any quadrant.)

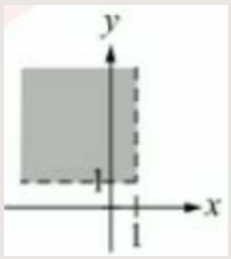
A.



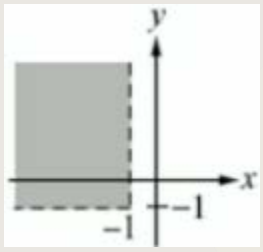
B.



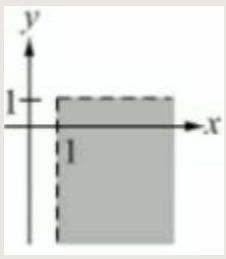
C.



D.



E.



19. A certain list has 5 entries and each entry is an integer between 55 and 70, inclusive. The median of the 5 entries is 60. If m is the average (arithmetic mean) of the 5 entries which of the following must be true?

A. $54 \leqslant m \leqslant 60$
B. $55 \leqslant m \leqslant 61$
C. $56 \leqslant m \leqslant 62$
D. $57 \leqslant m \leqslant 63$

E. 58≤m≤64

20. A total of 600 tickets were sold for a play. The prices of the tickets were $5 for children $6 for senior citizens. and $7 for all other adults. The number of tickets sold for children was twice the number sold for adults who were not senior citizens. If the total receipts from the ticket sales were $3.425.how many tickets were sold to senior citizens?

A. 75
B. 150
C. 175
D. 225
E. 350

Section 10

1. Out of every 8 cars produced by a certain manufacturer, 3 are white.

Quantity A	Quantity B
The percent of the manufacturer's cars that are white	The percent of the manufacturer's cars that are black

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.

2.

$$\frac{1}{5}=\frac{y}{3}$$

Quantity A	Quantity B
y	6

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.

3.

31, -2, 79, 34, -47, 1, -25

Quantity A	Quantity B
The product of the numbers shown	The sum of the numbers shown

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.

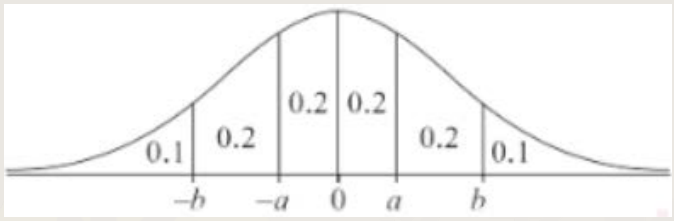
4.

mn=7 and m=3

Quantity A	Quantity B
m(2n+1)	15

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.

5.



The figure shows a normal distribution with mean 0, including probabilities corresponding to the six intervals shown. The random variable X has the distribution shown, and a<t<b.

Quantity A	Quantity B
P(X<t)	0.8

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.

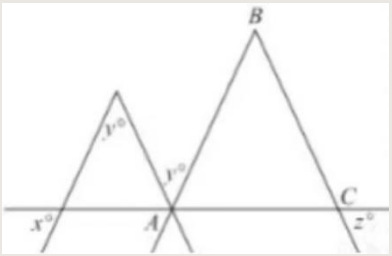
6.

Quantity A	Quantity B
The median of the consecutive integers from 4 to 88, inclusive	46.5

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.

7.



In the figure above, AB>BC.

Quantity A	Quantity B
x	z

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.

8. $x=(8q)^n$, where q and n are integers greater than 5 and q is odd.

Quantity A	Quantity B
The ratio of the number of odd positive factors of x to the number of even positive factors of x	$\frac{1}{3n}$

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.

9. If n and 1.25n are positive integers, which of the following could be the units digit of n? Indicate all such digits.

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

E. 4
F. 5
G. 6
H. 7
I. 8
J. 9

10. A cyclist traveled a distance of 50 miles in 5 hours. The cyclist's average speed for the first 25 miles was 10 miles per hour faster than the cyclist's average speed for the last 25 miles. Which of the following is closest to the time, in hours, that it took the cyclist to travel the last 25 miles?

A. 2.0
B. 2.5
C. 3.0
D. 3.5
E. 4.0

11. In the xy-plane, a quadrilateral has vertices at the points (1, 1), (7, 2), (5, 6), and (2, 6). What is the area of the quadrilateral?

A. 11
B. 17.5
C. 18
D. 20
E. 20.5

12. A chemist mixed a solution that is 5 percent acid, by weight, with a second solution that is 20 percent acid. by weight to produce x grams of a solution that is 12 percent acid, by weight. How many grams of the second solution did the chemist use to produce the mixture in terms of x?

A. $\frac{7}{15}x$

B. $\frac{8}{15}x$

C. $\frac{7}{12}x$

D. $\frac{3}{5}$x

E. $\frac{2}{3}$x

13. Kelly deposited $1,200 into a savings account that paid interest at a simple annual interest rate of4 percent. If Kelly made no additional deposits to or withdrawals from the account, how much money was in the account at the end of one year after the interest had been paid?

$_____

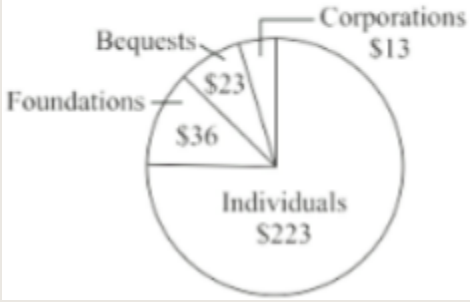
Questions 14 and 16 are based on the following data

Charitable Donations in Country C in 2017

Total:$295 million

Amount Received by Category

Amount Donated by Source (in millions)



Category	Amount Received (in millions)
Religion	$97
Education	$41
Human Services	$30
Public and Society	$21
Health	$20
Arts and Humanities	$13
Other	$73

14. If the amount donated to the Religion category by Individuals was donated by a total of 2 million people and if 82 percent of the amount received by the Religion category was donated by Individuals. approximately what was the average (arithmetic mean) amount donated to the Religion category per person for all the people who donated as Individuals?

A. $40

B. $60

C. $80
D. $100
E. $120

15. The amount donated by Corporations was approximately what percent less than the total amount donated by Bequests and Foundations?

A. 22%
B. 46%
C. 54%
D. 70%
E. 78%

16. If the amounts donated by Foundations to the 7 categories shown were in the same proportion as the total amounts donated to the 7 categories which of the following categories received more than $3 million in donations from Foundations?
Indicate **all** such categories.

A. Religion
B. Education
C. Human Services
D. Public and Society
E. Health
F. Arts and Humanities
G. Other

17. If x is positive and satisfies $\frac{4}{x} = 3 + 7x$, what is the value of x?

Give your answer as a fraction.

x= $\frac{\square}{\square}$

18. A water storage container has the shape of a right circular cone positioned so that its base is at the top and is horizontal. The interior height of the cone is 60 centimeters. Water is filling the container at a constant rate. If it takes 168 seconds for the height of the water to increase from 20 centimeters to 40 centimeters. how many seconds does it take for the height of the water to increase from 40 centimeters to 60 centimeters? (Note: The volume V of a right circular cone is given by $V = \frac{1}{3}\pi r^2 h$, where r is the radius of the base and h is the height of the cone.)

A. 168
B. 252
C. 456
D. 480
E. 567

19. The variance of n values x_1, x_2, x_3,...,x_n with mean $\bar{x}$ is equal to $\frac{S}{n}$. where S is the sum of the squared differences $\left(x_i - \bar{x}\right)^2$ for 1≤i≤n. Data set R consists of n values and data set T consists of 2n values, where n is a positive integer. The means of the values in R and T are the same, and the variances of the values in R and T are 16 and 100 respectively. What is the variance of the values in the data set that consists of the values in R and the values in T?

A. 72
B. 64
C. 58
D. 49
E. 44

20. For any subset S of a universal set U, the set $\bar{S}$ consists of all the elements in U that are not in S. Of the elements in U. 50 percent are in set A, 30 percent are in set B, and 10 percent are in the set A∩B. If the set A∪ $\overline{B}$ contains 840 elements how many elements does the set $\overline{A}$ ∪B contain?

A. 420
B. 504
C. 630
D. 1,120
E. 1,680

Section 11

1.

$a > 1$

Quantity A	Quantity B
$\frac{a}{a-1}$	$\frac{a+1}{a}$

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.

2. When the positive number k is multiplied by itself, the result is $\frac{1}{2}$ of k.

Quantity A	Quantity B
k	$\frac{1}{4}$

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.

3. In the xy-plane, line ℓ is perpendicular to the line determined by the equation 5y+3x=1.

Quantity A	Quantity B
The slope of line ℓ	$\frac{5}{3}$

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.

4. a and b are consecutive positive integers and a is less than b.

Quantity A	Quantity B
a^b	b^a

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.

5. n is an integer and 5n-1 is a positive even integer.

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

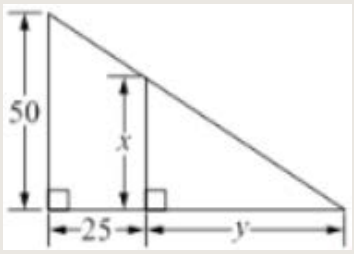
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

6. In a department of 15 employees, the average (arithmetic mean) annual salary of the 7 lowest-paid employees is $33,500, and the average annual salary of the 7 highest-paid employees is 38,000.

Quantity A	Quantity B
The median of the 15 annual salaries	$35,900

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.

7.



Quantity A	Quantity B
x	y

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.

8. A set consists of k consecutive integers, including 2. The sum of the integers in the set is -11.

Quantity A	Quantity B
k	10

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.

9.

M={6, 27, 15, 8}
P={-1, 0, 5, -12, 3}

For sets M and P above, $\overline{M}$ is the set of numbers obtained by adding 3 to each number in M. and $\overline{P}$ is the set of numbers obtained by adding 7 to each number in P. How much greater is the range of the numbers in $\overline{M}$ than the range of the numbers in $\overline{P}$?

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

E. 4

10. Stores A, B, C, and D sell a certain model of printer for the same retail price. The retail price of the printer is discounted by 10 percent, 20 percent, 16 percent, and 12 percent at Stores A, B, C, and D, respectively. If the retail price of the printer is at least $100, which of the following statements about the discounted prices at the four stores must be true? Indicate **all** such statements.

A. The range is at least $10.
B. The median is at least $90.
C. The average (arithmetic mean) is at least $80.

11. In a certain raffle, the probability that the first ticket randomly drawn from the box will be a first-prize ticket is 0.001. and the probability that it will be a second-prize ticket is 0.005. If there are no other prizes, how many of the 1.000 tickets in the raffle box do not represent a prize?

A. 994
B. 995
C. 996
D. 997
E. 998

12. Martha invested a total of $10,000, part at 8 percent simple annual interest and the remainder at 10 percent simple annual interest. If these investments yielded a total of $870 in interest for one year. what amount had Martha invested at 8 percent simple annual interest?

A. $4,500
B. $5,500
C. $6,000
D. $6,500
E. $7,000

13. Sam, Jan, and Kate all bought the same style of jacket. Jan paid 17 percent more for the jacket than Sam paid, and Kate paid 12 percent more for the jacket than Jan paid. The amount that Kate paid was what percent greater than the amount that Sam paid? Give your answer to the nearest whole percent.

_____%

Questions 14 and 16 are based on the following data

14. In 1970 the annual contribution to the charity from Foundation X was closest to what percent of the annual contribution from Foundation Y?

A. 29%
B. 31%
C. 43%
D. 58%
E. 64%

15. Which of the following is closest to the range, in dollars of the annual contributions to the charity from Foundation X for the five years shown?

A. S13,000
B. S19,000
C. S25,000
D. S31,000
E. $35,000

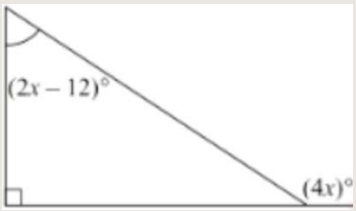
16. The ratio of the annual contribution to the charity from Foundation X to the annual contribution from Foundation Y was greatest in which of the following years?

A. 1970
B. 1975
C. 1980
D. 1985
E. 1990

17. The sequence a_1, a_2, a_3,...,a_n,... is defined by $a_1=1$ and $a_n=a_{n-1}+n$ for all integers $n \geqslant 2$. What is the value of a_{49}?

a_{49}=_____

18.



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

A. 13
B. 17
C. 31
D. 39

E. 51

19.

Value	Frequency
1	20
2	18
3	14
4	13
5	12
6	10
7	9
8	8
Total	104

The frequency distribution for a data set is shown above. What is the median of the distribution?

A. 3
B. 3.5
C. 4
D. 4.5
E. 5

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

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

Section 12

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

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.

2. The random variable Y is normally distributed with a mean of 50.0 and a standard deviation of 5.4

Quantity A	Quantity B
The probability that Y is between 44.6 and 48.2	The probability that Y is between 55.4 and 59.0

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.

3.

Quantity A	Quantity B
$\left(\frac{x+y}{2}\right)-\left(\frac{x-y}{2}\right)$	y

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.

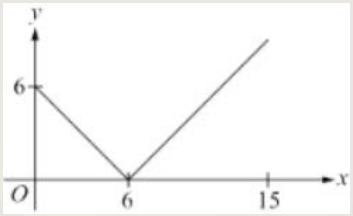
4.

$x > y > \sqrt{2}$

Quantity A	Quantity B
x+y	xy

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.

5.



In the xy-plane the graph of the function y=f(x) for $0 \leq x \leq 15$ consists of two line segments intersecting at the point (6, 0). The slopes of the two line segments are -1 and 1.

Quantity A	Quantity B
f(3)	f(9)

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.

6.

$x \neq 0$

y is a negative integer.

Quantity A	Quantity B
x^y	0

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.

7. When integer n is divided by 8, the remainder is 3. When integer n^2 is divided by 8, the remainder is R.

Quantity A	Quantity B
R	1

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.

8. One cup of a certain type of yogurt contains 9 grams of protein, which is equal to x percent of the recommended daily consumption of protein. How many grams is the recommended daily consumption of protein in terms of x?

A. 9x
B. $\frac{x}{9}$
C. $\frac{100x}{9}$
D. $\frac{9}{100x}$
E. $\frac{900}{x}$

9. A stone was dropped into a still pond and produced concentric circular ripples on the surface of the water. The radius of the outermost ripple increased at a constant rate of x feet per second. If the area of the circular region enclosed by the outermost ripple was 400π square feet 10 seconds after the stone hit the water. what is the value of x?

A. 2
B. 4
C. 20

D. $\sqrt{40}$

E. $\sqrt{200}$

10. At a certain gasoline station last year, the price of gasoline on July 1 was 10 percent higher than it was on January 1, and the price of gasoline on December 31 was 30 percent higher than it was on January 1. Which of the following is closest to the percent increase in the price of gasoline at this station from July 1 to December 31 last year?

A. 15%
B. 18%
C. 20%
D. 22%
E. 43%

11. For all positive even integers n. n] represents the product of all even integers from 2 to n. inclusive. For example, 12]=12×10×8×6×4×2. What is the greatest prime factor of 20]+22]?

A. 41
B. 23
C. 19
D. 17
E. 11

12.

List A: 1, 5, 9, 13, 4
List B: 1, 5, 9, 13, 9
List C: 1, 5, 9, 13, 7
List D: 1, 5, 9, 13, 6

The standard deviation of n numerical data x_1, x_2, x_3,...,x_n with mean $\bar{x}$ is equal to $\sqrt{\frac{S}{n}}$,

where S is the sum of the squared differences $\left(x_i - \bar{x}\right)^2$ for 1≤i≤n.

Which of the following shows lists A, B, C, and D in order from the list with the least standard deviation to the list with the greatest standard deviation?

A. A, B, C, D
B. A, D, B, C
C. B, C, D, A
D. C, B, D, A
E. C, D, B, A

13. The integer n is greater than 1, and S={5-n, 5-n^2, 5+n^2}. If the difference between the greatest number in S and the least number in S is 72 what is the value of n?

n=_____

Questions 14 and 16 are based on the following data

Theater Revenues for Seven Movies

Movie	Number of Weeks Movie Has Been Released	Total Revenue (in millions)	Number of Theaters (first week released)	Average* Revenue per Theater (first week released)
A	2	$32.4	2,800	$5,250
B	3	$53.6	3,100	$5,060
C	1	$13.0	2,900	$4,480
D	8	$61.1	1,800	$4,450
E	5	$38.6	1,500	$4,150
F	3	$28.2	1,600	$3,840
G	10	$86.5	900	$3,220

*Arithmetic Mean

14. When Movie C has been released for 10 weeks, its producers expect it to have a total revenue equal to the total revenue of Movie G for the 10 weeks of its release. To meet this expectation, approximately what must be the average (arithmetic mean) revenue per week of Movie C for the next 9 weeks of its release?

A. $7.35 million
B. $7.67 million

C. $8.17 million
D. $9.19 million
E. $9.61 million

15. The total revenue for Movie F is approximately what percent less than the total revenue for Movie B?

A. 25%
B. 47%
C. 53%
D. 75%
E. 60%

16. For the revenue of Movie B in the first week it was released and the revenue of Movie E in the first week it was released, approximately what was the average revenue per theater for the two movies combined?

A. $4,447
B. $4,605
C. $4,622
D. $4,654
E. $4,763

17.

	Department A	Department B	Department C
Number of employees	25	15	19
Average number of vacation days	12.8	10.4	x

For each of three departments of a certain business at the end of 2011the table above shows the number of employees and the average (arithmetic mean) number of vacation days taken by the employees in 2011. The average number of vacation days taken by all of the employees in the three departments in 2011 was 10.0. If each employee worked in only one department, what is the value of x?

x=_____

18.

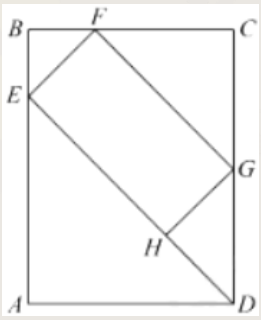
S={1, 3, 5, 7,..., 397, 399}

Set S consists of the odd numbers from 1 to 399, inclusive. How many different ordered pairs (p, t) can be formed, where p and t are numbers in S and p<t?

(Note: The sum of the integers from 1 to n, inclusive is given by the formula $\frac{n(n+1)}{2}$ for all positive integers n.)

A. 19,900
B. 20,000
C. 49,500
D. 79,600
E. 79,800

19.



In the figure ABCD and EFGH are rectangular regions. The length of line segment BF is 4, and the measure of angle AED is 45 degrees. If G is the midpoint of side CD. what is the area of EFGH?

A. $32\sqrt{2}$
B. $32\sqrt{3}$
C. $64\sqrt{2}$
D. 32
E. 64

20.

$$\left(\frac{100}{x}+\frac{100}{y}\right)T=100$$

Which of the following statements <u>individually</u> provide(s) sufficient additional information to determine the value of T? Indicate **<u>all</u>** such statements.

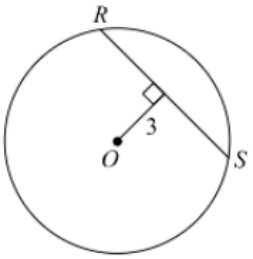
A. x+y=10

B. $\frac{x}{y}=\frac{3}{2}$

C. $\frac{xy}{x+y}=\frac{12}{5}$

Section 13

1.



The circle with center O has radius 5.

Quantity A	Quantity B
The length of chord RS	6

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.

2. a and b are integers.

$$\frac{a}{b} = -\frac{1}{3}$$

Quantity A	Quantity B
a	b

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.

3. C_1 and C_2 are two circles in the xy-plane.
The center of circle C_1 is inside circle C_2.

Quantity A	Quantity B
The number of points at which C_1 and C_2 intersect	1

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.

4.

$$\frac{\sqrt{y}}{4}=\frac{\sqrt{k}}{5}$$

$yk \neq 0$

Quantity A	Quantity B
$\frac{y}{k}$	$\frac{25}{16}$

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.

5.

Quantity A	Quantity B
The number of tenths equal to 1.4	The number of hundredths equal to 1.3

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.

6. The average (arithmetic mean) price of 8 used books is $1.55.

Quantity A	Quantity B
The total price of n of the 8 books (n>0)	($1.55)n

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.

7.

S={1, 2, 3}
T={1, 2, 3, 4}

Quantity A	Quantity B
The number of 4-digit positive integers that can be formed using only the digits in set S	The number of 3-digit positive integers that can be formed using only the digits in set T

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.

8. The sequence shown is defined by $x_1=2$ and $x_{j+1}=\frac{1}{2}x_j$ for each positive integer j.

Quantity A	Quantity B
x_9	$(2^{13})x_{22}$

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.

9. When the integer n is divided by 35, the remainder is 14. Which of the following must be a divisor of n?

A. 2
B. 3
C. 6
D. 7
E. 11

10. On a trip, Marie drove the first half of the distance at an average speed of 30 miles per hour for a total of 13 hours of driving, and Juanita will drive the second half of the trip. They scheduled t hours driving for the entire distance. If they are to arrive exactly on schedule. at what average speed must Juanita drive the second half of the distance?

A. $\frac{t-13}{(30)(13)}$

B. $\frac{(t-13)(13)}{30}$

C. $\frac{(t-13)(30)}{13}$

D. $\frac{(30)(13)}{t-13}$

E. $\frac{30}{(13)(t-13)}$

11. At a certain school, there are 46 students enrolled in biology and 42 students enrolled in chemistry. If 20 students are enrolled in both biology and chemistry, how many students are enrolled in one of these courses but not enrolled in the other?

A. 48
B. 54
C. 64
D. 68
E. 78

12. P is the set of all positive factors of 20, and Q is the set of all positive factors of 12. If a member of P will be chosen at random, what is the probability that the chosen member will also be a member of Q?

A. $\frac{1}{6}$

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

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

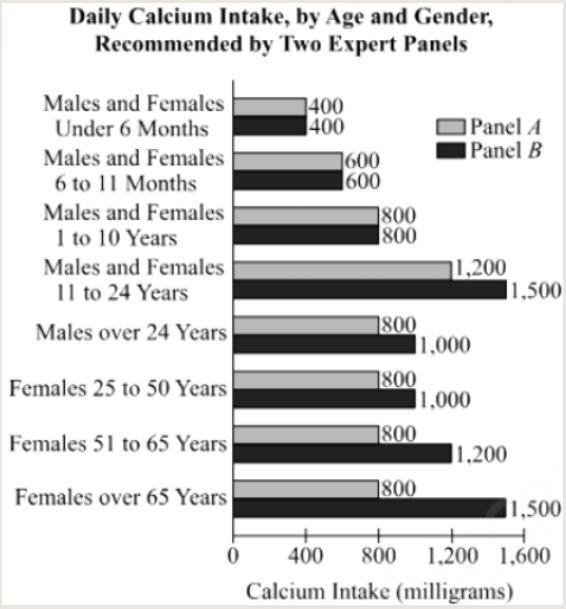
D. $\frac{2}{3}$

E. $\frac{5}{6}$

13. Last year the value of one share of a certain stock increased by 10 percent from January to June, and the value of one share of the stock increased by 50 percent from January to December. What was the percent increase in the value of one share of the stock from June to December of last year? Give your answer to the nearest whole percent

_____%

Questions 14 and 16 are based on the following data



14. For how many of the eight groups shown is the daily calcium intake recommended by panel B at least 30 percent greater than that recommended by panel A?

A. One

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

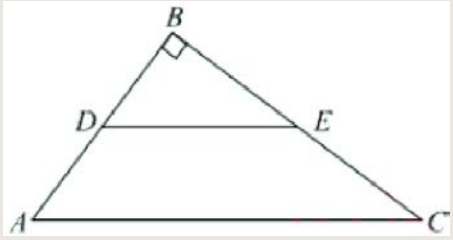
15. Panel B's recommended daily calcium intake for females 70 years old is what percent of that panel's recommended daily calcium intake for males 70 years old?

A. 25%
B. 50%
C. 67%
D. 100%
E. 150%

16. An 8-ounce serving of a certain type of yogurt contains 40 percent of the daily calcium intake recommended by panel A for males over 24 years. How many ounces of this yogurt contains 40 percent of the daily calcium intake recommended by panel B for females over 65 years?

A. 15.0
B. 16.0
C. 17.5
D. 25.0
E. 37.5

17.



In the figure above, line segments AC and DE are parallel, AC=2(DE), DE=5, and AD=3. What is the area of triangle ABC ?

18. If $t=h^2+2$ and h is an integer from -5 to 2, inclusive, then the greatest possible value of t is how much more than the least possible value of t?

A. 16
B. 18
C. 21
D. 25
E. 27

19. The average (arithmetic mean) of the r integers in a certain list is 23, and the average of the k integers in another list is 20. If r=4k, what is the average of the r+k integers in the two lists?

A. 22.1
B. 22.4
C. 22.7
D. 23.0
E. 23.3

20. Vladimir invested $10,000 for one year. He invested some of the amount at 4 percent simple annual interest and the rest of the amount at 6 percent simple annual interest. If the total interest earned for the year was between $450 and $550 which of the following statements must be true? Indicate **all** such statements.

A. The amount invested at 6 percent simple annual interest was greater than $2,000.
B. The amount invested at 6 percent simple annual interest was less than $8,000.
C. The amount invested at 6 percent simple annual interest was more than 3 times the amount invested at 4 percent simple annual interest.

Section 14

1. The total number of people in a certain park is T, the number of people in the park who are under 20 years old is C, and the number of people who are hiking in the park is H.

Quantity A	Quantity B
T-C	H

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.

2.

Quantity A	Quantity B
The greatest possible value of $\frac{5}{x-y}$, where $7 \leqslant x \leqslant 11$ and $-4 \leqslant y \leqslant 5$	5

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.

3.

Quantity A	Quantity B
(1.98)(81)(99)(1,249)	25,000,000

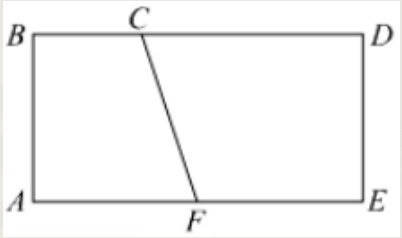
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

4. Pumps X and Y, each working alone at its own constant rate would take 8 hours and 24 hours. respectively, to fill a swimming pool.

Quantity A	Quantity B
The number of hours that pumps X and Y working together at their own constant rates, would take to fill the pool	8 hours

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.

5.



In rectangle ABDE shown, AF=FE and BC=$\frac{1}{3}$(BD)

Quantity A	Quantity B
The ratio of the area of trapezoid ABCF to the area of trapezoid FCDE	$\frac{5}{7}$

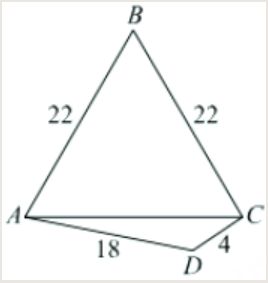
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

6. x and y are integers such that $x \geqslant 0$ and $y \geqslant 0$.

Quantity A	Quantity B
The total number of ordered pairs (x, y) that satisfy the inequality $2x+3y<5$	4

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.

7.



Quantity A	Quantity B
The measure of angle ABC	60°

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.

8. A store purchased a refrigerator at a wholesale price of $800 and then listed the refrigerator at a retail price that was 60 percent greater than the wholesale price. During a sale the store reduced the listed retail price of the refrigerator by 25 percent. A customer purchased the refrigerator at the reduced price and used a coupon to receive an additional 10 percent discount on the reduced price. It the sales tax charged by the store was 8.75 percent of the amount that the customer paid for the refrigerator, what was the amount of the sales tax?

A. $71.05
B. $72.80
C. $75.60
D. $84.00
E. $87.50

9. Of the 250 students enrolled in a college economics course, 50 percent have never taken an economics course before. If 20 percent of the students in the class are sophomores and 80 percent of the sophomores in the class have never taken an economics course before, how many of the students in the class who have taken an economics course before are not sophomores?

A. 85
B. 90
C. 100
D. 105
E. 115

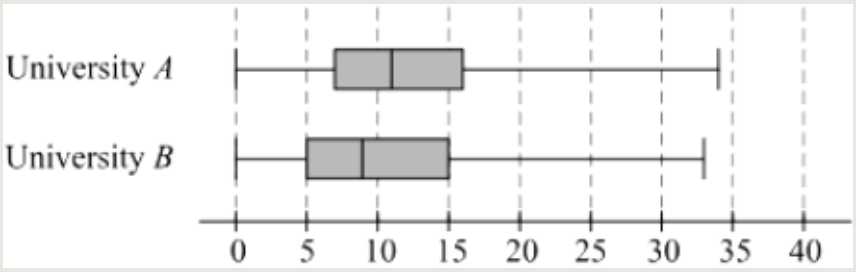
10.

Rank	Win Percentage
Beginner	Less than 25%
Intermediate	25% to 40%
Expert	Greater than 40%

In a certain online game, players are assigned the ranks of Beginner, Intermediate, and Expert based on the win percentage. which is the number of games won by a player as a percent of the total number of games played by the player. For a player who played 50 or more games, the table shows the rank based on the win percentage. A certain player won 27 of the first 90 games played and was assigned the rank of Intermediate. The player won n of the next 90 games played and was again assigned the rank of Intermediate. Which of the following could be the value of n? Indicate **all** such values.

A. 10
B. 20
C. 30
D. 40
E. 50
F. 60
G. 70
H. 80

11.



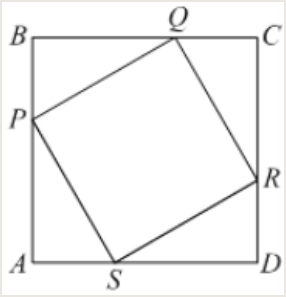
For the professors at universities A and B, the number of years of experience for each professor was rounded to the nearest whole number and recorded, and the recorded numbers are summarized in the boxplots shown. If the first quartile of the recorded numbers of years of experience for the professors at A is p percent greater than that for B and if the third quartile of the recorded numbers of years of experience for the professors at A is r percent greater than that for B, approximately what is the value of p+r?

A. 5
B. 15
C. 35
D. 40
E. 45

12. In a certain 10-sided polygon, 9 interior angles are congruent, and the measure of the remaining interior angle is 108 degrees. What is the measure of an exterior angle at the vertex of one of the congruent angles? (Note: An exterior angle at a vertex of a polygon is the angle between one side of the polygon and a line extended from an adjacent side of the polygon.)

A. 32
B. 34
C. 36
D. 38
E. 40

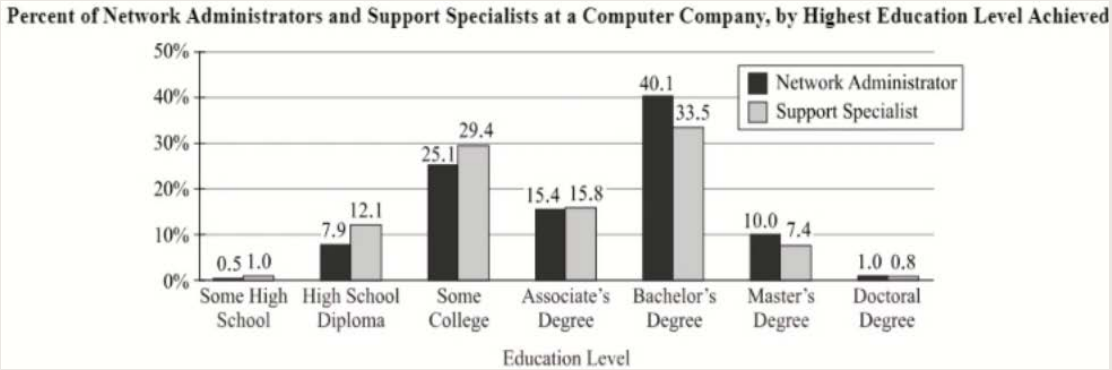
13.



In the figure shown, square PQRS is inscribed in square ABCD. If the perimeter of square ABCD is 60 and the measure of angle RQC is 60 degrees, which of the following is closest to the perimeter of square PQRS?

A. 42.5
B. 43.9
C. 45.2
D. 47.0
E. 47.4

Questions 14 and 16 are based on the following data



14. The number of network administrators with an education level of associate's. bachelor's, master's, or doctoral degree is closest to which of the following fractions of the total number of network administrators?

A. $\frac{5}{9}$

B. $\frac{29}{50}$

C. $\frac{3}{5}$

D. $\frac{5}{8}$

E. $\frac{2}{3}$

15. One support specialist will be selected at random from the support specialists with an education level of associate's, bachelor's master's or doctoral degree. Which of the following is closest to the probability that the selected support specialist will be one who has an education level of associate's degree?

A. 0.16
B. 0.23
C. 0.27
D. 0.30
E. 0.38

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

A. The number of network administrators with an education level of some college is greater than 75 percent of the number of support specialists with an education level of some college.
B. The number of network administrators with an education level of bachelor's degree is greater than the number of support specialists with an education level of bachelor's degree.
C. The number of network administrators with an education level of bachelor's degree exceeds the number of network administrators with an education level of master's degree by more than 275 percent.

17. What is the value of $\left(\frac{(2^{-2})(3^2)}{(3^{-2})(2^2)}\right)^{-1}$?

Give your answer as a fraction.

$\frac{\square}{\square}$

18.

n=13!+15!

What is the number of distinct prime factors of n?

A. 5
B. 6
C. 7
D. 10
E. 12

19. If $nk>10^4$, then the value of $\frac{n+\frac{1}{k}}{2n}$ is closest to which of the following?

A. 0.1
B. 0.2
C. 0.3
D. 0.4
E. 0.5

20. If $4x-5<10$ and $5-3x\leqslant 17$, which of the following could be the value of x?

Indicate **all** such values.

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

F. 3
G. 4
H. 5

Section 15

1. Country R's population in 1975 was 90 percent of its population in 1990.

Quantity A	Quantity B
The population of Country R in 1990	1.1 times the population of Country R in 1975

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.

2. n is an integer greater than or equal to 5.

Quantity A	Quantity B
The number of positive factors of n	The number of positive factors of n+2

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.

3. $\frac{k}{a} = p + 1$ and $\frac{b}{k} = \frac{1}{p}$, where a, b, k, and p are positive.

Quantity A	Quantity B
a	b

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.

4. The area of a circular region is 5π.

Quantity A	Quantity B

The diameter of the circular region	$\sqrt{20}$

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.

5. x and y are two consecutive positive odd integers.

Quantity A	Quantity B
The remainder when x^2+y^2 is divided by 4	2

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.

6. The reciprocal of n equals 8 times the square of n.

Quantity A	Quantity B
$\frac{1}{n}$	2

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.

7. The probabilities that independent events A and B will occur tomorrow are 0.60 and 0.80, respectively.

Quantity A	Quantity B
The probability that A or B or both will occur tomorrow	0.92

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.

8. An appliance dealer purchased refrigerators of a certain model for $850 each. The dealer sold each refrigerator at a 25 percent discount off a regular price of p dollars. If the dealer's profit on each refrigerator was 20 percent of the amount for which the dealer purchased each refrigerator, what is the value of p? (Note: Profit equals revenue minus cost.)

A. 1,063
B. 1,150
C. 1,233
D. 1,328
E. 1,360

9. The weights of 80,000 fish are approximately normally distributed with a mean of 12.5 ounces and a standard deviation of 4.2 ounces. Approximately what percent of the 80,000 fish have weights between16.7 and 20.9 ounces?

A. 14%
B. 20%
C. 27%
D. 34%
E. 48%

10. Jamie claimed that if n is a positive integer, then $4n^2-3$ must be a prime number. Which of the following values of n could be used as a counterexample to show that Jamie's claim is not true? Indicate **all** such values.

A. 3
B. 4
C. 6

11.

S={1, 2, 3, 4, 6}

T={1, 2, 3, 6, 8}

From set S, an integer is chosen and called s, and from set T an integer is chosen and called t. The product of the two integers s and t is called p. What is the total number of different values of p that can be determined in this way?

A. 5
B. 9
C. 14
D. 18
E. 25

12.

n=1234567891011....499500

The digits of the integer n above are the digits of the integers from 1 to 500 written in consecutive order. How many digits does n have?

A. 1,389
B. 1,392
C. 1,393
D. 1,409
E. 1,410

13.

$$1+2+3+...+n=\frac{n(n+1)}{2}$$

For each integer n greater than 1, the sum of the first n positive integers is given by the formula shown.

If the average (arithmetic mean) of the first n positive integers is k, what is the sum of the first n positive integers in terms of k?

A. k^2-k

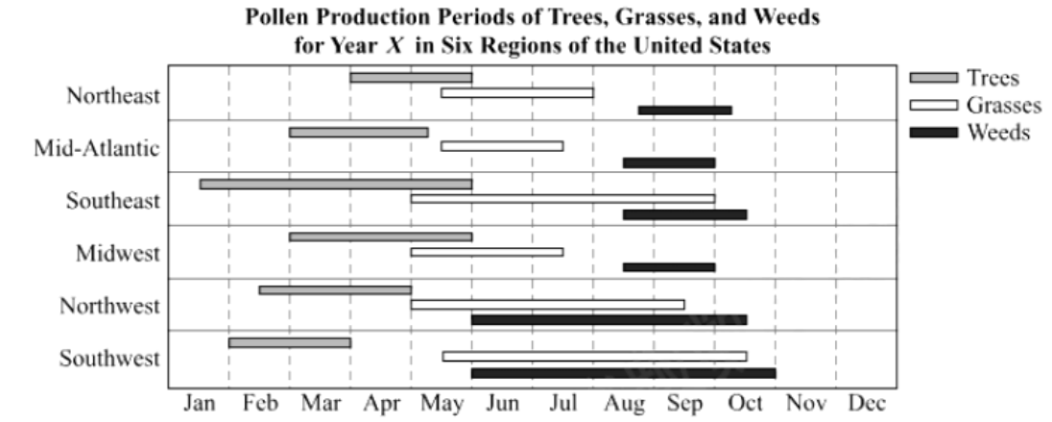
B. $\frac{k^2-k}{2}$

C. $\frac{k^2+k}{2}$

D. $2k^2-k$

E. $4k^2+2k$

Questions 14 and 16 are based on the following data



14. For Year X, in how many of the six regions did grasses produce pollen for a period of less than three months?

A. None
B. Two
C. Three
D. Four
E. Five

15. For approximately what fraction of Year X was pollen produced by both grasses and weeds in the Southwest?

A. $\frac{9}{24}$

B. $\frac{11}{24}$

C. $\frac{12}{24}$

D. $\frac{14}{24}$

E. $\frac{20}{24}$

16. For year X, which of the following is closest to the total length, in months, of the time period during which no pollen was produced by trees or grasses in any of the six regions?

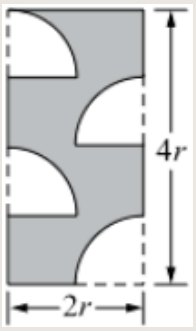
A. 0.5
B. 1.0
C. 2.0
D. 2.5
E. 3.0

17.

List K: 70, 75, 80, -10x, x^2

The average (arithmetic mean) of the numbers in list K is 40. What is the range of the numbers in K?

18.

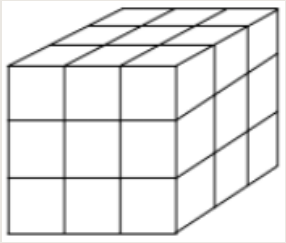


What is the perimeter of the shaded region of the rectangle shown above if each of the unshaded regions is a 90-degree sector of a circle with radius r?

A. $(12+2\pi)r$
B. $(11+2\pi)r$
C. $(10+2\pi)r$

D. $(8+2\pi)r$
E. $(4+2\pi)r$

19.



If 20 red cubes and 7 white cubes, all of equal size, are fitted together to form one large cube, as shown above, what is the greatest fraction of the surface area of the large cube that could be red?

A. $\frac{10}{27}$
B. $\frac{20}{27}$
C. $\frac{47}{54}$
D. $\frac{8}{9}$
E. $\frac{49}{54}$

20.

List S: 1, 2, 3, k, 2k

If k<2, which of the following numbers could be the median of the five numbers in list S? Indicate **all** such numbers.

A. 1
B. 2
C. 3
D. k
E. 2k

Section 16

1. From 1980 to 1990, the number of residents of Town X decreased by $\frac{1}{7}$ of its 1980 value, and the number of residents under the age of twenty decreased by 686 residents.

Quantity A	Quantity B
The number of residents in Town X under the age of twenty in 1990	4,116

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.

2.

$x > 0$
$y < 0$

Quantity A	Quantity B
$(x-y)^2$	x^2+y^2

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.

3.

k and n are consecutive positive odd integers.

Quantity A	Quantity B
The least common multiple of k and n	kn

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.

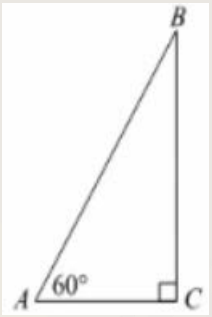
4.

$x^{10}=y^{10}$

Quantity A	Quantity B
x	y

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.

5.



In right triangle ABC, the length of side AB is 100.

Quantity A	Quantity B
The length of side BC	75

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.

6.

$2m-4p=x$

$\frac{1}{2}m-p=y$

$y\neq 0$

Quantity A	Quantity B
$\frac{x}{y}$	1

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.

7. Events A and B are independent. The probability that event A will occur is 0.75, and the probability that event B will occur is p, where $0<p<1$.

Quantity A	Quantity B
The probability that events A and B will both occur	1-0.25p

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.

8.

Triangle A is isosceles with two sides of length 8.
Triangle B is isosceles with two sides of length 10.

Quantity A	Quantity B
The area of triangle A	The area of triangle B

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.

9. A certain town with a population of 50,000 uses an average of 5,000,000 gallons of water per day. If the average number of gallons of water used per person per day remained the same and the population of the town increased to 65,000, by how many gallons would the average amount of water used by the town per day increase?

A. 150,000
B. 650,000
C. 1,500,000
D. 3,500,000

E. 6,500,000

10.

A group of n people is categorized as follows:

9 people are taller than 6 feet.

14 people are shorter than $5\frac{1}{2}$ feet

12 people are under 21 years old.

If each person in the group is in at least one of the three categories, then n can be any integer between

A. 9 and 14, inclusive
B. 12 and 21, inclusive
C. 14 and 23, inclusive
D. 21 and 26, inclusive
E. 23 and 35, inclusive

11. If a, b, e, and fare positive integers and $\frac{a}{b}<\frac{e}{f}$, which of the following inequalities must be true?

A. a＞f
B. b＞e
C. $\frac{b}{a}>\frac{e}{f}$
D. $\frac{b}{a}>\frac{f}{e}$
E. $\frac{a}{b}>\frac{f}{e}$

12.

X={1, 3, 5, 8}
Y={2, 4, 6, 7}

Set T consists of all integers n such that $n=x^2+y$, where x is an integer from set X and Y is an integer from set Y. How many integers in T are even?

A. None
B. Two
C. Three
D. Six
E. Eight

13. Irina solved 30 easy crossword puzzles and 20 hard crossword puzzles. She spent an average (arithmetic mean) of 12.1 minutes per puzzle solving the easy puzzles and 30.1 minutes per puzzle solving the hard puzzles. What was the average number of minutes she spent per puzzle to solve the 50 puzzles?

_____minutes

Questions 14 and 16 are based on the following data

Selected Data for Men and Women over Age 65
Living in the United States, 1995

Category	Men	Women
Marital Status:		
Single (never married)	4.2%	4.2%
Married	77.1%	42.5%
Widowed	13.5%	47.3%
Divorced	5.2%	6.0%
Household Status:		
Living alone	17.3%	41.8%
Living with family members	74.6%	40.6%
Living with nonfamily members	8.1%	17.6%
Below poverty level	7.2%	14.9%
In the labor force	16.8%	8.8%

Note: *In 1995 there were 13.0 million men and 18.3 million women over age 65 in the United States.*

14. How many of the four marital-status categories contained between 1.3 million and 6.5 million men over age 65?

A. None
B. One
C. Two
D. Three
E. Four

15. Based on the information given, which of the following statements are true? Indicate **all** such statements.

A. There were more single women over age 65 than single men over age 65.
B. The fraction of the number of men over age 65 who were living with family members was less than $\frac{3}{4}$.
C. The number of women over age 65 living alone exceeded the number of men over age 65 living alone by more than 2 million.

16. If 3.5 percent of the women over age 65 in the labor force were unemployed, which of the following is closest to the percent of all women over age 65 who were employed?

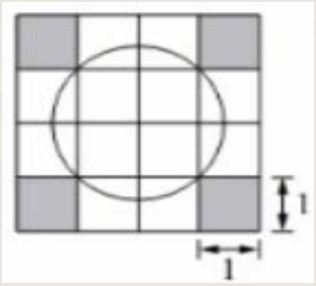
A.5.3%
B.6.5%
C.7.8%
D.8.2%
E.8.5%

17. In a list of consecutive integers, the least integer is -15 and the greatest is 87. How many integers are in the list?

18. A clothing manufacturer produces rectangular pieces of cloth that vary from 4 meters to 6 meters in length and from 2 meters to 2.5 meters in width. Which of the following values could be the area in square meters, of a piece of cloth produced? Indicate **all** such values.

A.8
B.10
C.12
D.14
E.16

19.



What is the area, in square units, of the circular region shown above?

A. π
B. 2π
C. 3π
D. 4π
E. 8π

20. In the xy-plane, the equation of line k is $y=\frac{2}{3}x-2$. Which of the following is a point on the line that is perpendicular to line k and has a y-intercept of 2?

A. (-3, 1)
B. (-2, 5)

C. (1, -1)
D. (3, 3)
E. (6, 2)

Section 17

1.

$x < y < 90$

Quantity A	Quantity B
180-x-y	45

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.

2. The arithmetic mean of the numbers 10, 20, and x equals the median of the numbers 10, 20, and x.

$10 < x < 20$

Quantity A	Quantity B
x	15

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.

3.

$$\frac{1}{100} < n < \frac{1}{50}$$

Quantity A	Quantity B
$\frac{n}{50}$	n^2

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.

4. Of the n members of an association, $\frac{2}{5}$ are at least 65 years old; and of the members that are at least65 years old, $\frac{1}{10}$ are employed.

Quantity A	Quantity B
The number of members of the association who are not employed	$\frac{n}{2}$

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.

5. $a_1, a_2, a_3, \ldots, a_n, \ldots$

In the sequence shown, $a_1=1$ and for all integers $n \geq 2$.
$a_n=3a_{n-1}+c$, where c is a positive integer.

Quantity A	Quantity B
$a_1+a_2+a_3$	5c

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.

6. $m=2n$
$m^{-1}+n^{-1}=1$

Quantity A	Quantity B
n	1

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.

7.

In the xy-plane, the graph of the equation y=(x+3)(x-2) is a parabola.

Quantity A	Quantity B
The x-coordinate of the point on the graph for which the y-coordinate is a minimum	0

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.

8.

The surface area of a certain cube is 36.

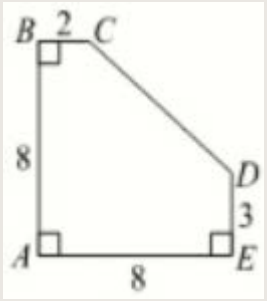
Quantity A	Quantity B
The volume of the cube	15

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.

9. A certain list of numbers contains the number 23 and has a mean of 53 and a standard deviation of 12. How many standard deviations below the mean is the number 23?

A. 1
B. 1.5
C. 2
D. 2.5
E. 3

10.



What is the area of region ABCDE?

A.28
B.40
C.43
D.49
E.55

11. Yesterday at a fruit stand, all peaches were sold for $0.40 each and all plums were sold for 0.25 each. A customer bought a total of 11 peaches and plums and paid a total of $3.50. How much more did the customer pay for the peaches than for the plums?

A. $0.50
B. $0.65
C. $0.75
D. $1.10
E. $1.15

12.

Hourly Wages of the Student Aides in a Physics Lab

Student Aide	Hourly Wage
D	$8.25
E	$8.25
F	$10.00
G	$11.25
H	$11.50

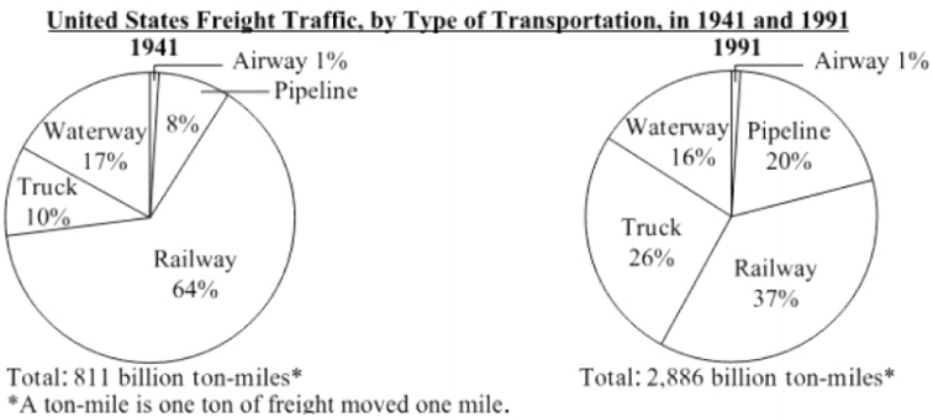
The table shows the hourly wages of the student aides that work in a physics lab at a certain university. When an aide is assigned to work in the lab on a particular day, the aide is assigned to work for a whole number of consecutive hours up to 4 hours. At least 2 aides are assigned to work for each hour that the lab is open. What is the least possible total amount of wares of the aides for one day if the lab is open for a 6-hour period that day?

A. $49.50
B. $53.00
C. $106.00
D. $108.50
E. $118.00

13. Two bags, A and B, each contain marbles some of which are green. If one marble is selected at random from each bag, the probability is $\frac{1}{21}$ that both of the marbles selected will be green. If one marble is selected at random from bag A only, the probability is $\frac{5}{21}$ that the marble selected will be green. If one marble is selected at random from bag B only, what is the probability that the marble selected will be green? Give your answer as a fraction.

$\frac{\square}{\square}$

Questions 14 and 16 are based on the following data



14. For how many of the types of transportation in the graphs was the number of ton-miles transported in 1991 more than 4 times the number transported in 1941?

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

15. If the total number of ton-miles that were transported increased at a constant rate from 1941 to 1991. approximately what was the total number of ton-miles that were transported in 1986?

    A. 1,870 billion
    B. 2,080 billion
    C. 2,470 billion
    D. 2,680 billion
    E. 2,850 billion

16. From 1941 to 1991approximately what was the percent increase in the number of ton-miles transported by railway?

A. 25%
B. 50%
C. 100%
D. 200%
E. 250%

17. In the xy-plane, the coordinates of points B, C, and Dare (2, 1), (6, 3), and (0, 4), respectively. If B is the midpoint of line segment AC and D is the midpoint of line segment AE, what is the length of line segment AE?
Give your answer to the nearest tenth.

18.

$$z=18^{15}-18$$

What is the units digit of z?

A.1
B.2
C.4
D.6
E.8

19. The 4-digit positive integer 8R5T, where R is the hundreds digit and T is the units digit, is divisible by 9. Which of the following could be the value of R+T?
Indicate all such values.

A.2
B.3
C.5
D.11
E.14

20.

$$\frac{1}{4}, \frac{1}{3}, \frac{2}{3}, \frac{3}{4}$$

Set S consists of all the possible sums formed by adding any two different numbers from the list shown. Set S consists of how many different numbers?

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

Section 18

1.

The units digit of the 2-digit positive integer N is 6.

Quantity A	Quantity B
The units digit of the product 7N	2

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.

2. The dollar value of a certain painting in 1984 was 30 percent greater than its dollar value in 1980. The dollar value of the painting in 1988 was 84 percent greater than its dollar value in 1980.

Quantity A	Quantity B
The percent increase in the dollar value of the painting from 1984 to 1988	54%

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.

3.

$y > 0$

Quantity A	Quantity B
$\left(\sqrt{y}\right)^2$	$\frac{1}{y^2}$

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.

4.

The function f is defined for all numbers x by f(x)=2+3x.

Quantity A	Quantity B
f(x+4)-f(x)	12

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.

5. Let G be the set of integers from 100 to 999, and let n be the integer for which 40 percent of the integers in G are less than or equal to n.

Quantity A	Quantity B
2n	900

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.

6.

rt=8

Quantity A	Quantity B
r+t	12

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.

7. In the xy-plane, the points (2, 7) and (8, 3) are the endpoints of a line segment that is the hypotenuse of a right triangle.

Quantity A	Quantity B
The x-coordinate of the vertex at the	The y-coordinate of the vertex at the

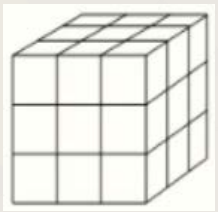
right angle of the triangle | right angle of the triangle

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.

8. If x+y=1, y+z=4, and x+z=9, then x+y+z=

A. -7
B. -1
C. 7
D. 10
E. 14

9.



A large cube is to be formed by placing together 27 identical white cubes as shown. The large cube will then be placed on a floor, and the 5 exposed faces will be painted black. How many of the original 27 cubes will have exactly 2 black faces?

A. 8
B. 9
C. 12
D. 16
E. 18

10. In a normal distribution approximately 95 percent of the data are within 2 standard deviations of the mean. Which of the following is closest to the percent of the data that are more than 2 standard deviations above the mean?

A. 2%

B. 5%
C. 10%
D. 48%
E. 87%

11.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1	56	63	63	53	64	53	61
Week 2	57	58	58	59	57	56	58

The table above shows the predicted high temperatures, in degrees Fahrenheit, for two weeks in City X. Based on the information given, which of the following changes to the temperatures would cause a change in the median of the temperatures for the two-week period?

A. Interchanging the temperatures for Wednesday of week 1 and Thursday of week 1
B. Interchanging the temperatures for Wednesday of week 1 and Wednesday of week 2
C. Changing the temperature for Wednesday of week 1 to be equal to the temperature for Wednesday of week 2
D. Changing the temperature for Sunday of week 1 to be equal to the temperature for Tuesday of week 2
E. Changing the temperature for Saturday of week 2 to be equal to the temperature for Friday of week 1

12. Last year Henry's income was the same each month, and each month he invested the same fraction of his income. He did not invest any other money last year. The total amount that he invested last year was 6 times the amount of one month's income that he did not invest. The amount of money he invested each month last year was what fraction of his monthly income last year?

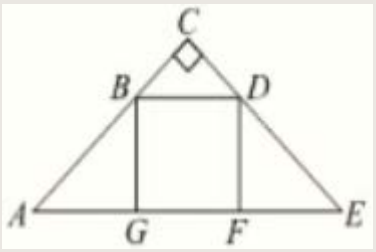
A. $\frac{1}{2}$
B. $\frac{5}{12}$

C. $\frac{1}{3}$

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

E. $\frac{1}{6}$

13.



Square BDFG is inscribed in isosceles triangle ACE. If the area of triangular region ACE is 1, what is the area of triangular region BCD?

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

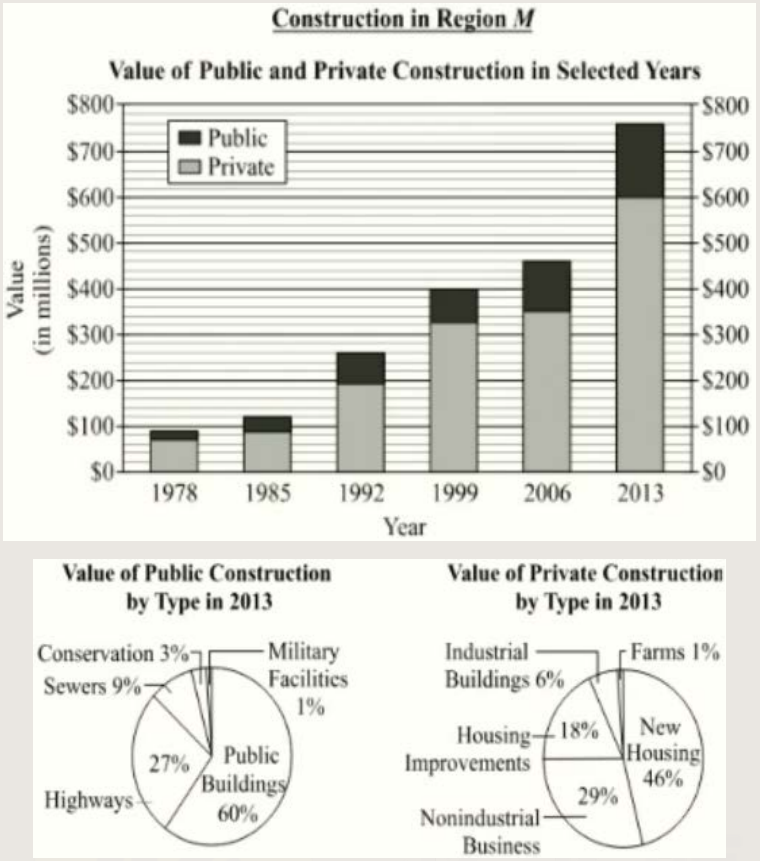
B. $\frac{1}{5}$

C. $\frac{1}{6}$

D. $\frac{1}{8}$

E. $\frac{1}{9}$

Questions 14 and 16 are based on the following data



14. Let a represent the increase from 1992 to 1999 in the total value of public and private construction let b represent the corresponding increase from 1999 to 2006, and let c represent the corresponding increase from 2006 to 2013.Which of the following statements is true?

A. a>b>c
B. a>c>b
C. b>a>c
D. c>a>b
E. c>b>a

15. In 2013 the value of construction for highways was approximately how much greater than the value of construction for industrial buildings?

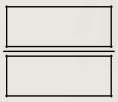
A. $7 million
B. $21 million
C. $34 million

D. $126 million
E. $160 million

16. Of the following pairs of types of construction in 2013 where the first type is a public type and the second type is a private type, which pair had dollar values that were closest to each other?

A. Military facilities and farms
B. Conservation and farms
C. Conservation and industrial buildings
D. Sewers and industrial buildings
E. Highways and nonindustrial business

17. In the xy-plane, the point (3p, 5p-1) lies on the line with equation $y=-\frac{1}{2}x-\frac{5}{3}$. What is the value of p? Give your answer as a fraction.



18. If x is an integer and y=3x+2, which of the following integers could be a divisor of y? Indicate all such integers.

A. 4
B. 5
C. 6
D. 7
E. 8

19. The probability that both events d and B will occur is $\frac{1}{2}$. Which of the following values could be the probability that event A will occur? Indicate <u>all</u> such values.

A. 0

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

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

D. $\frac{3}{4}$

E. 1

20. How many distinct solutions does the equation |1-|x-215||=1 have?

A. None

B. One

C. Two

D. Three

E. Four

Section 19

1.

$y \neq -5$

$y(y+5)=0$

Quantity A	Quantity B
$2+y+y^2$	$(2+y)^2$

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.

2. In the xy-plane, lines ℓ_1 and ℓ_2 have slopes m1 and m2, respectively, and m1>m2>0. Both lines have an x-intercept of -2.

Quantity A	Quantity B
The y-intercept of ℓ_1	They-intercept of ℓ_2

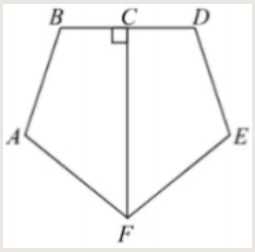
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

3. Ann, Bob, and Celia work at Company C. Bob earns $15,000 more than Ann, and Celia earns $16,000 more than Bob.

Quantity A	Quantity B
The median of Ann, Bob, and Celia's earnings	The average (arithmetic mean) of Ann, Bob, and Celia's earnings

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.

4.



ABDEF is equilateral and equiangular.

Quantity A	Quantity B
The measure of angle AFC	60°

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.

5.

A certain list consists of four numbers that are consecutive multiples of 2^3.

Quantity A	Quantity B
The range of the numbers in the list	24

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.

6.

$x+y>1$

$x-y>0$

Quantity A	Quantity B
x	1

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.

7.

x is a positive even integer.

Quantity A	Quantity B
The units digit of $5x^3$	2

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.

8.

Quantity A	Quantity B
The remainder when 2^{32} is divided by 3	1

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.

9. A flock of starlings were feeding in a 5-acre open field. A farmer estimated that an average of 4 starlings per square yard were in the field. According to this estimate, approximately how many starlings were in the flock? (1 acre=4,800 square yards, rounded to the nearest 100 square yards.)

A. 10
B. 100
C. 1,000
D. 10,000
E. 100,000

10. If the lengths of the sides of a triangle are 5, 10, and x, which of the following could be the value of x?

A. 50
B. 30
C. 20

D. 15
E. 10

11. If $\frac{x}{y}=2$, which of the following is equal to x^3-8y^3?

A. $-6y^3$
B. $-2y^3$
C. 0
D. $2y^3$
E. $6y^3$

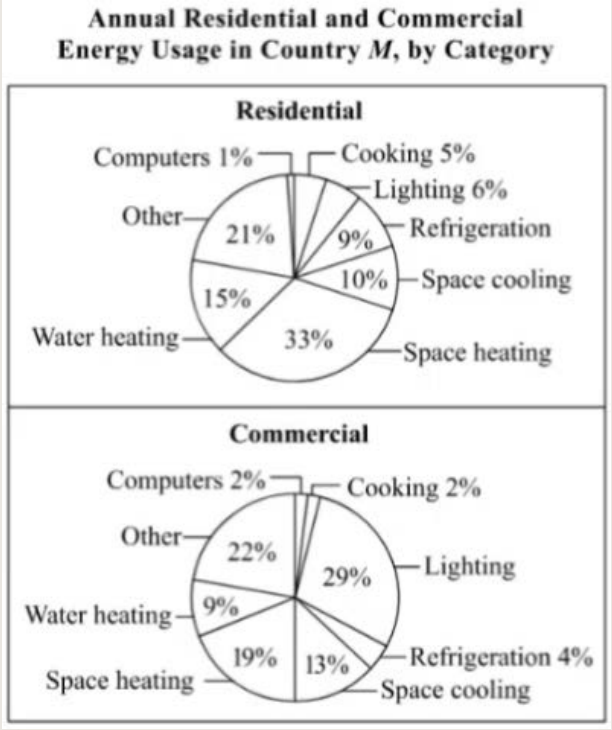
12. If $x^6=y^2$, where x and y are greater than 1, which of the following is equal to x^{16}?

A. $y^5\left(\sqrt[3]{y}\right)$
B. y^8
C. $y^9\left(\sqrt[3]{y}\right)$
D. y^{10}
E. y^{12}

13. Last year Fred invested two amounts, $90,000 and $60,000, for one year at the simple annual interest rates of 10 percent and 7.5 percent respectively. Last year Sharon invested $150,000 for one year at the simple annual interest rate of x percent. If Fred and Sharon each earned the same total amount of interest for that year from the investments. what is the value of x?

x=_____

Questions 14 and 16 are based on the following data



14. Energy usage for ventilation is included in the "other" category. Annual commercial energy usage for ventilation is 27 percent of annual commercial energy usage in the "other" category. Approximately what percent of all annual commercial energy usage is for ventilation?

A. 2%
B. 6%
C. 10%
D. 14%
E. 18%

15. If the total annual residential energy usage for water heating and refrigeration combined is r energy units then the total annual residential energy usage for the remaining six categories combined is how many energy units?

A. 0.24r
B. 0.76r
C. 1.24r

D. $\frac{0.24r}{0.76}$

E. $\frac{0.76r}{0.24}$

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

A. In four of the categories, the percent of annual residential energy usage in that category is greater than the percent of annual commercial energy usage in that category.
B. The annual residential energy usage for cooking is 2.5 times the annual commercial energy usage for cooking
C. The total annual energy usage for both residential and commercial water heating is 24 percent of the total annual energy usage for all residential and commercial purposes.

17. If $\left(\frac{1}{x}\right)^{-3} = \frac{27}{8}$, what is the value of x?

Give your answer as a fraction.

x= $\frac{\square}{\square}$

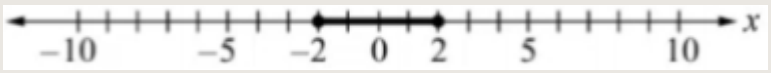
18. In 2004 a collector had 5 items valued at $20, $25, $33, $41, and $52, respectively. In 2008 the value of each item was $9 greater than its value in 2004. Which of the following statements are true?
Indicate all such statements.

A. The standard deviation of the values of the 5 items in 2008 was the same as the standard deviation in 2004.
B. The average (arithmetic mean) of the values of the 5 items in 2008 was $9 greater than the average in 2004.
C. The range of the values of the 5 items in 2008 was S9 greater than the range in

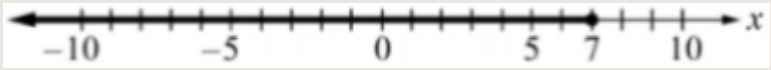
2004.

19. Which of the following is the graph of |x-5|≤2?

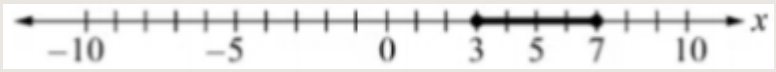
A.



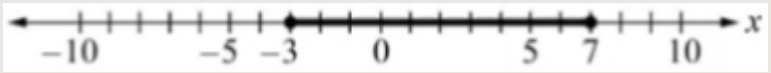
B.



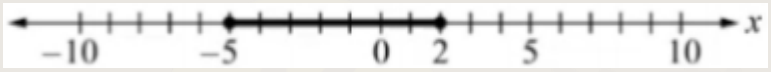
C.



D.



E.



20. Of the paperbacks in a private library, 5 percent are biographies. If 3 percent of all the books in the library are paperbacks that are biographies, what percent of all the books in the library are paperbacks?

A. 2%
B. 15%
C. 30%
D. 48%
E. 60%

Section 20

1. Alicia has several pet birds and uses a total of w kilograms of food per week to feed them. Each of her pet birds is fed f kilograms of food per day where f>0.

Quantity A	Quantity B
The number of pet birds Alicia has	$\frac{7w}{f}$

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.

2.

Quantity A	Quantity B
x^2+1	$x+\frac{7}{8}$

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.

3.

n is an integer greater than 1.

Quantity A	Quantity B
The number of positive divisors of 2n	Twice the number of positive divisors of n

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.

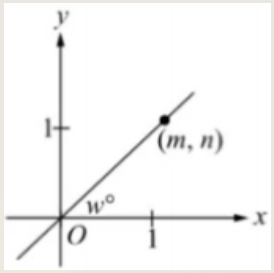
4.

The function f is defined by $f(n)=3n^2+2n+5$ for all integers n.

Quantity A	Quantity B
The least value of f(n) for all integers n	5

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.

5.



W＞45

Quantity A	Quantity B
m+n	2m

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.

6.

The probabilities that independent events A and B will occur tomorrow are 0.60 and 0.80, respectively

Quantity A	Quantity B
The probability that A or B or both will occur tomorrow	0.92

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.

7.

$a_1, a_2, a_3, \ldots, a_n, \ldots$

In the sequence shown, $a_1=5$, $a_2=10$, and $a_3=105$. Each term after the 2nd is defined by $a_n = (a_{n-1})^{(a_{n-2})}$ where n is an integer greater than 2.

Quantity A	Quantity B
The number of digits of the 5th term in the sequence	5,000,001

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.

8. The standard deviation of the numbers a, b, c, d, e, f, and g is 3.6. What is the standard deviation of a+2.4, b+2.4, c+2.4, d+2.4, e+2.4. f+2.4, and g+2.4?

A. 1.2
B. 2.4
C. 3.6
D. 4.8
E. 6.0

9. One cup of a certain type of yogurt contains 9 grams of protein, which is equal to x percent of the recommended daily consumption of protein. How many grams is the recommended daily consumption of protein in terms of x?

A. 9x
B. $\frac{x}{9}$
C. $\frac{100x}{9}$

D. $\frac{9}{100x}$

E. $\frac{900}{x}$

10. If -8≤h≤10 and h+m=-4, what is the least possible value of m-h?

A. -12
B. -16
C. -22
D. -24
E. -36

11.

$r^2t<0$ and $r<0$

Which of the following must be a positive number?
Indicate <u>all</u> such numbers.

A. r+t
B. rt^2
C. r^2-t^2
D. r^2+t^2

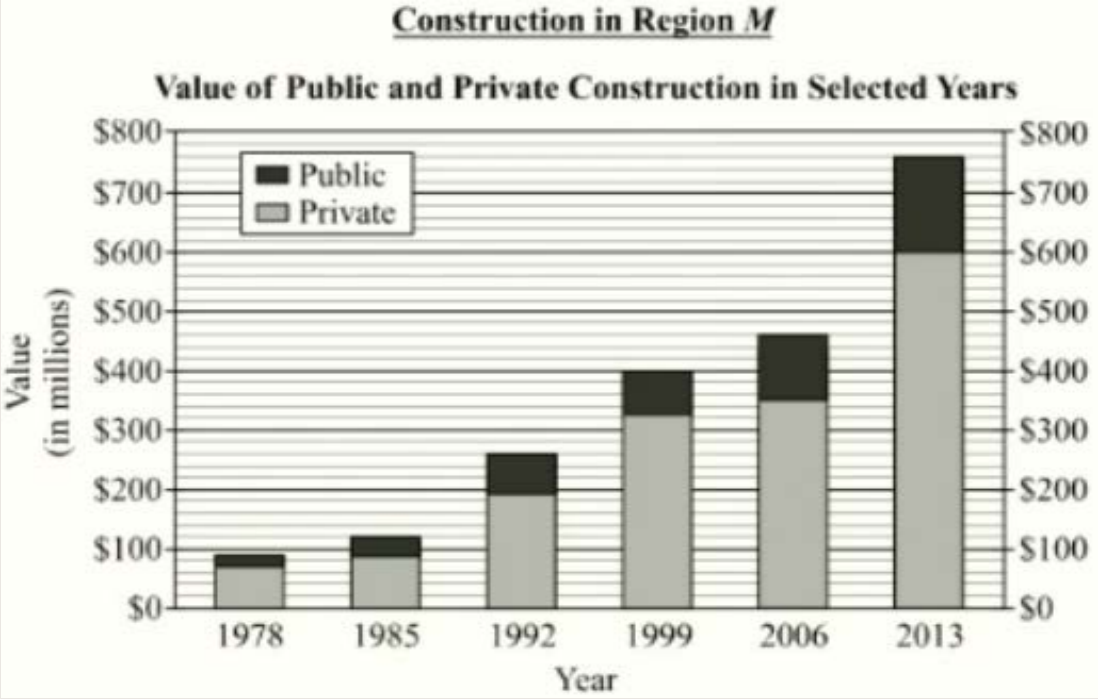
12. If x=(96,538)(701,865) then x is between

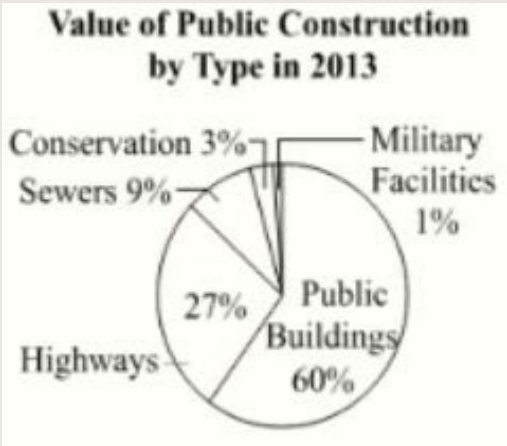
A. 10^7 and 10^8
B. 10^8 and 10^9
C. 10^9 and 10^{10}
D. 10^{10} and 10^{11}
E. 10^{11} and 10^{12}

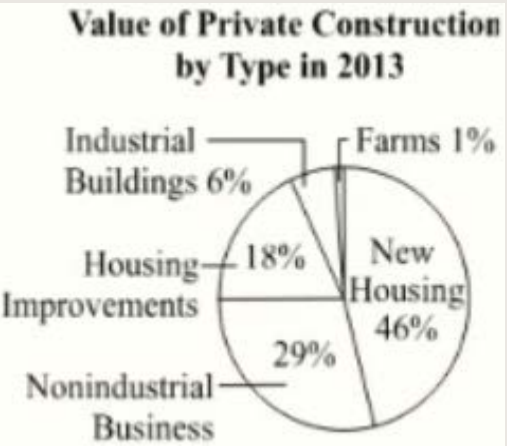
13. When positive integers k and n are each divided by 9, the remainders are 2 and 5 respectively. If k>n, what is the remainder when k-n is divided by 9?

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

Questions 14 and 16 are based on the following data







14. Approximately what was the average (arithmetic mean) value of public construction for the years shown?

A. $20 million
B. $40 million
C. $80 million
D. $100 million
E. $120 million

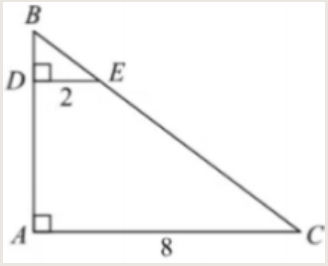
15. Approximately what was the percent increase in the value of private construction from 2006 to 2013?

A. 40%
B. 50%
C. 70%
D. 110%
E. 140%

16. Of the following pairs of types of construction in 2013, where the first type is a public type and the second type is a private type which pair had dollar values that were closest to each other?

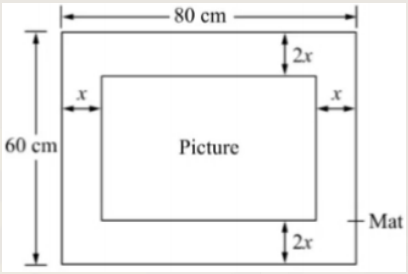
A. Military facilities and farms
B. Conservation and farms
C. Conservation and industrial buildings
D. Sewers and industrial buildings
E. Highways and nonindustrial business

17.



In the figure shown, if AB=6, what is the length of EC?

18.



The figure above shows a rectangular picture mounted on a larger rectangular mat that is 80 centimeters by 60 centimeters. The distance between the outside edge of the painting and the outside edge of the mat is x centimeters on the vertical sides and 2x centimeters on the horizontal sides, as shown. If the picture covers 91 percent of the mat, what is the value of x in centimeters?

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

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

C. 1

D. 2

E. 4

19. If the average (arithmetic mean) of p, q, and r is 9, then the average of the numbers in which of the following lists can be determined?
Indicate all such lists.

A. p^2, q^2, r^2
B. -p, -q, -r
C. C.2p, 2q, 2r, 3p, 3q, 3r

20. In a certain university, 60 percent of all sophomores are liberal arts majors, 24 percent are education majors, and the rest are majoring in other areas or have not yet chosen a major. At the university, 55 percent of all sophomores are currently taking a psychology course. If x percent of all sophomores are liberal arts majors who are currently taking a psychology course, what is the least possible value of x?

A. 15
B. 16
C. 31
D. 36
E. 40

Section 21

1. On the final examination for a biology course, the least score was 9 and the greatest score was 93. Of the 120 students who took this final examination, 65 percent received a score that was less than the score that José received.

Quantity A	Quantity B
José's score on this final examination	65

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.

2.

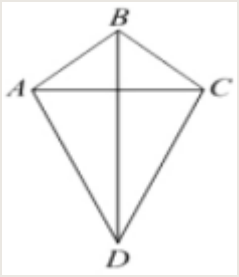
n, n+3, n+6, n+9,...

In the sequence shown, each term after the first is 3 greater than the preceding term. The 17th term is 55.

Quantity A	Quantity B
The 98th term of the sequence 301	

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.

3.



Quantity A	Quantity B
The perimeter of ABCD	The sum of the lengths of diagonals AC and BD

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.

4.

k>0

Quantity A	Quantity B
The volume of a hemisphere (half of a sphere) that has radius k	The volume of a right circular cylinder that has height k and whose base has radius k

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.

5.

x and y are each negative integer.

Quantity A	Quantity B
x^y	0

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.

6. The random variable X has a normal distribution with a mean of 400 and a standard deviation of 60. A value of X is to be chosen at random.

Quantity A	Quantity B
The probability that the value chosen will be between 400 and 430	The probability that the value chosen will be between 430 and 460

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.

7.

r is a positive integer, k=2r+1, and h=5k-3.

Quantity A	Quantity B
The units digit of h	2

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.

8.

r=-2s, where r and s are nonzero numbers.

Quantity A	Quantity B
$\frac{3}{4}r^2s$	$\frac{3}{2}rs^2$

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.

9. For a certain television show, $\frac{1}{4}$ of each $\frac{1}{2}$ hour episode is taken up by commercials.

What is the total number of hours in a 24-episode season of the show that are not taken up by commercials?

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

10. Of the 80 voters who completed a survey, 40 supported issue A, 60 supported issue Band 20 did not support either issue. How many of the 80 voters supported both issues?

A. 20
B. 25
C. 30
D. 35
E. 40

11.

$x>0$
$y<0$

Which of the following is equivalent to $|x-y|+|y-2x|$?

A. $3|x|+2|y|$
B. $2|x|+2|y|$
C. $|x|+|y|$
D. $3|x|$
E. $2|y|$

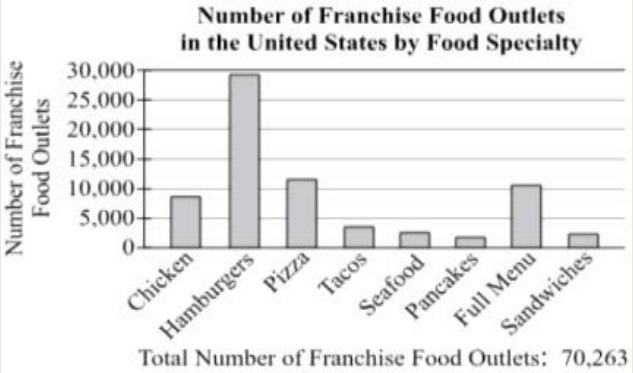
12. If x is the product of all the different prime factors of 6 then x=

A. 10
B. 12
C. 15
D. 20
E. 30

13. Last year a total of 114.5 million movie tickets were sold at Movie Theater A and Movie Theater B combined. If there were 7.5 million more movie tickets sold at Movie Theater A than at Movie Theater B last year. how many movie tickets were sold at Movie Theater Blast year?

_____million

Questions 14 and 16 are based on the following data



14. For which of the following food specialties is the number of franchise outlets most nearly equal to the average (arithmetic mean) number of franchise outlets per specialty?

A. Chicken
B. Pizza
C. Tacos
D. Seafood
E. Full Menu

15. If $\frac{1}{3}$ of the franchise hamburger outlets are Company X outlets, then the franchise hamburger outlets that are not Company X outlets are approximately what fraction of all the franchise food outlets?

A. $\frac{2}{3}$

B. $\frac{3}{5}$

C. $\frac{3}{7}$

D. $\frac{2}{5}$

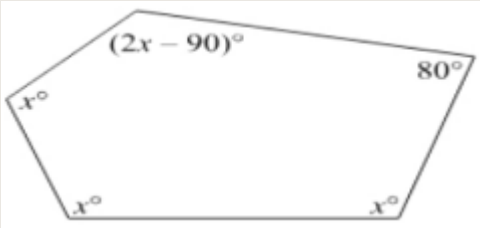
E. $\frac{2}{7}$

16. Two-thirds of all the franchise food outlets are owned by their operators, and the rest are owned by parent companies and leased to the operators. If $\frac{1}{3}$ of all the franchise hamburger outlets are owned by their operators, approximately what fraction of all the nonharmburger outlets are owned by their operators?

A. $\frac{1}{3}$
B. $\frac{1}{2}$
C. $\frac{2}{3}$
D. $\frac{3}{4}$
E. $\frac{9}{10}$

17. Let a, b, and c be positive integers such that $x^2+cx+16=(x+a)(x+b)$ for all values of x . What is the largest possible value of c minus the smallest possible value of c?

18.



What is the value of x in the pentagon shown?

A. 100
B. 104
C. 106
D. 110
E. 115

19. If $t=h^2+2$ and h is an integer from -5 to 2, inclusive then the greatest possible value oft is how much more than the least possible value oft?

A. 16
B. 18
C. 21
D. 25
E. 27

20. At a grocery store, the revenue from the sale of a certain brand of cookies was $70 on Monday $120 on Tuesday, and $100 on Wednesday. If the revenue from the sale of this brand of cookies was not less than $90 on Thursday, which of the following values could be the range of the daily revenues from the sale of this brand of cookies for the four days?
Indicate all such values.

A. $30
B. $40
C. $50
D. $60
E. $70

Section 22

1.

n is an integer greater than 3.

Quantity A	Quantity B
The fraction of the integers greater than 1 and less than n that are prime numbers	$\frac{1}{2}$

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.

2.

$x<y$

x and y are integers

Quantity A	Quantity B
The number of integers between x and y, inclusive	y-x+1

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.

3.

$x>0$

$y>0$

Quantity A	Quantity B
$\left(\sqrt{x}\right)\left(\sqrt{y}\right)$	$\sqrt{x+y}$

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.

4. The average (arithmetic mean) of the values in data set R is m. Data set S consists of the values in data set R and the value k and the average of the values in data set S is m+a, where a>0. Data set T consists of the values in data set Sand the value k.

Quantity A	Quantity B
The average of the values in data set T	m+2a

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.

5. All applicants for a certain job will take a skills test. An applicant who scores 80 percent or greater on the test has a probability of 0.65 of being hired.

Quantity A	Quantity B
The probability that an applicant who scores less than 80 percent on the test will be hired	0.35

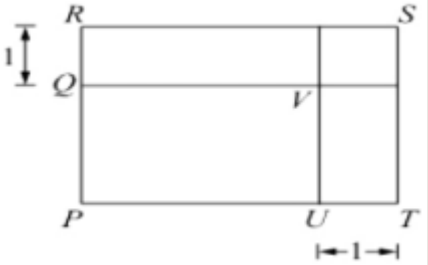
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

6. For all positive integers n,the function f is defined by the equation $f(n)=\frac{n(n+1)}{2}$.

m is a positive integer.

Quantity A	Quantity B
$(-1)^{f(4m+1)}$	$(-1)^{f(4m+2)}$

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.



7. The area of rectangular region PRST is 5 greater than the area of rectangular region POVU, RQ=l and UT=1.

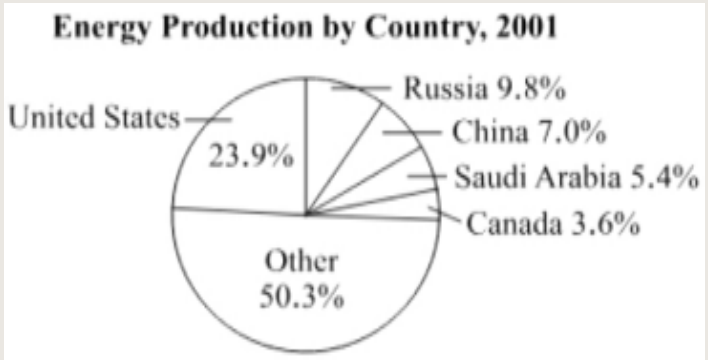
Quantity A	Quantity B
The perimeter of rectangular region PQVU	8

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.

8. In the xy-plane, the origin and the point (-6, 4) are on the graph of y=ax+ b. Which of the following points is NOT on that graph?

A. (-3,2)
B. (9,-6)
C. $(-1, \frac{2}{3})$
D. (-16,12)
E. $(-\frac{1}{6}, \frac{1}{9})$

9.



Total world energy production in 2001: 4.03×10^{17} British thermal units (Btu)

The circle graph above shows the percent of the world's energy produced by several countries. Which of the following countries produced between 2.0×10^{16} Btu and 4.0 ×10^{16} Btu in 2001? Indicate all such countries.

A. United States
B. Russia
C. China
D. Saudi Arabia
E. Canada

10. The original price of a radio was reduced by 20 percent. During a special sale the reduced price was decreased by 10 percent of the reduced price. The resulting special sale price must be increased by approximately what percent of the special sale price to restore the price of the radio to the original amount?

A. 28%
B. 30%
C. 35%
D. 39%
E. 42%

11. The lengths of the diagonals of a certain parallelogram are 10 and 24. If the diagonals intersect at right angles, what is the perimeter of the parallelogram?

A. 26
B. $20\sqrt{2}$
C. $24\sqrt{2}$
D. $26\sqrt{2}$
E. 52

12. x and y are integers, and $\frac{x+y}{y}=\frac{9}{5}$. Which of the following could be the integer x?

Indicate all such integers.

A. 4
B. 6
C. 9
D. 10
E. 12
F. 14

13. If n is a positive integer, which of the following CANNOT be the units digit of 2^n-1?

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

Questions 14 and 16 are based on the following data

Voting in Annual Municipal Elections of City X
in Selected Years from1980 to1996

Year	Number of Eligible Voters	Percent of Eligible Voters Who Voted	Percent of Eligible Voters Who Were Republicans
1980	38,000	62	40
1984	41.300	60	45
1988	43,100	58	50
1992	45.800	55	52
1996	52.000	54	55

14. In which of the years shown did the greatest number of eligible voters vote?

A. 1980
B. 1984
C. 1988
D. 1992
E. 1996

15. The percent increase in the number of eligible voters from 1980 to 1996 is closest to which of the following?

A. 10%
B. 25%
C. 35%
D. 50%
E. 75%

16. The least possible number of eligible voters who voted in 1988 and who were not Republicans is closest to which of the following?

A. 3,450
B. 7,500
C. 12,500
D. 21,550
E. 25,000

17. Set S consists of all integers greater than 7 and less than 60 such that when each of the integers is divided by 7, the remainder is 3. How many integers are in S?

_____integers

18. A certain type of storage container is in the shape of a rectangular solid that is 6 meters long, 2 meters wide, and 2.5 meters high. In a container ship, 12 of these storage containers were stacked together face-to-face to form a large rectangular block that is 12 meters long, 6 meters wide, and 5 meters high. The total surface area of all the container faces that are against other faces is approximately what percent of the total surface area of all the containers?

A. 48%
B. 53%
C. 58%
D. 63%

E. 68%

19. A team of two students from an art school is to be selected to represent the school at a national event. The two students will be selected from the students in three classes that have no students in common, he three classes have 10 students, 8 students,and 7 students. If the two students must be selected from different classes, how many teams are possible?

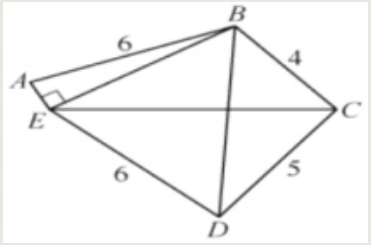
A. 168
B. 206
C. 210
D. 240
E. 560

20. If a sequence is defined by $a_n=n(-1)^n$ for all integers n from 1 through 499, what is the sum of all the terms in the sequence?

A. -499
B. -250
C. -1
D. D.1
E. E.499

Section 23

1.



Quantity A	Quantity B
The perimeter of quadrilateral BCDE	21

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.

2.

R is the remainder when a four-digit number is divided by a three-digit number.

Quantity A	Quantity B
R	10

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.

3.

$|x-5|<2$

Quantity A	Quantity B
x	3

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.

4. d_1, d_2, and d_3 are nonzero digits. S is the sum of the three 3-digit positive integers $d_1d_2d_3$, $d_2d_3d_1$, and $d_3d_1d_2$. For example, if d_1, d_2, and d_3; are 2, 4 and 7, respectively, then S=247+472+724=1,443.

Quantity A	Quantity B
S	$111(d_1+d_2+d_3)$

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.

5.

A rectangle is inscribed in a circle with radius r.

Quantity A	Quantity B
One-half of the perimeter of the rectangle	2r

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.

6.

Commuting Distance for Commuting Students at College Y

Commuting Distance	Percent of Students
Less than 10 miles	54%
From10 to 20 miles, inclusive	41%
Greater than 20 miles	5%

Quantity A	Quantity B
The average (arithmetic mean) commuting distance of the commuting students at College Y	15 miles

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.

7.

$0<a<b<c<d<e$

List X: a, b, c, d, e

List Y: -2a, -2b, -2c, -2d, -2e

Quantity A	Quantity B
The standard deviation of the numbers in list X	The standard deviation of the numbers in list Y

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.

8.

$3x+y=12$

$x+\frac{y}{3}=4$

Quantity A	Quantity B
x	y

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.

9. To the 200 coins in a box, Pam added additional coins for 9 consecutive weeks. During the first week, she added 10 coins to the box, and then during each of the remaining weeks, she added 10 more coins to the box than she had the preceding week. If no coins had been removed from the box, how many coins were in the box at the end of the 9th week?

A. 290
B. 300
C. 550

D. 650
E. 700

10. In a certain town, the daily rainfalls for each of the first 6 days of a recent 7-day period were 8, 12, 15, 18, 3, and 7 millimeters, respectively. Which of the following could have been the amount of rainfall, in millimeters, on the 7th day if the average (arithmetic mean) daily rainfall for the 7-day period was not less than 10 millimeters and not more than 11 millimeters?
Indicate all such amounts.

A. 4
B. 6
C. 8
D. 10
E. 12
F. 14
G. 16
H. 18

11. If $p^3=-8q^5$ and $q^3=1$, what is the value of p?

A. -8
B. -2
C. 2
D. 8
E. It cannot be determined from the information given.

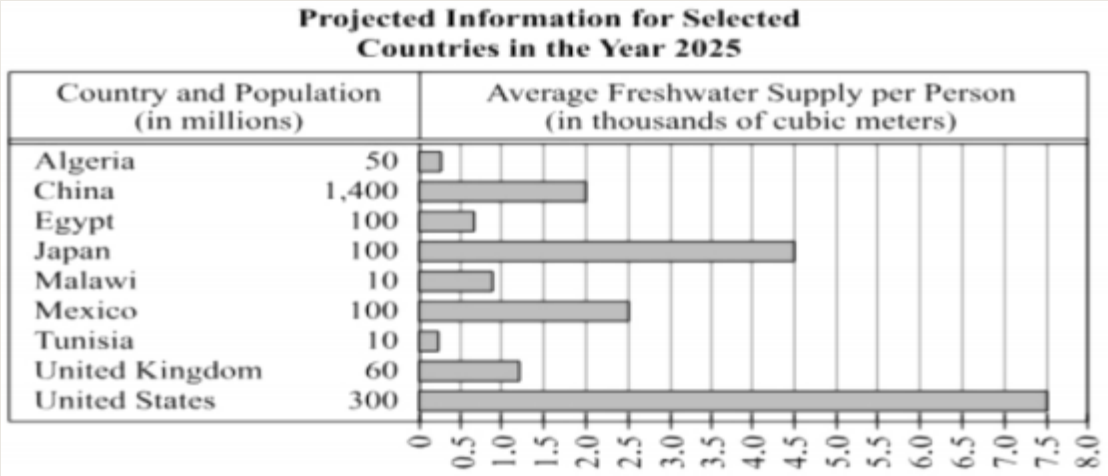
12. The integer t is the product of four different prime numbers. If t divided by 6 is a multiple of 7, which of the following could be equal to t divided by 2?

A. 4
B. 12
C. 14
D. 105
E. 525

13. Pumping at a constant rate,a certain gasoline pump can fill an empty 50-gallon tank in 2 minutes. If the pump pumped gasoline into the 50-gallon tank at the constant rate for 1.5 minutes and the tank had 10 gallons of gasoline in it when the pump began pumping, what percent of the volume of the 50-gallon tank was filled with gasoline at the end of the1.5minutes?

_____%

Questions 14 and 16 are based on the following data



14. The average freshwater supply per person for the United States is projected to decrease 20 percent from 1997 to 2025.Based on the data, which of the following was closest to the average freshwater supply per person for the United States in 1997, in cubic meters?

A. 6,000
B. 8.200
C. 8.800
D. 9,400
E. 9,900

15. The average amount of freshwater required per person per year is 1700 cubic meters. According to the projections in the year 2025 China will have a freshwater supply of how many millions of cubic meters above the amount required?

A. 420,000
B. 300,000
C. 240.000
D. 180,000
E. 140,000

16. If the countries shown are ordered, from least to greatest, by the amount of their total projected freshwater supply for 2025, which of the following represents the country with the least amount followed by the country with the greatest amount?

A. Algeria,United States
B. Tunisia, China
C. Algeria, Japan
D. Tunisia, Japan
E. Algeria,China

17.

$$\frac{\frac{n}{4}}{5} = \frac{180}{n}$$

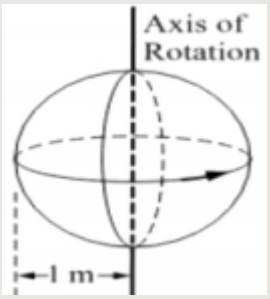
If n is the positive solution to the equation shown, what is the value of n?

n=_____

18. If $\frac{m}{n} = \frac{1}{2}$, which of the following must also have a value of $\frac{1}{2}$?

A. $\frac{m-n}{2}$
B. $\frac{n-m}{2}$
C. $\frac{m+n}{2}$
D. $\frac{n-m}{n}$
E. $\frac{m-n}{m}$

19.



A sphere, as shown above with a radius of 1 meter is rotating 360 degrees per second about its vertical axis. The speed, in meters per second, of a point on the sphere due to this rotation is in the range from

A. 0 to 1
B. 0 to π
C. 0 to 2π
D. 1 to π
E. 1 to 2π

20. Each time a certain coin is tossed, the probability is $\frac{1}{2}$ that it will land head up and $\frac{1}{2}$ that it will land tail up. If the coin is tossed 3 times, what is the probability that it will land head up exactly twice?

A. $\frac{1}{10}$
B. $\frac{1}{4}$
C. $\frac{3}{8}$
D. $\frac{2}{3}$
E. $\frac{9}{10}$

Section 24

1. The original price of a coat was discounted by x percent, resulting in a reduced price. The reduced price was then discounted by x percent resulting in a final price. The final price of the coat was 36 percent less than the original price.

Quantity A	Quantity B
x	18

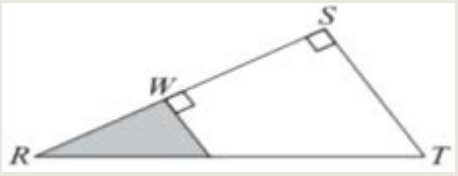
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

2. p is a positive prime number and a divisor of 40.

Quantity A	Quantity B
p	4

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.

3.



The area of the shaded triangular region is $\frac{1}{5}$ of the area of triangular region RST.

Quantity A	Quantity B
RW	$(\frac{1}{5})$(RS)

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.

4. A number is to be selected from the set{1, 3, 5, 7, 9}, and a number is to be selected from the set {2, 4, 6, 8, 10}. P is the product of the two numbers selected.

Quantity A	Quantity B
The number of different possible values of P	25

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.

5.

x is a positive number, and x^2 is an integer between 7 and 14.

Quantity A	Quantity B
x	3

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.

6.

E is the set of all positive common multiples of 7 and 11 that are less than 1,900.

Quantity A	Quantity B
The number of integers in E that are divisible by 6	The number of integers in E that are divisible by5

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.

7.

The length of each side of quadrilateral ABCD is 5.

Quantity A	Quantity B
The length of diagonal AC	5

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.

8. The sum of the digits of a two-digit integer is 6 more than the tens digit minus the units digit. What is the units digit?

A. 1
B. 3
C. 6
D. 7
E. It cannot be determined from the information given.

9. A family paid 12 percent of its annual after-tax income on food last year. This amount was equal to 10 percent of its annual before-tax income last year. Which of the following is closest to the percent of the family's annual before-tax income that was paid for taxes last year?

A. 8%
B. 12%
C. 17%
D. 20%
E. 25%

10. If x and y are integers $1<-x<4$ and $2<y<5$, what is the least possible value of the product xy?

A. -20
B. -12

C. -8
D. -6
E. -2

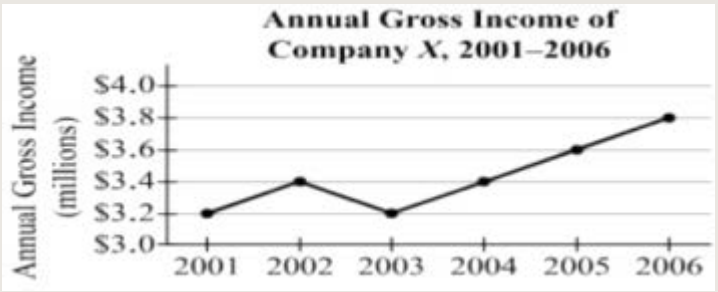
11. Each side of the floor of a square room is 10 percent longer than each side of the square carpet on the floor of the room. If the area of the floor is 30.24 square feet greater than the area of the carpet what is the length, in feet, of each side of the carpet?

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

12. How many 2-digit positive integers have a remainder of 3 when divided by 10 and also have a remainder of 3 when divided by 6?

A. None
B. One
C. Two
D. Three
E. Four

13.



According to the graph shown for which of the years 2002-2006 was the percent increase from the preceding year in the annual gross income greater than 6 percent? Indicate all such years.

A. 2002

B. 2003
C. 2004
D. 2005
E. 2006

Questions 14 and 16 are based on the following data

14. How many bagels sold in 1990 were not vegetable bagels?
Give your answer to the nearest 100000 bagels.

_____bagels

15. In 2010, 25 percent of the bagels sold in the "Other" category were pumpernickel bagels. In 2010, approximately what percent of the bagels in the "Plain" and "Other" categories combined were pumpernickel bagels?

A. 5%
B. 10%
C. 15%
D. 20%
E. 25%

16. For which type of bagel was the number of bagels of that type sold in 1990 closest to the number sold in 2010?

A. Plain
B. Sweet
C. Seed

D. Vegetable
E. Other

17.

x is an integer and $20 \leqslant x \leqslant 30$.

The units digit of x^2 is 1, and the units digit of $(x+2)^2$ is also 1. What is the value of x?

18. The median of the 7 consecutive odd numbers in a certain list is 39. If each of the numbers in the list were multiplied by -3, what would be the value of the least of the resulting 7 numbers?

A. -135
B. -126
C. -117
D. -105
E. -99

19. In a group of 10 people, the median height is 70 inches, the average (arithmetic mean) height is 70.5 inches and the range of the heights is 12 inches. If an additional person who is 74 inches tall joins the group, which of the three statistics must change?

A. Average only
B. Median only
C. Range only
D. Average and median
E. Average and range

20. A line in the xy-plane has the equation $y=mx+6$, where m is a constant and $3 \leqslant m \leqslant 4$. Which of the following values could be the x-intercept of the line?
Indicate <u>all</u> such values.

A. -3

B. -2

C. $-\frac{7}{4}$

D. $-\frac{5}{4}$

E. $\frac{5}{4}$

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

G. 2

H. 3

Section 25

1. The subscription price of a certain monthly magazine is $64.80 for 36 issues. The newsstand price of the magazine is $2.25 per issue.

Quantity A	Quantity B
The amount saved by purchasing 36 issues of the magazine at the subscription price instead of the newsstand price	$16.20

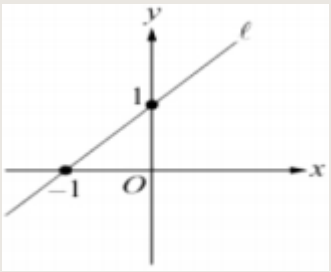
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

2.

Quantity A	Quantity B
$(x-0.7)^2$	$(0.7-x)^2$

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.

3.



In the xy-plane, point P (not shown) lies on line ℓ. Line ℓ has an x-intercept of -1 and a y-intercept of 1

Quantity A	Quantity B
The x-coordinate of P	The y-coordinate of P

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.

4.

$a<b<c<d<e$

List S: a, b, c, d, e

List T: a-2, b-1, c, d+1, e+2

Quantity A	Quantity B
The standard deviation of the numbers in list S	The standard deviation of the numbers in list T

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.

5.

Quantity A	Quantity B
The area enclosed by a square with a side of length 2	Twice the area enclosed by an equilateral triangle with a side of length 2

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.

6.

n is a positive integer.

n-12 is a multiple of 3.

Quantity A	Quantity B
The remainder when n-1 is divided by 3	2

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.

7.

$n > 0$

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

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.

8.

$x \leqslant 50$
$y \leqslant 4$

Quantity A	Quantity B
xy	300

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.

9.

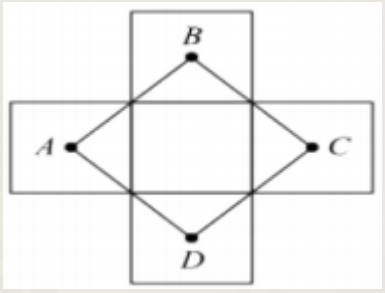
Prices at Donut Shop J

Donut Type	Price
Plain	$0.30
Glazed	$0.35
Filled	$0.35
Cake	$0.50
Super	$0.60

The table lists the prices of all types of donuts available at Donut Shop J. How many different combinations of two donuts of different types can be purchased at Donut Shop J if the total of the prices of the two donuts must be less than $1.00?

A. 4
B. 5
C. 9
D. 10
E. 19

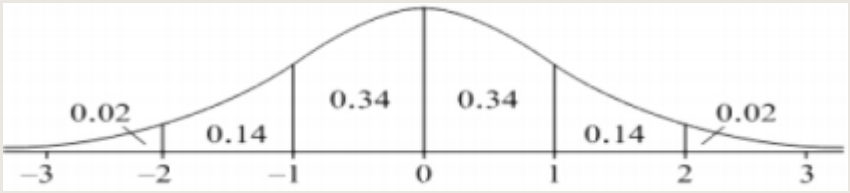
10.



In the figure above, square ABCD is placed on top of the 5 identical squares so that the vertices of ABCD are the centers of the 4 outer squares. The area of the region ABCD is what percent of the total area of the 5 identical square regions?

A. 20%
B. 25%
C. 40%
D. 50%
E. 60%

11.



The random variable X has the standard normal distribution with a mean of O and a standard deviation of 1 as shown. Probabilities.rounded to the nearest 0.01, are indicated for the six intervals shown. The random variable Y has a normal distribution

with a mean of 2 and a standard deviation of 1. Using the probabilities shown approximately how much greater is the probability that the value of Y is between 1 and 2 than the probability that the value of X is between 1 and 2?

A. 0.10
B. 0.12
C. 0.14
D. 0.20
E. 0.34

12. A certain baker sent 280 loaves of bread to a grocery store. The baker packed the loaves in two types of boxes. The smaller type of box could hold up to 8 loaves. while the larger type of box could hold up to 12 loaves. When the baker sent the loaves, all the boxes were full and there were equal numbers of both types of boxes. What fraction of the loaves of bread sent to the grocery store were packed in the smaller boxes?

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

13. A train engine, traveling at a constant rate. passed Station A on its way to Station B. Thirty minutes after the engine passed Station A, it was 40 miles from Station B, and 45 minutes after it passed Station A, it was 23 miles from Station B, where these distances were measured along the train route between the two stations. How fast was the train engine traveling in miles per hour?

_____miles per hour

Questions 14 and 16 are based on the following data

Inventory of 500 Vehicles at a Car Dealership.

Number of Vehicles by Type and Color

Vehicle Type		Vehicle Color						Total
		Black	Brown	Green	Red	Silver	White	
Sedan	4-door	25	34	42	33	30	36	200
	2-door	20	8	18	22	17	15	100
Specialty Vehicle	Minivan	12	6	10	10	8	14	60
	Sport-utility	12	16	22	9	3	18	80
	Station wagon	12	12	13	6	3	14	60
Total		81	76	105	80	61	97	500

14. For how many of the five vehicle types is the number of silver vehicles less than 20 percent of the total number of vehicles of that type?

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

15. By approximately what percent does the total number of green vehicles exceed the total number of brown vehicles?

A. 25%
B. 29%
C. 33%
D. 38%
E. 46%

16. For the 5 vehicle types and 6 vehicle colors, what is the average (arithmetic mean) number of vehicles per type per color, rounded to the nearest whole number?

A. 17

B. 33
C. 45
D. 83
E. 100

17. Set A consists of all odd integers between -50 and 50. Set B consists of all integers from 10 to 30. What is the average (arithmetic mean) of the integers in the intersection of set A and set B?

18. If p>0 and q-p=2, then $\frac{q^2-1}{p+1}=$

A. q-2
B. q-1
C. 1
D. q+1
E. q+2

19. For all numbers a and b, the operation $\otimes$ is defined by the following equation.

$$a \otimes b = \begin{cases} 2 \; if \; a > b \\ 0 \; if \; a = b \\ b+1 \; if \; a < b \end{cases}$$

What is the value of $((1 \otimes 2) \otimes 1) \otimes 2$?

A. 0
B. 1
C. 2
D. 4
E. 6

20. A circular walkway with a uniform width and an inner diameter of 60 feet is to be built. If the length of the outer edge of the walkway must be between 100π feet and 200π feet, which of the following values could be the width in feet of the walkway? Indicate all such values.

A. 30
B. 60
C. 90
D. 120

Section 26

1. At a county fair one evening, 420 people went on a roller coaster and 275 people went on a Ferris wheel. A total of 105 people went on both the roller coaster and the Ferris whee1.

Quantity A	Quantity B
The number of people who went on the roller coaster or the Ferris wheel but not on both	490

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.

2. c is a nonzero integer.

$\frac{x}{y}=\frac{2}{5}$, where x and y are positive.

Quantity A	Quantity B
x^c	y^c

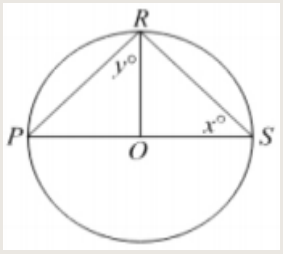
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

3. For all positive integers a and b, the operation□ is defined by.

Quantity A	Quantity B
5□ (4□ 3)	(5□ 4)□ 3

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.

4.



Points P, R, and S are on the circle with center O. The measure of angle ROS is 92°.

Quantity A	Quantity B
x	y

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.

5.

The reciprocal of n equals 8 times the square of n.

Quantity A	Quantity B
$\frac{1}{n}$	2

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.

6.

$B_n = \frac{n}{n+1}$ for all integers n>1.

$C_n=B_n+B_{n-1}$ for all integers n>2.

The integer k is greater than 2.

Quantity A	Quantity B
C_k	$\frac{2k^2-1}{k+k}$

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.

7. The average (arithmetic mean) of the six numbers y_1, y_2, y_3, y_4, y_5 and y_6 is k. The average of the six numbers y_1+k, y_2+k, y_3+k, y_4+k, y_5+k, and y_6+k is m.

Quantity A	Quantity B
k	m

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.

8. If n is a positive integer and $|n-18|<6$, what is the least possible value of n?

A. 23
B. 19
C. 17
D. 13
E. 11

9. When the positive integer z is divided by 42, the remainder is 9. What is the remainder when z is divided by 7?

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

10. A right circular cylindrical tank sitting on its base has a height of 6 feet and a volume of 54 cubic feet. What is the circumference in feet of the tank's base?

A. $3\sqrt{\pi}$
B. $2\sqrt{3\pi}$
C. 3π
D. 6π
E. 18π

11. If x is to be randomly selected from the integers -2 to 7, inclusive, and y is to be randomly selected from the integers -9 to -3, inclusive, what is the probability that the product xy will be negative?

A. 0.85
B. 0.8
C. 0.75
D. 0.7
E. 0.65

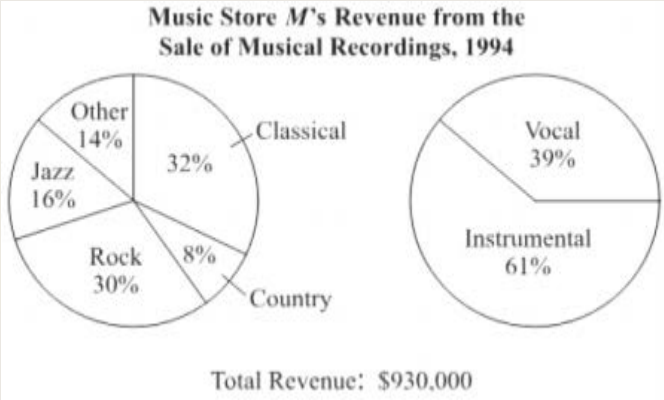
12. A certain company made neither a profit nor a loss on the first 1,000 Widgets it sold and made a profit of $0.50 on each widget it sold after the first 1,000. If the company's total profit from the sale of widgets was p dollars. what is the number of widgets it sold in terms of p?

A. 2p
B. 2(p+1,000)
C. 2p+1,000
D. $\frac{p+1,000}{2}$
E. $\frac{p}{2}+1,000$

13. The average (arithmetic mean) of the weights of a father and mother is twice the average of the weights of their 4 children. If the average weight of the 6 family members is 128 pounds what is the average weight, in pounds, of the 4 children?

A. 64
B. 91
C. 92
D. 94
E. 96

Questions 14 and 16 are based on the following data



14. If $\frac{1}{2}$ of the revenue from the sale of jazz recordings was from the sale of vocal jazz recordings, then revenue from vocal jazz recordings was approximately what fraction of revenue from all vocal recordings?

A. $\frac{1}{5}$
B. $\frac{1}{4}$
C. $\frac{1}{3}$
D. $\frac{2}{5}$
E. $\frac{1}{2}$

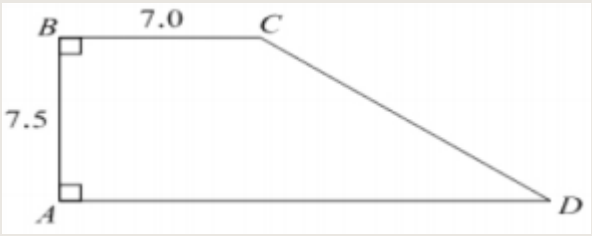
15. The graphs shown are drawn to scale. Which of the following is closest to the degree measure of the central angle of the sector that represents the category labeled “Other”?

A. 40
B. 45
C. 50
D. 55
E. 60

16. If in 1995 revenue from the sale of classical music recordings was $\frac{1}{2}$ of its 1994 value while revenue from the sale of all other recordings shown was the same as in 1994, approximately what percent of the total 1995 revenue was from the sale of classical music recordings?

A. 12%
B. 16%
C. 19%
D. 24%
E. 28%

17.

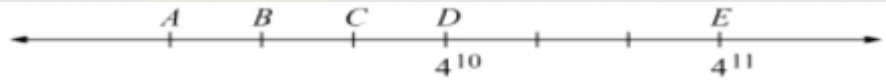


If the area of trapezoid ABCD above is 90, what is the length of side CD?

18. For which of the following values of x is the inequality $\frac{(x-4)^4(x+5)^6}{(x-2)^{10}} \le 0$ satisfied? Indicate <u>all</u> such values.

A. 9
B. -5
C. -2
D. 0
E. 1
F. 4
G. 6

19.



The tick marks shown on the number line are evenly spaced. Points D and E have coordinates of 4^{10} and 4^{11}, respectively. The point that has a coordinate of 4^9 is

A. point A
B. between points A and B
C. between points B and C
D. point C
E. between points C and D

20. In a list of 25 different numbers, the average (arithmetic mean) of all the numbers greater than the median is 200. and the average of all the numbers less than the median is 100. If the average of the 25 numbers is an integer. which of the following could be the value of the median?
Indicate <u>all</u> such values.

A. 120
B. 125
C. 140

D. 145
E. 160
F. 175
G. 180

Section 27

1.

$rs^4t^3 < 0$

Quantity A	Quantity B
$\frac{r}{t}$	0

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.

2.

$k > 0$

$w < 0$

Quantity A	Quantity B
$\frac{6k}{8k}$	$\frac{3w}{4w}$

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.

3.

x and y are different positive integers.

$x^2y=180$

Quantity A	Quantity B
x	y

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.

4. A 3-foot by 3-foot-square closet floor is to be covered completely using a combination of 1-foot by 1-foot square tiles and 1-foot by 2-foot rectangular tiles.

Quantity A	Quantity B
The number of 1-foot by 1-foot square tiles used	The number of 1-foot by 2-foot rectangular tiles used

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.

5. The standard deviation of n numbers x_1, x_2, x_3,...,x_n with mean $\bar{x}$ is equal to $\sqrt{\frac{S}{n}}$, where S is the sum of the squared differences $(x_i-\bar{x})^2$ for $1\leq i\leq n$.

List K consists of 5 different numbers. List L consists of 5 numbers and is formed by multiplying each number in K by 2. The standard deviation of the numbers in K is x and the standard deviation of the numbers in L is 2y.

Quantity A	Quantity B
x	y

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.

6.

$$x((75+y)+(15-y))=900$$

Quantity A	Quantity B
xy	10

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.

7. Polygon P has more than 5 sides. Polygon Q has twice as many sides as polygon P.

Quantity A	Quantity B
Twice the sum of the interior angles of polygon P	The sum of the interior angles of polygon Q

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.

8. The units digit of 3^n is 1 where n is an integer greater than 50.

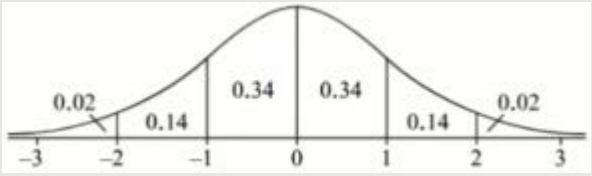
Quantity A	Quantity B
The units digit of 3^{n+3}	7

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.

9. A string of decorative lights consists of red, green and blue bulbs. The red bulbs flash every 4 seconds, the green bulbs flash every 6 seconds, and the blue bulbs flash every 9 seconds. If all the lights flash simultaneously when the string is first lit, how many seconds will it take until all the lights flash simultaneously the next time?

A. 18
B. 24
C. 36
D. 54
E. 108

10.



The figure shows the standard normal distribution with probabilities, rounded to the nearest 0.01. indicated for six intervals.
The ages, in years, of 250 students are approximately normally distributed, with a mean of 11 and a standard deviation of 2. According to the figure shown, approximately how many students are at least 7 years old but less than 9 years old?

A. 5
B. 35
C. 40
D. 90
E. 120

11. If 5x-3>2, then it must be true that x is

A. less than 1
B. greater than 0
C. not an integer
D. a prime
E. a multiple of 5

12.

X={1, 3, 5, 8}
Y={2, 4, 6, 7}

Set T consists of all integers n such that $n=x^2+y$, where x is an integer from set X and y is an integer from set Y. How many integers in T are even?

A. None
B. Two
C. Three
D. Six

E. Eight

13. A grocery store's monthly revenues from the sales of product P were $1,200, $1,500, $1,850, and $1,700 for the first 4 months of 2014, respectively. The median of the store's monthly revenues from the sales of product P for the first 5 months of 2014 was $1,550. What was the average (arithmetic mean) of the store's monthly revenues from the sales of product P for the first 5 months of 2014?

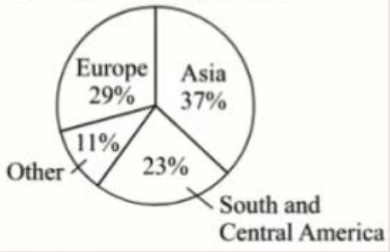
$_____

Questions 14 and 16 are based on the following data

Population Data for Five Neighborhoods of City *X*, 1930 and 1990

Neighborhood	Total Population		Foreign-Born Population	
	1930	1990	1930	1990
R	228,100	217,400	91,200	66,600
S	219,100	100,700	78,700	11,700
T	102,800	150,100	20,200	25,400
U	79,700	47,300	43,100	18,200
V	5,600	9,100	1,700	4,900
Total	635,300	524,600	234,900	126,800

Percent of Foreign-Born Population in Neighborhood *V* by Region of Origin, 1990



14. A list of the names of the people of the entire 1990 foreign-born population in Neighborhood V was unique with each person's name appearing once. The names of 2 different people will be randomly selected from the Neighborhood V. Which of the following is closest to the probability that both names selected will be names of people whose region of origin was “Other”?

A. 0.01
B. 0.11
C. 0.25
D. 0.39
E. 0.55

15. In 1990 approximately what percent of the total population of neighborhood V was foreign-born with Europe as region of origin?

A. 6%
B. 12%
C. 16%
D. 25%

E. 29%

16. For how many of the five neighborhoods did the ratio of the foreign-born population to the total population of the neighborhood increase from 1930 to 1990?

A. None
B. One
C. Two
D. Three
E. Four

17. If $\left(\frac{1}{x}\right)^{-3} = \frac{27}{8}$, what is he value of x?

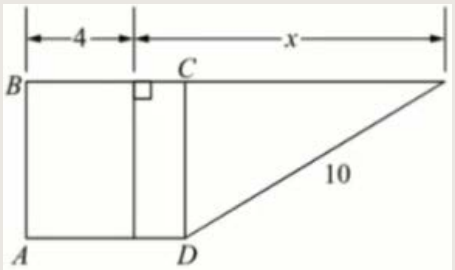
Give your answer as a fraction.

x= ☐/☐

18. For all integers x and y, the operation◇is defined by $x◇y=xy^2-yx^2$. If w is an integer such that w◇12=324, what is the greatest possible value of w?

A. -3
B. 6
C. 9
D. 12
E. 24

19.



In the figure above, if square ABCD has a perimeter of 24 then x=

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

20. Helen plays a game at an amusement park in which each player can win prizes valued at $5 or $10. If she plays the game 3 times and wins a prize at least twice, which of the following could be the total value of the prizes won?
Indicate all such values.

A. $6
B. $8
C. $11
D. $16
E. $17
F. $21

Section 28

1.

$-2<x<1$

Quantity A	Quantity B
$\|x\|$	1

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.

2. A certain parking garage charges x dollars for the first hour and y dollars (x>y) for each additional hour.

Quantity A	Quantity B
The average (arithmetic mean) charge per hour to park a car in this garage for a period of exactly 8 hours	The average (arithmetic mean) charge per hour to park a car in this garage for a period of exactly 2 hours

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.

3.

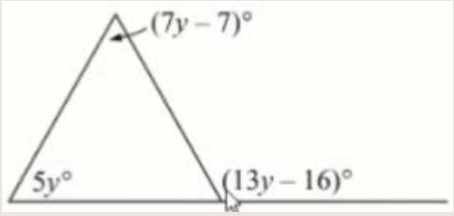
n is a positive integer.

$$\frac{(n+1)!}{5}-3(n!)=0$$

Quantity A	Quantity B
n	15

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.

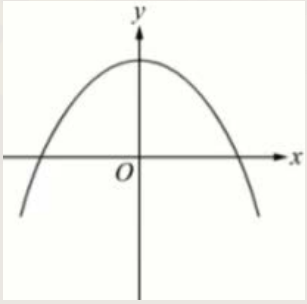
4.



Quantity A	Quantity B
y	10

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.

5.



In the xy-plane, the figure shows the graph of the equation $y=ax^2+b$, where a and b are constants.

Quantity A	Quantity B
a	b

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.

6.

The lengths of two of the three sides of a right triangle are 4 and 5.

Quantity A	Quantity B
The area of the triangle	8

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.

7.

$N=5^9+7^{10}$

Quantity A	Quantity B
Of the factors of N, the least factor greater than 1	3

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.

8. A library archive has 6 collections of single-sheet documents. and the collections are numbered consecutively from 1 to 6. Collection 1 contains 4 documents. After collection 1, each collection contains4 times the number of documents contained in the collection with the preceding number. If the thickness of each document is 0.01 centimeter, approximately what is the sum of the thicknesses, in centimeters, of all the documents in the 6 collections combined?

A. 24
B. 41
C. 55
D. 84
E. 252

9.

List S: 11, 2, 7, x, 3

If the average (arithmetic mean) of the 5 numbers in list S is less than the median which of the following could be the value of x?

A. 3
B. 5
C. 9
D. 12
E. 15

10. If x+2<0, -1<y<0, and $\left|z-\frac{3}{2}\right|<\frac{1}{2}$, which of the following expressions has the greatest value?

A. x+y+z
B. x+y-z
C. x-y+z
D. -x-y+z
E. -x-y-z

11. Points A, B, and C lie on the number line such that B is between A and C, and the coordinates of A and C are 15 and 45. respectively. If the distance between A and B is $\frac{3}{5}$ of the distance between A and C what is the coordinate of B?

A. 18
B. 21
C. 27
D. 33
E. 39

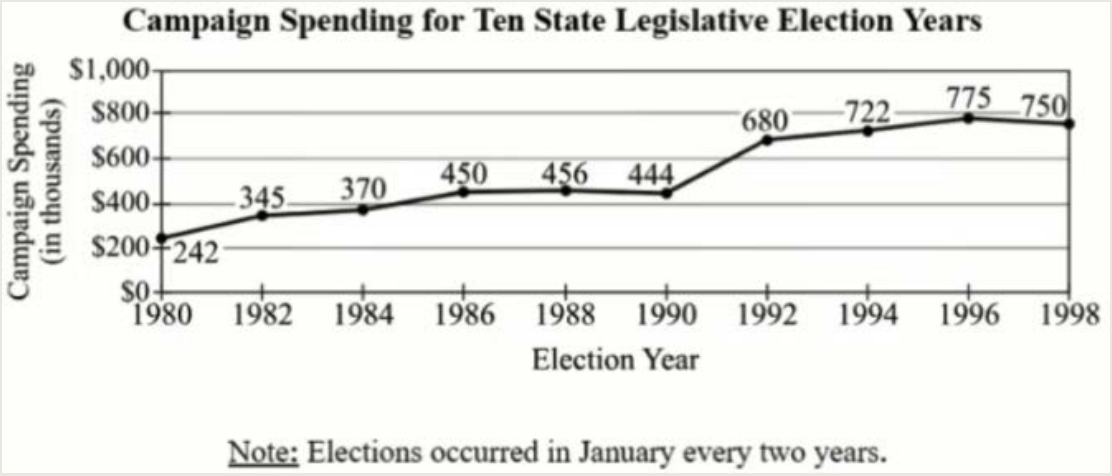
12. A car service charges $5 for the first mile of a trip and $2 for each additional mile or part thereof. If the car service charges $101 for an n-mile trip, where n is an integer what is the value of n?

A. 47
B. 48
C. 49
D. 50
E. 51

13. During a fishing trip, a family caught two types offish:bass and trout. If 10 percent of the fish caught were largemouth bass and 40 percent of the bass caught were largemouth bass what percent of the fish caught were trout?

A. 4%
B. 25%
C. 50%
D. 75%
E. 96%

Questions 14 and 16 are based on the following data



14. Based on the information given, which of the following statements are true? Indicate all such statements.

A. The campaign spending for the election year 1998 was more than 3 times the campaign spending for the election year 1980.
B. For the 10 campaign spending amounts shown, the average (arithmetic mean) is greater than the median.
C. The total campaign spending for the election years from 1994 to 1998 combined was greater than the total campaign spending for the election years from 1980 to 1992 combined.

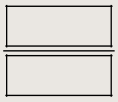
15. For each value x in a list of values with mean m, the absolute deviation of x from the mean is defined as |x-m|.
For the 10 campaign spending amounts shown, which amount has the least absolute deviation from the mean?

A. $242,000
B. $345,000
C. $444,000
D. $450,000
E. $456,000

16. Using data from the election years 1980 and 1998, a linear model was created in 1999 to predict future campaign spending. Which of the following is closest to the campaign spending predicted by the model for the election year 2000?

A. $778,000
B. $801,000
C. $806,000
D. $849,000
E. $860,000

17. In a list of 16 consecutive multiples of 5, ordered from least to greatest, the difference between the 2nd and 15th numbers is what fraction of the difference between the first and last numbers?



18. If $4x-5<10$ and $5-3x \leqslant 17$, which of the following could be the value of x? Indicate <u>all</u> such values.

A. -5
B. -4
C. -3
D. -2
E. 2
F. 3
G. 4
H. 5

19. The average (arithmetic mean) of the s values in data set S is m_1, and the average of the t values in data set T is m_2, Data set V consists of the values in T, each multiplied by 2. What is the average of the values in data sets S and V combined?

A. $\frac{sm_1 + 2tm_2}{s+t}$

B. $\frac{sm_1 + tm_2}{s+t}$

C. $\frac{sm_1 + 2tm_2}{s+2t}$

D. $2\left(\frac{sm_1 + tm_2}{s+t}\right)$

E. $\frac{1}{2}\left(\frac{sm_1 + tm_2}{s+t}\right)$

20. The floor of a closet is rectangular with a length that is between 4 feet and 6 feet and a width that is between 3 feet and 4 feet. Which of the following values could be the area in square yards, of the closet floor? (Note: 1 yard=3 feet.)
Indicate all such values.

A. 1.1
B. 1.3
C. 1.8
D. 2.7
E. 3.2

Section 29

1. When compared to a regular-size box of a certain cereal, a family-size box of the same kind of cereal contains 10 more ounces of cereal and costs 50 cents more.

Quantity A	Quantity B
The cost per ounce of the cereal in the family-size box	5 cents

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.

2. The units digit of the 2-digit positive integer N is 6.

Quantity A	Quantity B
The units digit of the product 7N	2

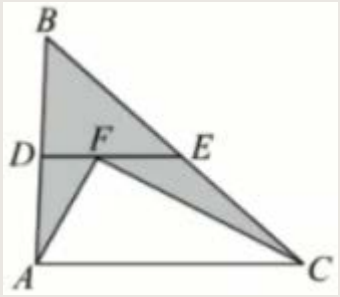
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

3. $x^2+4x-5>0$

Quantity A	Quantity B
x+4	5

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.

4.



D is the midpoint of AB.
E is the midpoint of BC.
F is a point on DE.

Quantity A	Quantity B
The area of triangular region ACF	The area of the shaded region

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.

5.

Quantity A	Quantity B
The remainder when $10^8+10^9+10^{10}+10^{11}$ is divided by 11	0

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.

6. S is the sum of 50 different numbers of the form $1+\frac{1}{n}$, where n takes on positive integer values.

Quantity A	Quantity B
S	51

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.

7.

Quantity A	Quantity B
The number of different 2-member subsets of a set of 5 members	The number of different 3-member subsets of a set of 5 members

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.

8. The average (arithmetic mean) of 12 numbers is -15. If the sum of 4 of the numbers is -120, what is the average of the other 8 numbers?

A. -7.5
B. -5.0
C. -2.5
D. 2.5
E. 7.5

9. If k is an integer and $|k+8|<3$, how many different values are possible for k?

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

10.

- 1 foot=12 inches
- 1 yard=3 feet
- 1 mile=5,280 feet

Approximately how many cubic yards of asphalt are needed to cover a level road that is $\frac{1}{2}$ mile long and 24 feet wide with a layer of asphalt that is 4 inches thick?

A. 800
B. 1,600
C. 2,400
D. 3,000
E. 9,000

11. Last year 40 percent of the students at College X took Biology I, If all of the science majors and10 percent of the nonscience majors took Biology I, approximately what percent of the students at College X last year were science majors?

A. 25%
B. 29%
C. 33%
D. 37%
E. 41%

12. Which of the following is equal to $\frac{5^9 - 5^8}{4}$?

A. $\frac{1}{4}$
B. $\frac{5}{4}$
C. $\frac{5^3}{4}$
D. 5^8
E. 5^9

13. A certain rectangle has length x, width y and a perimeter of 50. If $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}$, which of the following is equal to z in terms of x?

A. $50x-x^2$
B. $50x-25x^2$
C. $\frac{50}{25-x}$
D. $\frac{50-x^2}{25}$
E. $\frac{25x-x^2}{25}$

Questions 14 and 16 are based on the following data

Survey of Excercise Methods
(Number of people surveyed: 1,650)

Method	Percent of Those Surveyed Who Use the Method
Exercise near home or work	46%
Exercise outdoors	40%
Exercise at a certain time of day	58%
Exercise with friends or family	20%
Join a health club	34%
Listen to music while exercising	28%
Watch television while exercising	16%

14. What is the greatest possible percent of people surveyed who use all of the methods listed?

A. 16%
B. 28%
C. 42%
D. 44%
E. 58%

15. If 30 percent of the people surveyed use both of the methods “exercise near home or work” and “exercise outdoors,” what percent of the people surveyed use at least

one of the two methods?

A. 26%
B. 52%
C. 56%
D. 74%
E. 86%

16. The number of people surveyed who use the method “join a health club” is what percent greater than the number who use the method “exercise with friends or family”?

_____%

17. The positive number y has the property that y percent of y is 169. What is the value of y?

y=_____

18.

Top Five Sources of Advice to Investors

Source	Percent Using Source
Stockbrokers	62%
Financial planners	45%
Bankers	16%
Accountants	15%
Attorneys	8%

The table shows the results of a survey of 1200 investors who were asked to name their sources regarding investment advice. If 300 of those surveyed named both stockbrokers and financial planners as sources. how many of those surveyed named neither of these two sources?

A. 216
B. 256
C. 312
D. 345
E. 384

19. Let a be the greatest integer such that 5^a is a factor of 1,500, and let b be the greatest integer such that 3 is a factor of 33,333,333. Which of the following statements are true? Indicate <u>all</u> such statements.

A. ab=3
B. a>b
C. a>5b

20. The standard deviation of n numbers x_1, x_2, x_3,...,x_n with mean $\bar{x}$ is equal to $\sqrt{\frac{S}{n}}$, where S is the sum of the squared differences $(x_i - \bar{x})^2$ for $1 \leq i \leq n$.
If the standard deviation of the 5 numbers 20-2c, 20-c, 20, 20+c, and 20+ 2c is greater than 6, which of the following could be the value of c?

Indicate <u>all</u> such values.

A. -7
B. -5
C. -3
D. -1
E. 1
F. 3
G. 5
H. 7

Section 30

1.

M, a, and b are positive numbers.

Quantity A	Quantity B
$\frac{M\left(a^2+b^2\right)}{12}$	$\frac{M\left(a+b\right)^2}{12}$

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.

2.

Country R's population in 1975 was 90 percent of its population in 1990.

Quantity A	Quantity B
The population of Country R in 1990	1.1 times the population of Country R in 1975

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.

3.

a>1

List K: a, a+1, a-1, 2a, -2a

Quantity A	Quantity B
The average (arithmetic mean) of the five numbers in list K	The median of the five numbers in list K

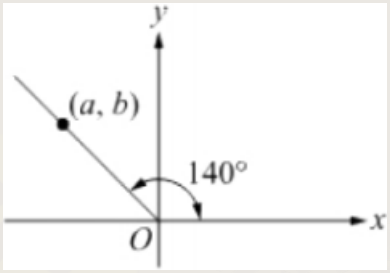
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

4. The sum of the integers from 1 to 50, inclusive, is x, and the sum of the integers from 1 to 30, inclusive is y.

Quantity A	Quantity B
x-y	800

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.

5.



Quantity A	Quantity B
|a|	|b|

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.

6.

$x > -1$

Quantity A	Quantity B
$\frac{x^3}{9}$	$\left(\frac{x}{9}\right)^3$

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.

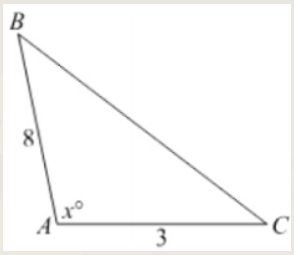
7.

$h^2 > 1$

Quantity A	Quantity B
h	$\frac{1}{h}$

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.

8.



x>90

Quantity A	Quantity B
The area of triangular region ABC	12

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.

9. 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. 5

E. 6

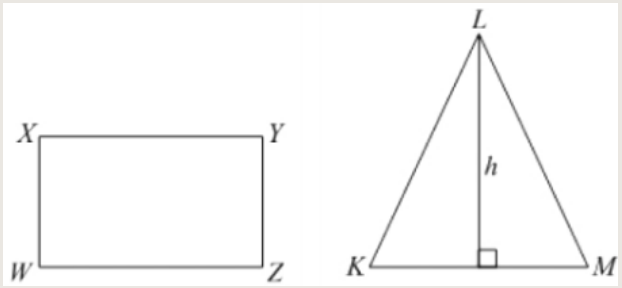
10.

Person	Test			
	A	B	C	D
Adell	95	90	98	93
Jill	70	96	94	72
Oren	85	92	87	80
Rabi	72	80	78	74
Tim	70	83	96	83

The table above shows scores received by 5 people on each of 4 tests. For these 5 people, which persons scores have the greatest standard deviation?

A. Adell
B. Jill
C. Oren
D. Rabi
E. Tim

11.



In the figures above, WZ=KM and the area of rectangular region WXYZ is equal to the area of triangular region KLM. If WX=6, then h=

A. 12
B. 9
C. 8
D. 6
E. 3

12. How many integers satisfy the two inequalities |x|>2 and |x+1|<5 simultaneously?

A. Three
B. Four
C. Six
D. Nine
E. Ten

13.

If n is a positive integer and $\frac{2^n}{n-1}=8$, what is the value of n?

n=_____

Questions 14 and 16 are based on the following data

Distribution of the Earth's Land and Water Area

Land Area Occupied by the Seven Continents

Continent	Area (square kilometers)
Asia	44,579,000
Africa	30,065,000
North America	24,256,000
South America	17,819,000
Antarctica	13,209,000
Europe	9,938,000
Australia	7,687,000
Total	147,553,000

Areas Occupied by the Four Oceans as Percent of the Water Area of the Earth

Ocean	Percent of the Water Area of the Earth
Pacific	46.0%
Atlantic	23.9%
Indian	20.3%
Arctic	2.6%
Total	92.8%

Land Area of the Earth: 148,429.000 square kilometers
Water Area of the Earth: 361,637.000 square kilometers
Total Area of the Earth: 510,066.000 square kilometers

14. Which of the following is closest to the ratio of the land area of the Earth to the water area of the Earth?

A. 1 to 5

B. 1 to 3
C. 2 to 5
D. 3 to 5
E. 2 to 3

15. The South China Sea occupies 2,974,600 square kilometers of water area of the Pacific Ocean. Approximately what percent of the water area of the Pacific Ocean is occupied by the South China Sea?

A. 2%
B. 6%
C. 10%
D. 14%
E. 18%

16. Of the water area occupied by the four oceans, the percent occupied by the Indian Ocean is closest to which of the following?

A. 14.3%
B. 20.3%
C. 21.9%
D. 24.8%
E. 27.5%

17. Sylvia has a white cube and a yellow cube. For each cube, each face of the cube is labeled with a different whole number from 1 to 6, and when the cube is tossed each face has the same probability of landing facing up. What is the probability that the white cube will land with the number 5 facing up and the yellow cube will land with an even number facing up?
Give your answer as a fraction.

18. In the xy-plane, the slope of line ℓ is $\frac{5}{3}$ and point (2, 1) is on line ℓ. Which of the following points is also on line ℓ?

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

19.

x	Frequency
31	2
32	3
33	4
34	5
35	5
36	4
37	3
38	3
Total	29

The table above shows the frequency distribution of the variable x. What is the median of the 29 values of x in the frequency distribution?

A. 34.0
B. 34.5
C. 35.0
D. 35.5
E. 36.0

20. A coffee shop sells its own brand of ground coffee packaged in two sizes-small and large. The small size is priced at k dollars per package, and the large size is priced at m dollars per package. If the total price of4 packages of the coffee is $30, which of the following could be the values of k and m?
Indicate all such values.

A. k=4 and m=6
B. k=4 and m=16
C. k=5 and m=10
D. k=5 and m=15
E. k=7 and m=8

答案及解析领取方式

扫码关注“GRE 必考题”公众号，后台回复“2023 数学 600 题”即可获取《参考答案》链接，或直接通过必考题官网(www.bikaoci.com)【在线搜题】功能进行单题搜索。

注：答案仅供参考，如果发现答案有疑问，欢迎同学老师加入答疑群讨论。

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