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

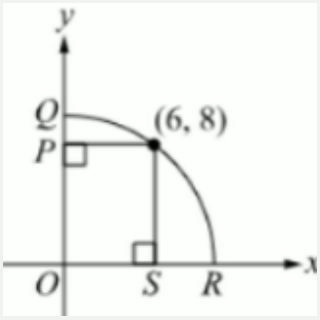
A. Quantity A is greater.
B. Quantity B is greater.
C. The two quantities are equal.
D. The relationship cannot be determined from the information given.

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.

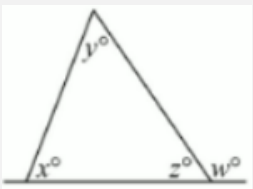
5.

$20<4x<32$
$8<x+4<11$

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.

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

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

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

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. $\frac{2}{3}$

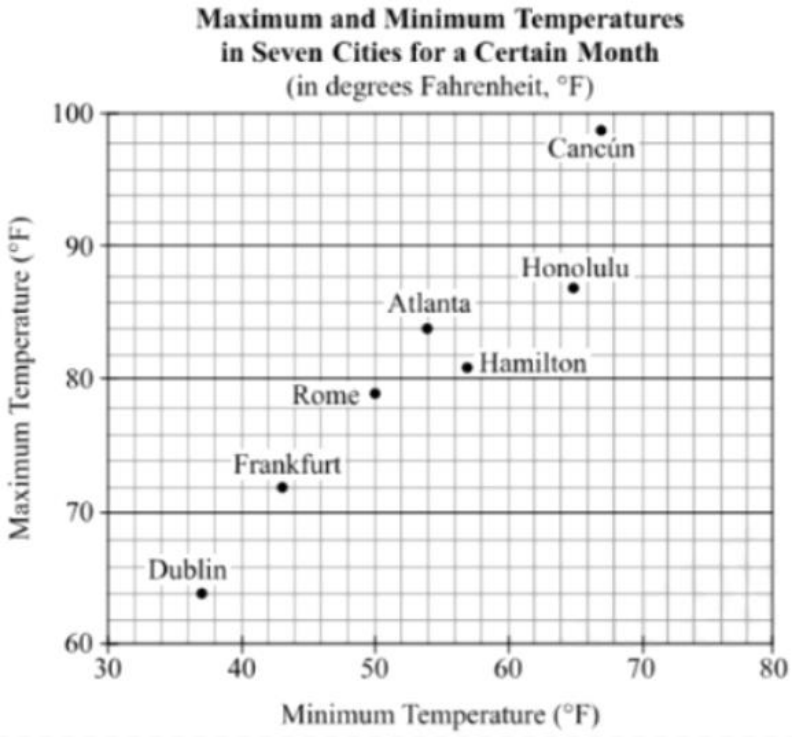
12. P, Q, and R are three points in a plane that are not all on the same line. Which of the following describes the set of all points in the plane that are equally distant from points P, Q, and R?

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 $a \geq 0$ and $b \geq 0$?

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?

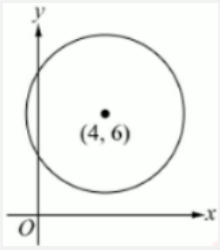
A. 67%
B. 57%
C. 52%
D. 47%
E. 42%

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 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.

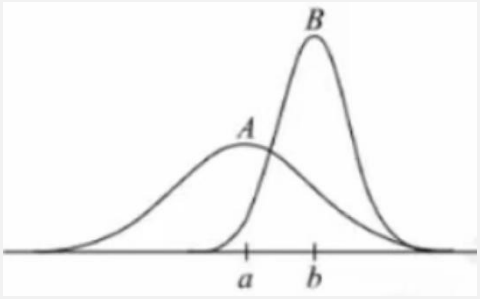
2. For each nonzero number x the function g is defined by $g(x)=\frac{1-x}{x}$.

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. $\frac{1}{6}$

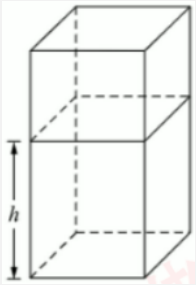
10. The average (arithmetic mean) of the numbers on a certain list is 30. Each of the numbers on the list is doubled and the result is then appended to the original list producing a new list that contains twice as many numbers as the original. What is the average of the numbers on the new list?

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

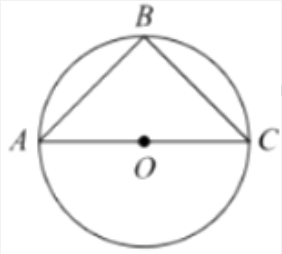
15. The Smiths total bank account balance on January 1, 2000, was 1.5 times their total bank account balance on December 1,1999. Their total bank account balance on December 1,1999, was $600 more than it was on November 1,1999. If the Smiths total bank account balance on November 1,1999, was x dollars,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

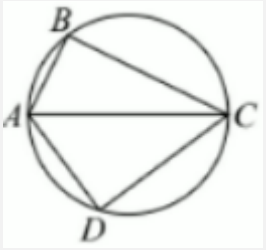
Quantity A	Quantity B
$(1.5+z)^2-\frac{1}{4}$	$(1.25+z)^2+\frac{3}{4}$

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?

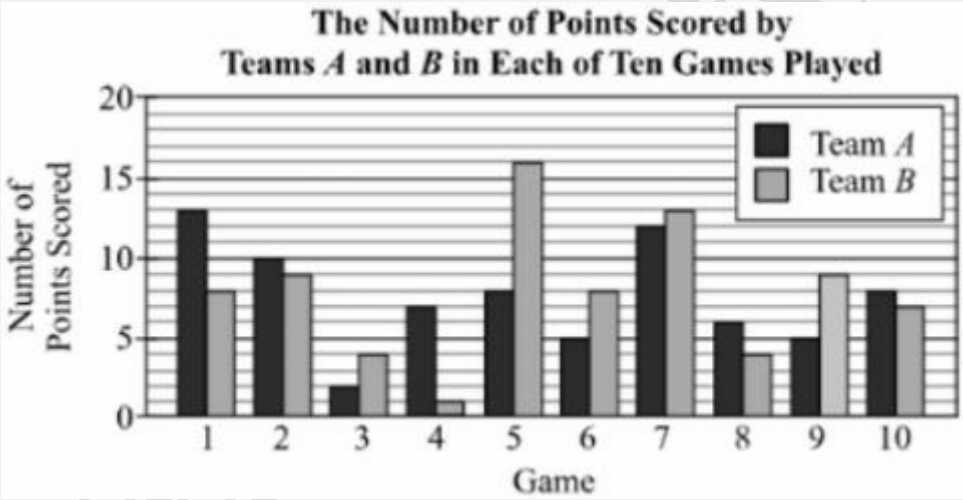
A.5
B.9
C.14

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

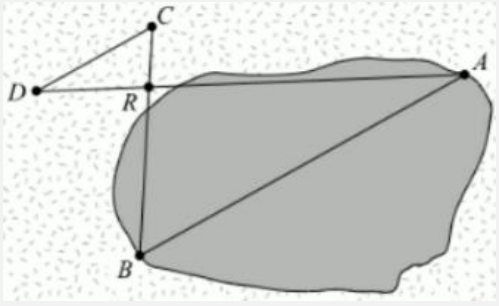
Which of the following statements are true for the list of six numbers above?
Indicate **all** such statements.

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