SECTION 1

1. A certain brand of dishwashing liquid was sold in two different bottle sizes. The small bottle was sold with 2/5 as many ounces of liquid as the large bottle and was sold at a price that was 1/2 the price of the large bottle.
Quantity A: The price per ounce of the liquid in the small bottle
Quantity B: 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.
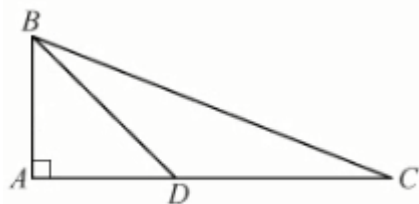
AB=12, AC=30, and AD= 2/5(AC).

Quantity A: The measure of angle BDC
Quantity B: 120°

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. Set I consists of the integers from 11 through 100, inclusive.

Quantity A: 4 times the number of integers in set T that are multiples of 4
Quantity B: 5times the number of integers in set T that are multiples of 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. $x^2+6x=7$
Quantity A: $(x+3)^2$
Quantity B: 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: The number of different prime factors of 500
Quantity B: The number of different prime factors of 360.

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: The area of a triangular region with perimeter 8
   Quantity B: 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. List L consists of 7 numbers. The range of the numbers in list L is 0.

Quantity A: The average (arithmetic mean) of the numbers in list L.
Quantity B: 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. $s=|t-2|$

Quantity A: $s+2$
Quantity B: $|t|$

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.

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

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

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

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

11. $(2x+1)^2 - (2x-1)^2 =$

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

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

A. $y=4$

B. $y = \dfrac{1}{2}x$

C. $y=x+3$

D. $y = x + \dfrac{1}{2}$

E. $y = \dfrac{1}{2}x + 3$

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

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

14-16 are based on the following data.
Survery* of preferred method to obtain news, by age-group
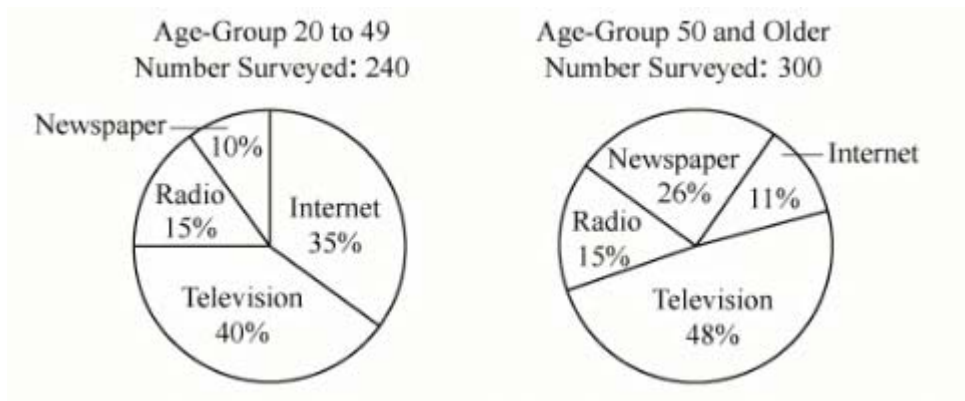
*Each person surveyed indicated one of the four methods as his or her preferred method to obtain news.

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

15. Which of the following is closest to the percent of all the people survey who indicated the Internet as their preferred method to obtain news?
A. 18.8%
B. 21.7%
C. 23.0%
D. 33.3%
E. 46.0%

16. For the age-group 50 and older, the number of people who indicated the Internet as their preferred method to obtain news is approximately what percent less than the number of people who indicated radio?
A. 12%
B. 27%
C. 36%
D. 45%
E. 50%

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

A. 0

B. 2

C. 3

D. 4

E. 5

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

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

A. 5%

B. 7.5%

C. 15%

D. 16.25%

E. 32.5%

20.

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

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

SECTION 2

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

Quantity A: k
Quantity B: 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. Quantity A: The greatest possible value of $\dfrac{2}{x-y}$, where $9 \le x \le 12$ and $-2 \le y \le 8$

   Quantity B: 2

A. Quantity A is great r.

e

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

3. $x - y = 5$
Quantity A: $x^2 - y^2$
Quantity B: 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. $f(x) = 4x^2 + 28x + 49$ for all x.

Quantity A: The number b such that $f(b)$ is the minimum value of f

Quantity B: -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. Quantity A: $(27)^{-8}$
   Quantity B: $(81)^{-6}$

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. m and n are integers.

Quantity A: $\left(\sqrt{10^{2m}}\right)\left(\sqrt{10^{2n}}\right)$
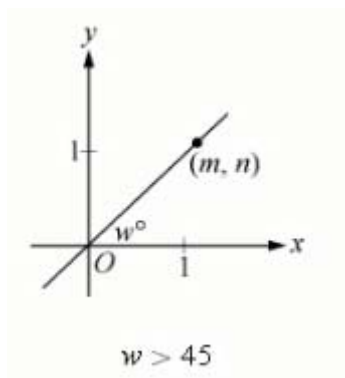
Quantity B: 10^{mn}

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.

$w > 45$

Quantity A: $m + n$
Quantity B: $2m$

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.

8. Company A has twice as many employees as Company B, and the two companies have no employees in common. If 64 percent of the employees of Company A are women and 52 percent of the employees of Company B are women, what percent of all

the employees of the two companies are women?

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

A. $\dfrac{ns}{s-1}$

B. $\dfrac{n(s+1)}{s}$

C. $\dfrac{(n+1)s}{s-1}$

D. $\dfrac{(n-1)s}{s-1}$

E. $\dfrac{(n+1)(s-1)}{s}$

10. Which of the following pairs of integers have reciprocals whose sum is either less than 1/3 or greater than 1/2?
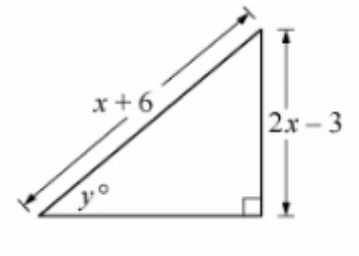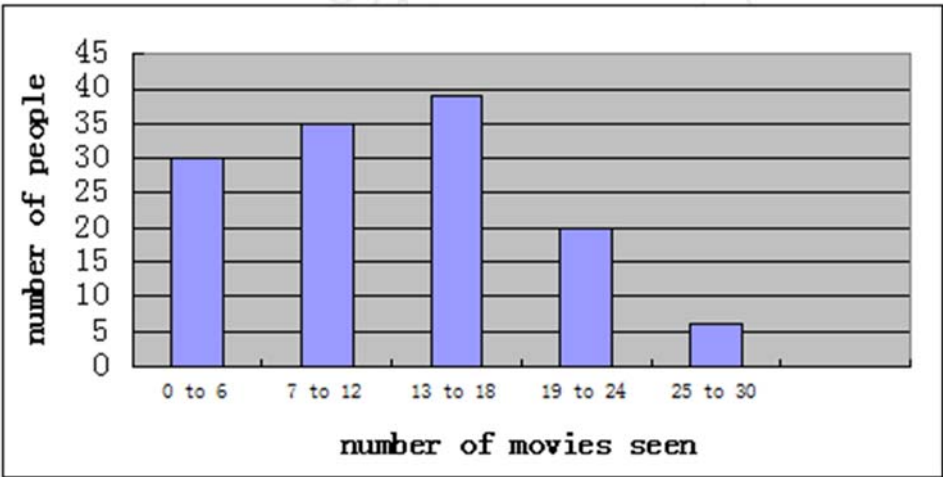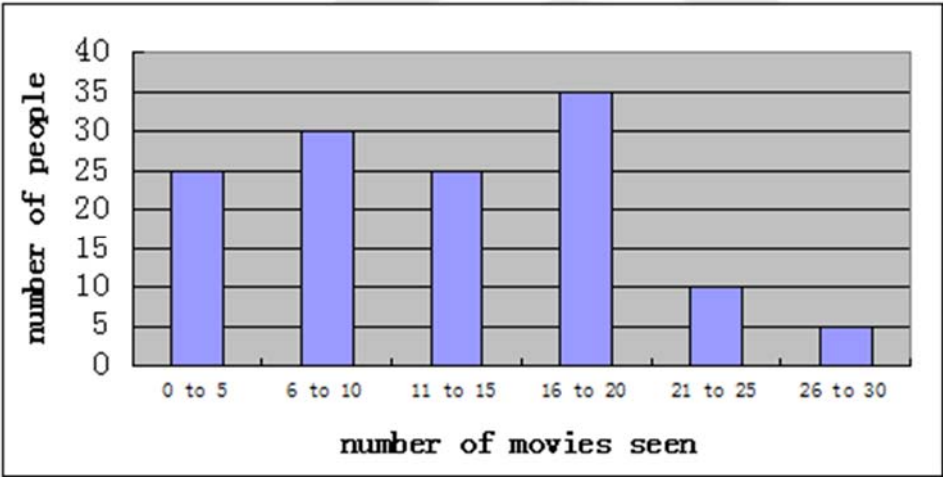Indicate all such pairs.
A. 1 and 14
B. 3 and 12
C. 5 and 10
D. 7 and 8

11.

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

A. 3
B. 4
C. 5
D. 8
E. 9

12.

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

survey results. How many people responded that they had seen 11 or 12 movies?

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

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

Questions 14-16 are based on the following data.

For each of the years 1997 through 2000*, the graph shows the number of towels imported to Japan from China, and the total number of towels imported to Japan from all countries, including China.

Number of Towels Imported to Japan, 1997-2000*
(in millions of dozens**)
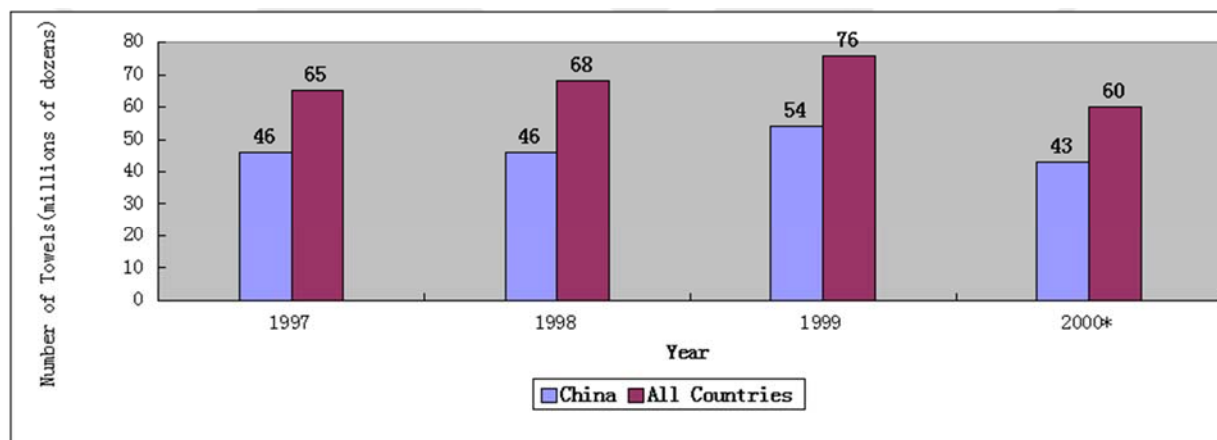
*For the first nine months of 2000
**1 dozen = 12

14. In 1998, how many of the imported towels were not imported from China?

A. 260 million
B. 264 million
C. 268 million
D. 272 million
E. 276 million

15. If the average (arithmetic mean) number of towels imported from China per month was the same for the last 3 months of 2000 as it was for the first 9 months of 2000, approximately how many million dozen towels were imported from China during the 12 months of 2000?

A. 57
B. 63
C. 76
D. 80
E. 86

16. In 1999, the ratio of the number of towels imported from China to the total number of towels imported from countries other than China was closets to which of the following?
A. 7 to 2
B. 3 to 1
C. 5 to 2
D. 2 to 1
E. 3 to 2

17. If x is a positive integer such that the units digit of x^3 is 3, what is the units digit of x^{15}?
A. 1
B. 3
C. 5
D. 7
E. 9

18. $\dfrac{60!-59!}{58!} =$

A. (59)(58)
B. (60)(59)
C. $(58)^2$
D. $(59)^2$
E. $(60)^2$

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

A. $\dfrac{1}{\pi}$

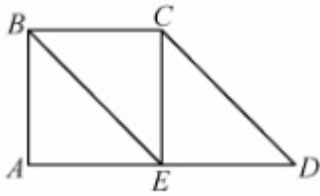B. $\dfrac{1}{\sqrt{\pi}}$

C. $\sqrt{\pi}$

D. π

E. π^2

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

一 套

SECTION 1

1.

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

Quantity A: The area of square *ABCE*
Quantity B: The area of parallelogram *BCDE*
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.
Quantity A: $(-1)^n(-1)^{n+2}$
Quantity B: 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. The population of Country X for 1980 was p. The population of Country X increased by 3.8 percent in each of the next two years.
Quantity A: The population of Country X for 1982.
Quantity B: $1.076p$
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. $x \neq 0$

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

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.

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

Quantity A: $x^{-1}yz^{-2}$

Quantity B: $(\frac{xz}{y})^{-2}$

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.

6. $x < y-2$

Quantity A: The average (arithmetic mean) of x and y
Quantity B: 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. x is an integer greater than 3.

Quantity A: The number of even factors of $2x$
Quantity B: 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. If (a,b) is a point in the xy-plane, then the distance between (a,b) and the x-axis is $|b|$ and the distance between (a,b) and the y-axis is $|a|$.

Quantity A: The total number of points P in the xy-plane such that the distance between P and one of the axes is 10 and the distance between P and the other axis is 8

Quantity B: The total number of points Q in the xy-plane such that the distance between Q and one of the axes is 5 and the distance between Q and the other axis is 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.

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

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

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

11. Each week a salesperson receives a commission that is equal to 12 percent of the first $500 of sales plus 20 percent of additional sales. If the salesperson received a commission of $380 last week, what was the total amount of the sales that the salesperson made last week?
A. $1,600
B. $1,660
C. $1,860
D. $2,000
E. $2,100

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

A. $0.68x$

B. $0.73x$

C. $0.76x$

D. $0.81x$

E. $0.84x$

13. In a distribution of 8,500 different measurements of the variable x, 26.5 is the 56th percentile and 37.1 is the 78th percentile. Which of the following is closest to the number of measurements of x that are in the distribution such that $26.5 \le x \le 37.1$?

A. 1,850

B. 2,200

C. 3,500

D. 4,750

E. 6,650

Questions 14 and 16 are based on the following data.

NUMBER OF OCCUPATIONAL INJURIES IN STATE X, 1998
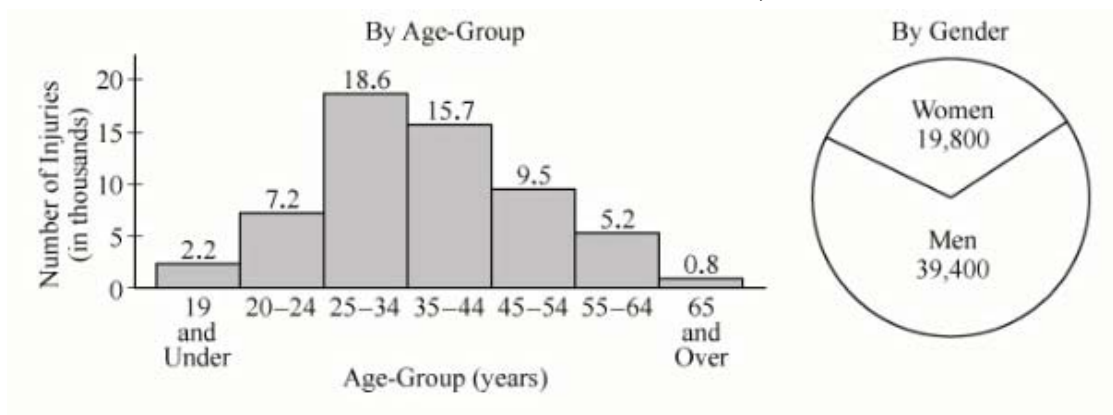
14. How many of the age-groups each accounted for more than 15 percent of the total number of occupational injuries in State X in 1998?

A. One

B. Two

C. Three

D. Four

E. Five

15. In 1998, if one-half of the occupational injuries in the combine 34-and-under age-groups were incurred by men, what was the number of occupational injuries incurred by men in the combined 35-and-over age-groups?

A. 33,500

B. 31,900

C. 30,500

D. 25,400

E. 21,700

16. For the 55-64 age-group in 1998, the average (arithmetic mean) number of work-hours lost per occupational injury was 48.5. If a workweek is 40 work-hours, which of the following is closets to the total number of workweeks lost due to occupational injuries in the 55-64 age-group in 1998?

A. 4,500

B. 5,200

C. 5,500

D. 5,900

E. 6,300
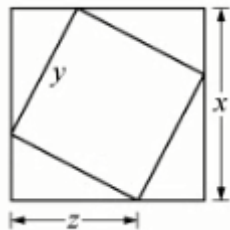
17.
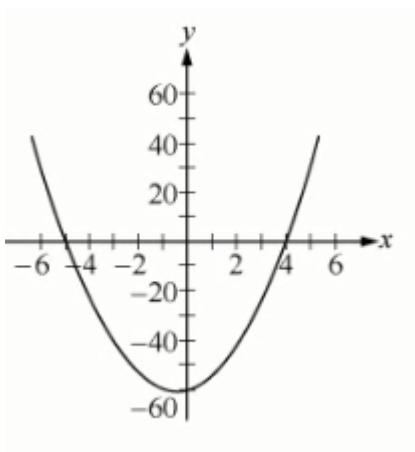
Which of the following could be the equation of the graph in the xy-plane shown above?

A. $y = x^2 + x - 60$

B. $y = x^2 + x - 20$

C. $y = x^2 + 3x - 60$

D. $y = 3x^2 + x - 60$

E. $y = 3x^2 + 3x - 60$

18.

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

A. $x^2 = y^2 + z^2$

B. $x^2 = y^2 - z^2$

C. $(x-z)^2 = y^2$

D. $(x-y)^2 = z^2$

E. $(x-z)^2 + z^2 = y^2$

19.

X	Frequency
0	6
1	11
2	18
3	23
4	15

The table shows the frequency distribution of the random variable X. What is the median of the distribution of the values of X ?

A. 1.0

B. 1.8

C. 2.0

D. 2.5

E 3.0

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

SECTION 2

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

Quantity A: The ratio of the number of juniors in the group to the number of seniors in the group.
Quantity B: 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.

2. The area of a circular region is 5π

Quantity A: The diameter of the circular region

Quantity B: $\sqrt{20}$

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.

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

Quantity A: x
Quantity B: 3

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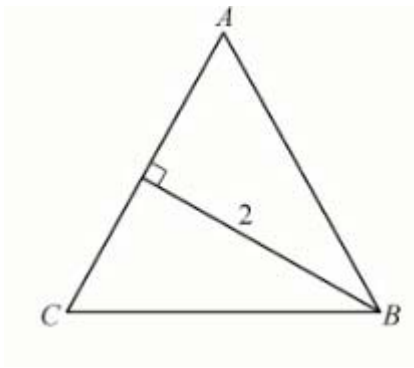D. The relationship cannot be determined from the information given.

4. $x > 0$

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

Quantity B: The area of a circular region with diameter 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.

5.

ABC is an equilateral triangle.

Quantity A: The length of *AB*

Quantity B: $2\sqrt{3}$

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. $1/2 < r < 1$

Quantity A: $2r$
Quantity B: $1/r$

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 data set of 10,000 numbers varying from 20 to 80, the number 62 is the 60th percentile and the number 74 is the *n*th percentile..

Quantity A: *n*
Quantity B: 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.

8. A historian asserts that at the beginning of 1852, the population of a certain mining town was 16,000. The historian also asserts that for each of the years from 1849 through 1853, the town's population at the beginning of the year was twice that of the preceding year. According to the historian, what was the range of the town's populations at the beginning of each year from 1848 through 1853?

A. 14,000
B. 15,000
C. 28,000
D. 30,000
E. 31,000

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

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

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

Indicate all such statements.

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

11. What is the remainder when 3^{283} is divided by 5?
A. 0
B. 1
C. 2
D. 3
E. 4

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

A. $2x < y$

B. $2x > y$

C. $x^2 < y^2$

D. $2x-y < y$

E. $2x-y < 2xy$

13. A rectangular solid P has height $2c$ and a base of width a and length b. Two other rectangular solids, Q and R, each have height c and bases of width a and length b. Which of the following represents the amount by which the sum of the surface areas of Q and R exceeds the surface areas of P?

A. $2ab$

B. $4ab$

C. $2ab + 2bc$

D. $2ab + 4ac$

E. $2ab +4ac +4bc$

Questions 14 and 16 are based on the following data.

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

SURVEY RESULTS

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

14. Which of the following statements about the managers surveyed must be true? (多选）

A. Less than 55 percent were male managers.

B. Of the male managers, more identified work experience as an important characteristic to consider than identified proficiency in English.

C. Less than 60 percent of the male managers identified specific occupational skill as important to consider.

15. The number of managers surveyed who identified work experience as an important characteristic to consider was approximately what percent greater than the number who identified appropriate attire and behavior as an important characteristic to consider?
A. 15%
B. 20%
C. 25%
D. 30%
E. 35%

16. If 48 percent of the managers surveyed identified both ability to follow directions and computer expertise as an important characteristics to consider, what percent of the managers surveyed identified neither of these characteristics as important to consider?
A. 15%
B. 18%
C. 23%
D. 25%
E. 28%

17. If the product of 7 consecutive integers is equal to the median of the integers, what is the least of the 7 integers?

18. On his trip to the airport, Grant drove a total of 9 miles. His average speed on the trip was x miles per hour, where $30 \leq x \leq 35$. Which of the following could be the total number of <u>minutes</u> that Grant took to make the trip?

Indicate <u>all</u> such numbers of minutes.
A. 15
B. 16
C. 17
D. 18
E. 19

19. If n is an integer, what is the least possible value of $3^n+(3)(3^{-n})$
A. 1
B. 2
C. 3
D. $3\frac{1}{3}$
E. 4

20. At a certain elementary school, 10 percent of the fifth-grade students are members of the school band. If 12 percent of the fifth-grade boys and 8 percent of the fifth-grade girls are members of the band, what percent of the fifth-grade students at the school are boys?

A. 10%

B. 12%

C. 20%

D. 30%

E. 50%

SECTION 1

1. *n* is an odd integer between 2 and 10, and *n* is <u>not</u> a prime number.

<u>Quantity A</u>:   *n*
<u>Quantity B</u>:   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.

2. s, t, and u are integers, and 10≤ s < t < u ≤ 20

<u>Quantity A</u>: $s + \dfrac{t}{u}$

<u>Quantity B</u>: 11

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

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

<u>Quantity A</u>: The least possible value of *x*
<u>Quantity B</u>: 0

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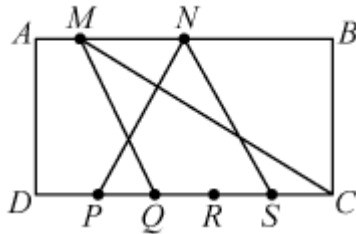D. The relationship cannot be determined from the information given.

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

<u>Quantity A</u>: The average number of <u>seconds</u> per step that Magdalena took to complete the remaining 30 steps.
<u>Quantity B</u>: 80

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

Quantity A: The area of $\triangle MCQ$
Quantity B: The area of $\triangle NSP$

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

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

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> 0*

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

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. $|2y - 5| < 1$
Quantity A: y
Quantity B: 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. If 1 kilometer is approximately 0.62 mile, what is the approximate speed, in kilometers per hour, of a car that is traveling at a speed of 50 miles per hour?
A. 31
B. 41
C. 61
D. 71
E. 81

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

11. In the xy-plane, a circle is centered at the point (-4,3) and passes through the origin. What is the area of the circle?
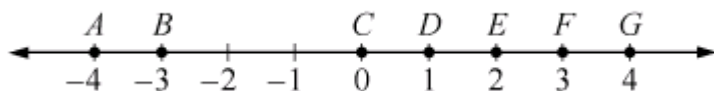A. 9π
B. 12π
C. 16π
D. 20π
E. 25π

12.

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

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

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

Indicate all such statements.

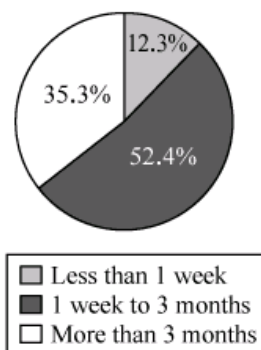A. The average (arithmetic mean) value is at most $325,000.
B. The median value is at most $325,000.
C. At most 400 homes have values greater than $325,000.

Questions 14 to 16 are based on the following data.

TEMPORARY EMPLOYMENT IN GERMANY, 1993–1999

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

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

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

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

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

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

17.
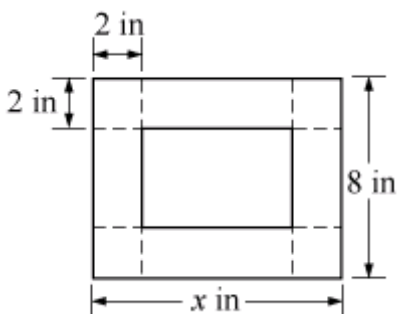
The thin rectangular sheet of metal shown in the figure is 8 inches wide and x inches long. An open box is to be made bu cutting a 2-inch square from each corner of the sheet of metal and then folding up the sides. If the volume of the box is to be 48 cubic inches, what is the value of x ?

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

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

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

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

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

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

1. n is an integer, and k is not an integer.

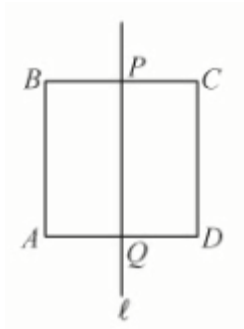 $0 < k < n < k+2$

Quantity A: n

Quantity B: $k + 1$

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.

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

Quantity A: The length of *PQ*

Quantity B: The length of *PE*

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

Quantity A: The actual area of region *X*

Quantity B: 150 square kilometers

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. $x > 0$

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

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

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

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. $z*10^k = 6*10^m$
   $m = k +2$
Quantity A: z
Quantity B: 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.

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

Quantity A: The value of c
Quantity B: 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.

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

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

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

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

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

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

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

12. The area of a circle with radius a is less than the area of a square with sides of length ka. Which of the following could be the value of k ?
Indicate all such values.

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

13. Which of the following is most nearly equal to $\dfrac{2.5*10^6}{2.5*10^6 - 3.5*10^{-6}}$

A. $-2.5*10^6$

B. $-3.5*10^{-6}$

C. $2.5*10^6$

D. -1

E. 1

Questions 14 to 16 are based on the following data

BENEFITS AND INCENTIVES SURVEY RESULTS FOR 600 COMPANIES

						Incentive	Number of Companies Offering Incentive
	481	327	274	225	198	Bonus Plan	482
	246	103	195	186	112	Profit Sharing	246
	78	60	59	55	40	Stock Ownership	78
	60	41	44	41	24	Stock Options	60
Benefit	Health Insurance	Flex-time	Disability Insurance	Tuition	Tele-commuting		
Number of Companies Offering Benefit	588	426	387	303	207		

Note: Each shaded cell is the intersection of a benefit column and an incentive row and contains the number of companies (out of the 600 surveyed) that offer both that benefit and that incentive. For example, 195 of the companies surveyed offer both a disability-insurance benefit and a profit-sharing incentive.

14. For how many of the four incentives listed does each of the companies surveyed that offers this incentive also offer a health-insurance benefit?

A. None

B. One

C. Two

D. Three

E. Four

15. A certain benefits and incentives package consists of 2 benefits to be chosen from the benefits offered by more than 1/2 of all the companies surveyed and 1 incentive to be chosen from the incentives offered by more than 1/3 of all the companies surveyed. How many suck packages are possible?

A. 4
B. 6
C. 8
D. 10
E. 12

16. The ratio of the number of companies offering both a stock-options incentive and one of the benefits listed to the number of companies offering that benefit is greatest for which of the five benefits?

A. Health insurance
B. Flex-time
C. Disability insurance
D. Tuition
E. Telecommuting

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

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

18.
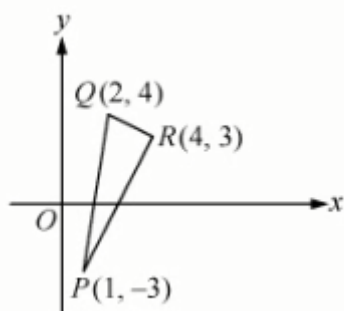
Which of the following statements about triangle *PQR* shown in the *xy*-plane are true?

A. *PQR* is a right triangle.

B. The area of *PQR* is 15/2.

C. *PQR* is an isosceles triangle.

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

A. $x = 1$

B. $|x| < 1$

C. $|x| < 2$

D. $|x + 1| < 1$

E. $|x - 1| < 1$

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

A. 0

B. 1/4

C. 1/3

D. 1/2

E. 2/3

SECTION 1

1.

In a fruit basket containing apples, pears, and oranges, the ratio of the number of apples to the number of pears is 3 to 4, and the ratio of the number of pears to the number of oranges is 5 to 3.

Quantity A	Quantity B
The number of apples in the fruit basket	The number of oranges in the fruit basket

○ Quantity A is greater.

○ Quantity B is greater.

○ The two quantities are equal.

○ The relationship cannot be determined from the information given.

2.

$$0 < x < y$$

Quantity A	Quantity B
x percent of y	y percent of x

3.

The average (arithmetic mean) of x and z is greater than y, and $x < y < z$.

Quantity A	Quantity B
The average of x, y, and z	The median of x, y, and z

4.

$$\frac{a^2}{b^2} = \frac{a}{b}$$

$$ab \neq 0$$

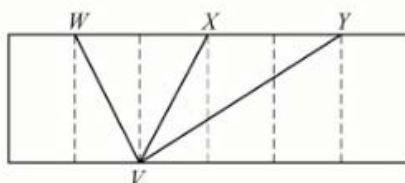| Quantity A	Quantity B
a	b

5.

Quantity A	Quantity B
The least integer x that satisfies the inequality $x^3 > -30$	-3

6.

The dotted line segments separate the rectangular region into six identical smaller rectangular regions.
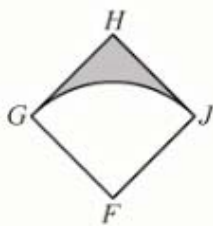
Quantity A	Quantity B
The area of triangular region WXV	The area of triangular region XYV

7.

$$a \neq 0$$

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

8.

Square *FGHJ* has sides of length *x*. Region *FGJ* is a sector of the circle with center *F*.

Quantity A	Quantity B
The area of the shaded region	$\dfrac{x^2}{4}$

9.

SOURCES OF FINANCIAL SUPPORT FOR A NONPROFIT ORGANIZATION

Source	Percent of Financial Support
Corporations	37%
Federal/state governments	33%
Individuals	22%
Others	8%

The table shows the percent distribution of financial support for a nonprofit organization, by source. The amount of financial support from individuals is approximately what percent less than the amount from corporations?

○ 24%   ○ 35%   ○ 41%   ○ 69%   ○ 88%

10.

Data Set X	Data Set Y
x_1	$5x_1 + 16$
x_2	$5x_2 + 16$
x_3	$5x_3 + 16$
x_4	$5x_4 + 16$

Data sets X and Y each consist of 4 values, as shown in the table. If the range of data set X is 21, what is the range of data set Y?

- ○ 0
- ○ 37
- ○ 84
- ○ 100
- ○ 105

11.

Three different committees consist of 8, 10, and 13 people, respectively. If N is the total number of different people in the 3 committees combined, what is the least possible value of N?

- ○ 13
- ○ 15
- ○ 21
- ○ 24
- ○ 31

12.

If $\dfrac{17 + m}{43 + m} = \dfrac{2}{3}$, what is the value of m?

[   ]

13.

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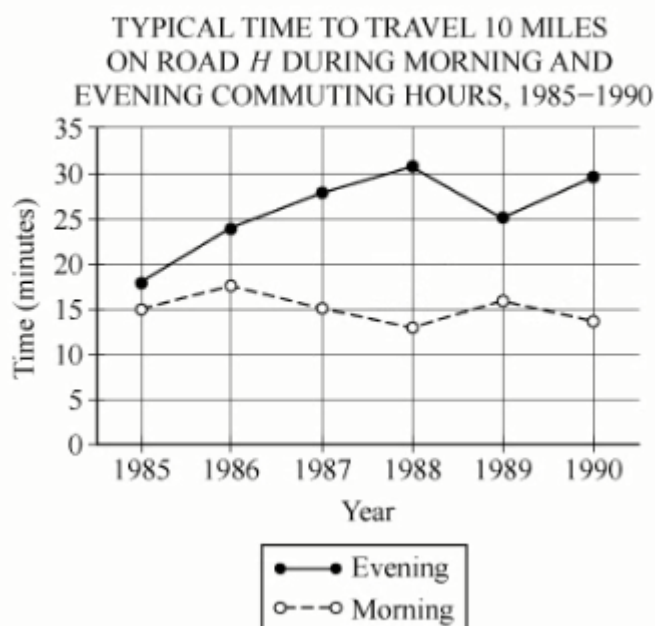
○ -2

○ -1

○ 0

○ 1

○ 2

14.

TYPICAL TIME TO TRAVEL 10 MILES
ON ROAD H DURING MORNING AND
EVENING COMMUTING HOURS, 1985−1990

For 1988, the typical travel time during the morning commuting hours was approximately what fraction of the typical travel time during the evening commuting hours?

- ○ $\frac{1}{3}$

- ○ $\frac{2}{5}$

- ○ $\frac{5}{9}$

- ○ $\frac{8}{13}$

- ○ $\frac{2}{3}$

15.

The typical travel time during the morning commuting hours decreased by approximately what percent from 1986 to 1988 ?

- ○ 5%
- ○ 10%
- ○ 25%
- ○ 40%
- ○ 45%

16.

During the morning commuting hours in 1987, what was the average speed, in miles per hour, of a car that traveled the 10 miles on Road H if the car took the typical amount of time to travel the 10 miles?

- ○ 15
- ○ 20
- ○ 25
- ○ 33
- ○ 40

17.

A certain box contains 4 red blocks, 5 blue blocks, and 3 yellow blocks. Judy will select one of these blocks at random from the box, put it back in the box, and then again select a block at random from the box. What is the probability that both of the blocks selected will be yellow?

Give your answer as a fraction.

$$\frac{\boxed{}}{\boxed{}}$$

18.

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

Indicate all such people.

- ☐ Mike
- ☐ Scott
- ☐ Jim
- ☐ Kate
- ☐ Pete

19.

The legs of a right triangle are in the ratio of 3 to 1. If the length of the hypotenuse of the triangle is $\sqrt{40}$, then the perimeter of the triangle is between

- ◯ 14 and 15
- ◯ 13 and 14
- ◯ 12 and 13
- ◯ 11 and 12
- ◯ 10 and 11

20.

If n and m are positive integers and m is a factor of 2^6, what is the greatest possible number of integers that can be equal to both $3n$ and $\frac{2^6}{m}$?

○ Zero
○ One
○ Three
○ Four
○ Six

SECTION 2

1.

A total of 1,500 boxes are stored in four warehouses. The number of boxes stored in the individual warehouses are x, y, z, and w, respectively, where $w = 2x$ and $z = 2y$.
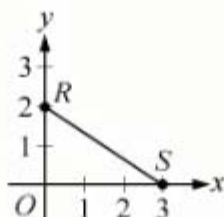
Quantity A	Quantity B
$x + y$	500

2.

In the xy-plane, line segment RS is one of the sides of square $RSTU$ (not shown).

Quantity A	Quantity B
The area of square $RSTU$	13

3.

$$T = \{2, 3, 5, 6, 7, 8, 9\}$$

Quantity A	Quantity B
The total number of positive 4-digit integers that can be formed where each digit is in set T and the 4 digits in each 4-digit integer are different from each other	$(7)(6)(5)(4)$

4.

n is a positive integer.

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

5.

In the xy-plane, a line with equation $y = mx + b$, where m and b are constants and $mb \neq 0$, has a y-intercept that is twice the x-intercept.

Quantity A	Quantity B
m	-2

6.

n is a positive integer.

Quantity A	Quantity B
$\dfrac{1}{3^n}$	$3\left(\dfrac{1}{4^n}\right)$

7.
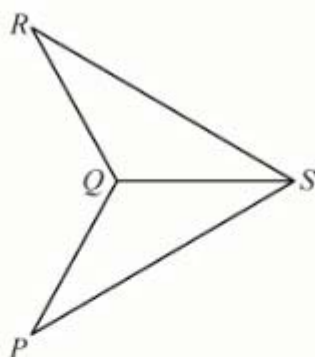
$$PQ = QR = QS$$

Quantity A	Quantity B
PS	RS

8.

A certain class of 90 students took a typing proficiency test. The average (arithmetic mean) score of the students who passed the test was 84, and the average score of the students who failed the test was 60. If the average score of all students was 80, how many students passed the test?

- ○ 15
- ○ 20
- ○ 42
- ○ 70
- ○ 75

9.

Which of the following equals $(8)(72)^{-5}$?

○ 8^{-4}

○ 8^{-5}

○ $\dfrac{(72)^{-4}}{9}$

○ $\dfrac{(72)^{-5}}{8}$

○ $\dfrac{(72)^{-6}}{9}$

10.

In the xy-plane, line ℓ is parallel to the line $y = 3x + 2$. If line ℓ passes through the point $(1, -1)$, then line ℓ passes through which of the following points?

Indicate all such points.

☐ $(2, 2)$
☐ $(0, -2)$
☐ $(-2, -10)$

11.

If 2, 4, 6, and 9 are the digits of two 2-digit integers, what is the least possible positive difference between the integers?
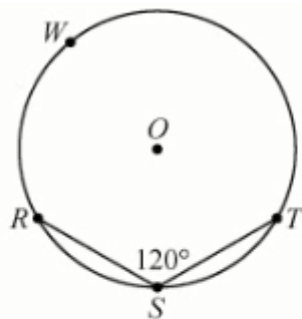
○ 28
○ 27
○ 17
○ 13
○ 9

12.

The center of the circle is O, and $RS = ST = 4$. What is the length of arc RWT?

- $\dfrac{4\pi}{3}$
- $\dfrac{8\pi}{3}$
- $\dfrac{16\pi}{3}$
- 4π
- 8π

13.

How many values of x are there such that x is an integer and $|3x - 2| < 8$?
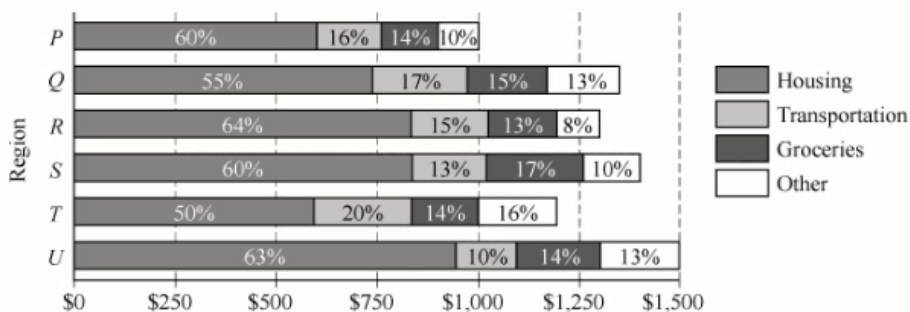
- One
- Two
- Three
- Four
- Five

14.

LIVING EXPENSES FOR A TYPICAL HOUSEHOLD IN SELECTED REGIONS
APRIL 2004

Note: The percents are based on total household living expenses.

In April 2004 the dollar amount of the Housing expense in region Q was less than the dollar amount of the Housing expense in which of the other regions?

Indicate all such regions.

☐ P ☐ R ☐ S ☐ T ☐ U

15.

In region P, the expense in the category Other was what fraction of the total of the expenses in the three nonhousing categories?
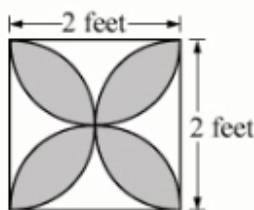
○ $\frac{1}{10}$ ○ $\frac{1}{6}$ ○ $\frac{1}{5}$ ○ $\frac{1}{4}$ ○ $\frac{1}{3}$

16.

For the region in which the range of the dollar amounts of the four expense categories was least, what percent of total living expenses was the Transportation expense in that region?

○ 10%   ○ 15%   ○ 16%   ○ 17%   ○ 20%

17.

The figure shows the design of a mosaic tile in which the four sides of the square are the diameters of four intersecting semicircles. Small blue stones are to be placed in the shaded regions and will cover 95 percent of the area of these regions. If each side of the square has length 2 feet, approximately how many square feet of the tile will be covered by the blue stones?

○ 0.9

○ 1.5

○ 2.2

○ 2.9

○ 3.2

18.

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.

☐ The least of the 120 measurements

☐ The median of the 120 measurements

☐ The standard deviation of the 120 measurements

☐ The sum of the 120 measurements

19.

Amy and Jed are among the 35 people, who are standing in a line, one behind the other, waiting to buy movie tickets. The number of people in front of Amy plus the number of people behind Jed is 24. If there are 15 people behind Amy, including Jed, how many people are in front of Jed?

○ 23
○ 25
○ 27
○ 29
○ 31

20.

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

$$c = \boxed{}$$

SECTION 1

1.

The average (arithmetic mean) of the two numbers $3x$ and $3y$ is 48.

Quantity A	Quantity B
The average of the two numbers $2x$ and $2y$	30

2.

A certain train travels 150 miles in h hours at the average rate of m miles per hour.

Quantity A	Quantity B
The number of hours required for the train to travel 320 miles at the average rate of $2m$ miles per hour	h

3.

$$x + 2y = 12 \text{ and } 2y > 7$$

Quantity A	Quantity B
x	y

4.

Quantity A	Quantity B
$(-87)^8$	$\left(\frac{1}{87}\right)^{-8}$

5.

The equation $ax^2 = bx^2 + 1$, where a and b are constants, has two real solutions.

Quantity A	Quantity B
a	b

6.

$$R = \left(2^{16}\right)\left(5^{34}\right)\left(N^{50}\right)$$

N is a positive integer.

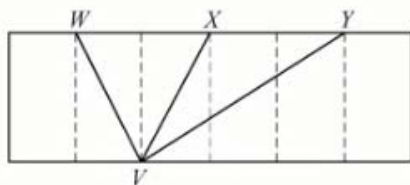| Quantity A	Quantity B
$\sqrt{R}$	$\dfrac{R}{10}$

7.

The dotted line segments separate the rectangular region into six identical smaller rectangular regions.

Quantity A	Quantity B
The area of triangular region WXV	The area of triangular region XYV

8.

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

Quantity A	Quantity B
r	3

9.

HOURLY WAGES AT COMPANY C

Length of Employment	Number of Employees	Hourly Wage
Less than 1 year	30	$10
From 1 to 5 years	10	$18
From 6 to 10 years	20	$25
From 11 to 20 years	28	$30
More than 20 years	12	$40

According to the table, what is the average (arithmetic mean) hourly wage of the employees at Company C?

    ○ $12
    ○ $17
    ○ $23
    ○ $25
    ○ $30

10.

The discounted price of a certain suit is 20 percent less than the original price of the suit. If the discounted price of the suit plus a sales tax of 5 percent of the discounted price equals $67.20, what was the original price of the suit?

    ○ $70.50
    ○ $73.90
    ○ $76.00
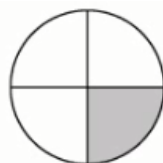   ○ $79.80
    ○ $80.00

11.

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

○ 2
○ $8x$
○ $4x - 1$
○ $4x + 1$
○ $8x + 2$

12.

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

○ $y = 4$

○ $y = \dfrac{1}{2}x$

○ $y = x + 3$

○ $y = x + \dfrac{1}{2}$
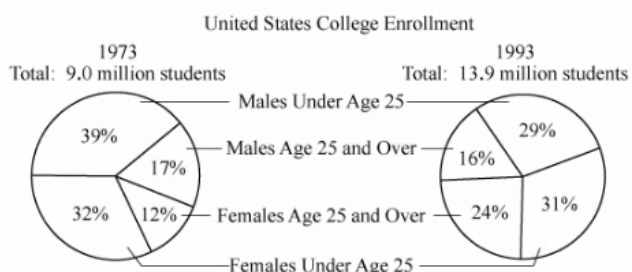
○ $y = \dfrac{1}{2}x + 3$

13.

The circle shown has an area of 49π and is divided into four sectors, all of which have a central angle of the same measure. What is the perimeter of the shaded region?

○ $14 + \dfrac{7\pi}{16}$　　○ $14 + \dfrac{7\pi}{8}$　　○ $14 + \dfrac{7\pi}{4}$　　○ $14 + \dfrac{7\pi}{2}$　　○ $14 + 7\pi$

UNITED STATES POPULATION AND COLLEGE ENROLLMENT BY AGE AND GENDER, 1973 AND 1993

United States Population
(in millions)

Year	Males Under Age 25	Males Age 25 and Over	Females Under Age 25	Females Age 25 and Over
1973	31	73	29	79
1993	37	88	36	96

United States College Enrollment

1973
Total: 9.0 million students

1993
Total: 13.9 million students

Males Under Age 25
Males Age 25 and Over
Females Age 25 and Over
Females Under Age 25

1973: 39%, 17%, 32%, 12%

1993: 29%, 16%, 24%, 31%

14.

Of the four college enrollment categories shown, how many categories accounted for more than $\frac{3}{8}$ of the total college enrollment in 1973 ?

○ None   ○ One   ○ Two   ○ Three   ○ Four

15.

By approximately what percent did the total number of students enrolled in college increase from 1973 to 1993 ?

○ 45%   ○ 55%   ○ 65%   ○ 75%   ○ 85%

16.

Which of the following is closest to the number of males who were not enrolled in college in 1993 ?

○ 107 million   ○ 110 million   ○ 113 million   ○ 116 million   ○ 119 million

17.

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

Indicate all such people.

☐ Mike

☐ Scott

☐ Jim

☐ Kate

☐ Pete

18.

If an integer greater than 100 and less than 1,000 is to be selected at random, what is the probability that the integer selected will be a multiple of 7 ?

○ $\dfrac{142}{999}$

○ $\dfrac{142}{900}$

○ $\dfrac{142}{899}$

○ $\dfrac{128}{900}$

○ $\dfrac{128}{899}$

19.

How many integer values of n satisfy the inequality $|3 - n| \leq 4$?

[   ]

20.

Greg's weekly salary is $187, which is 15 percent less than Karla's weekly salary. If Karla's weekly salary increases by 10 percent, by what percent must Greg's weekly salary increase in order to equal Karla's new weekly salary?

Give your answer to the nearest tenth of a percent.

[   ] %

SECTION 2

1.

Quantity A	Quantity B
The greatest possible value of $\dfrac{3}{x-y}$, where $6 \le x \le 8$ and $0 \le y \le 5$	3

○ Quantity A is greater.

○ Quantity B is greater.

○ The two quantities are equal.

○ The relationship cannot be determined
   from the information given.

2.

In a certain club, the average (arithmetic mean) age of the 35 males is 24.2 years and the average age of the 25 females is 27.6 years.

Quantity A	Quantity B
The average age of all of the people in the club	25.9

3.

Point O is the center of a circle with circumference 12.
Point P is another point inside the circle.

Quantity A	Quantity B
The greatest distance from P to a point on the circle plus the least distance from P to a point on the circle	4

4.

$$xy > 0$$

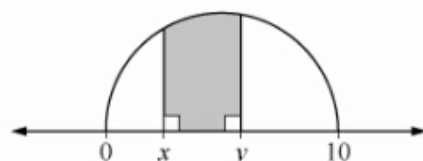| Quantity A	Quantity B
$x^4 y^3$	0

5.

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

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

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

6.

In the xy-plane, C and D are circles centered at the origin with radii $\sqrt{17}$ and $\sqrt{5}$, respectively.

Quantity A	Quantity B
The number of points (a, b) on circle C where both a and b are integers	The number of points (a, b) on circle D where both a and b are integers

7.

In a distribution of the values of the variable x, the 50th percentile is 48.5 and the 60th percentile is 56.5.

Quantity A	Quantity B
The 40th percentile of the distribution of the values of x	40.5

8.

POPULATION OF THE UNITED STATES
IN 1800 AND 1900

Year	Population	Population per Square Mile
1800	5.3 million	6.1
1900	76.0 million	25.6

By approximately how many square miles did the area of the United States increase from 1800 to 1900 ?

○   360,000

○   2,000,000

○   3,625,000

○ 20,000,000

○ 36,250,000

9.

Which of the following pairs of integers have reciprocals whose sum is either less than $\frac{1}{3}$ or greater than $\frac{1}{2}$?

Indicate all such pairs.

☐   1 and 14

☐   3 and 12

☐   5 and 10

☐   7 and 8

10.

In the xy-plane, the points P, Q, and S have coordinates $(14, 10)$, $(1, 0)$, and $(6, 0)$, respectively. What is the area of triangular region PQS ?

○ 25
○ 30
○ 35
○ 42
○ 50

11.

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?

○ 8%
○ 12%
○ 17%
○ 20%
○ 25%

12.

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

○ 28
○ 27
○ 17
○ 13
○ 9

13.

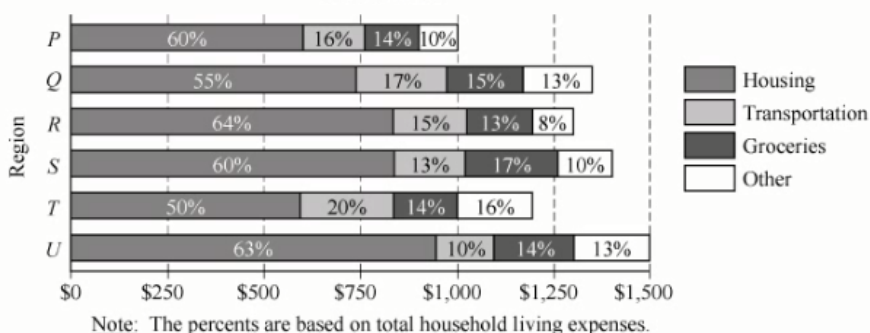For which of the following values of x is the units digit of the product $(2)(3^x)$ equal to 4 ?

- ◯ 12
- ◯ 13
- ◯ 14
- ◯ 15
- ◯ 16

LIVING EXPENSES FOR A TYPICAL HOUSEHOLD IN SELECTED REGIONS
APRIL 2004

Note: The percents are based on total household living expenses.

14.

In April 2004 the dollar amount of the Housing expense in region Q was less than the dollar amount of the Housing expense in which of the other regions?

Indicate all such regions.

☐ P   ☐ R   ☐ S   ☐ T   ☐ U

15.

In region P, the expense in the category Other was what fraction of the total of the expenses in the three nonhousing categories?

◯ $\frac{1}{10}$ ◯ $\frac{1}{6}$ ◯ $\frac{1}{5}$ ◯ $\frac{1}{4}$ ◯ $\frac{1}{3}$

16.

For the region in which the range of the dollar amounts of the four expense categories was least, what percent of total living expenses was the Transportation expense in that region?

◯ 10%   ◯ 15%   ◯ 16%   ◯ 17%   ◯ 20%

17.

How many 6-digit integers greater than 400,000 can be formed such that each of the digits 2, 3, 4, 5, 6, and 7 is used once in each 6-digit integer?

- ○ 240
- ○ 480
- ○ 720
- ○ 960
- ○ 1,440

18.

If $\dfrac{3x}{2} = \dfrac{5}{7y}$ and $\dfrac{3y}{5} = \dfrac{a}{x}$, what is the value of a ?

Give your answer as a fraction.

$$a = \dfrac{\Box}{\Box}$$

19.

Of the total number of students enrolled at University U in the fall of 2008, $\dfrac{3}{8}$ were sophomores and $\dfrac{1}{50}$ were biology majors. Which of the following could be the total number of students enrolled at University U in the fall of 2008 ?
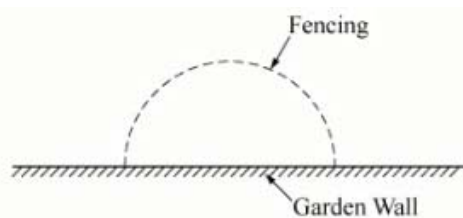
Indicate all such numbers.

- ☐ 7,000
- ☐ 7,040
- ☐ 7,050
- ☐ 7,100
- ☐ 7,125
- ☐ 7,200

20.

Fencing

Garden Wall

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

○ $\dfrac{20}{\pi}$ ○ $\dfrac{50}{\pi}$ ○ $\dfrac{100}{\pi}$ ○ $\dfrac{200}{\pi}$ ○ $\dfrac{400}{\pi}$