

Math 1

1.

A

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

Quantity A

The average of the two numbers
 $2x$ and $2y$

Quantity B

30

2.

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

A

Quantity A

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

Quantity B

h

3.

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

D

Quantity A

x

Quantity B

y

4.

C

Quantity A

$(-87)^8$

Quantity B

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

5.

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

A

Quantity A

a

Quantity B

b

6.

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

N is a positive integer.

B

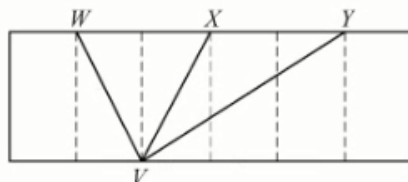
Quantity A

\sqrt{R}

Quantity B

$\frac{R}{10}$

7.



C

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

Quantity A

The area of triangular region $W XV$

Quantity B

The area of triangular region XYV

8.

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

D

Quantity A

r

Quantity B

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?

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?

E

☐ \$70.50

☐ \$73.90

☐ \$76.00

☐ \$79.80

☒ \$80.00

11.

B

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

☐ 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?

D

☐ $y = 4$

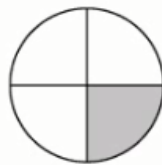
☐ $y = \frac{1}{2}x$

☐ $y = x + 3$

☒ $y = x + \frac{1}{2}$

☐ $y = \frac{1}{2}x + 3$

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?

☐ $14 + \frac{7\pi}{16}$

☐ $14 + \frac{7\pi}{8}$

☐ $14 + \frac{7\pi}{4}$

☒ $14 + \frac{7\pi}{2}$

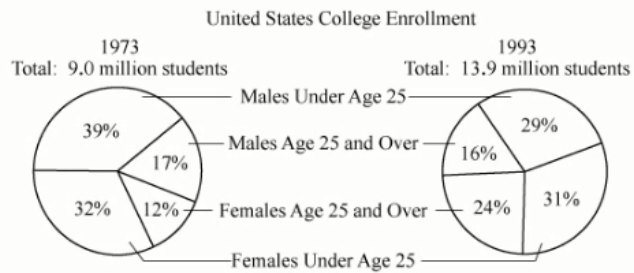
☐ $14 + 7\pi$

D

s 14 to 16 are based on the following data.

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



14.

B

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?

B

- ☐ 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?

E

- 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.

ACE

☐ 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?

E

☐ $\frac{142}{999}$

☐ $\frac{142}{900}$

☐ $\frac{142}{899}$

☐ $\frac{128}{900}$

☒ $\frac{128}{899}$

19.

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

9

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.

30%

%

Section 2

1.

C

<u>Quantity A</u>	<u>Quantity B</u>
The greatest possible value of $\frac{3}{x-y}$, where $6 \leq x \leq 8$ and $0 \leq y \leq 5$	3
<p><input type="radio"/> Quantity A is greater.</p> <p><input type="radio"/> Quantity B is greater.</p> <p><input checked="" type="radio"/> The two quantities are equal.</p> <p><input type="radio"/> The relationship cannot be determined from the information given.</p>	

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.

B

<u>Quantity A</u>	<u>Quantity B</u>
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.

B

<u>Quantity A</u>	<u>Quantity B</u>
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.

D

$$xy > 0$$

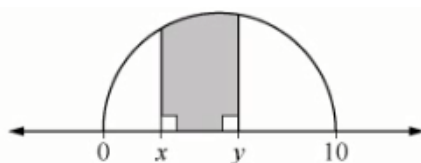
Quantity A

$$x^4y^3$$

Quantity B

$$0$$

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.

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

C

Quantity A

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

Quantity B

$$A(a, c)$$

6.

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

C

Quantity A

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

Quantity B

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.

D

Quantity A

The 40th percentile of the distribution of the values of x

Quantity B

$$40.5$$

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 ?

B

☐ 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.

ACD

☐ 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

A

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?

C

☐ 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?

D

☐ 28

☐ 27

☐ 17

☒ 13

☐ 9

13.

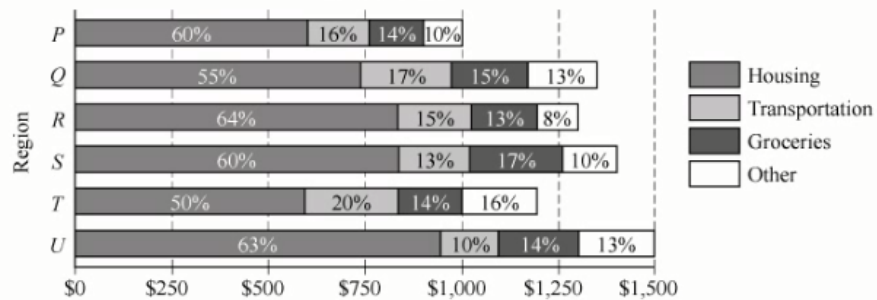
For which of the following values of x is the units digit of the product $(2)(3^x)$ equal to 4?

D

- ☐ 12
☐ 13
☐ 14
☒ 15
☐ 16

Questions 14 to 16 are based on the following data.

LIVING EXPENSES FOR A TYPICAL HOUSEHOLD IN SELECTED REGIONS
APRIL 2004



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

BCE

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.

D

- ☐ 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?

- ☐ $\frac{1}{10}$ ☐ $\frac{1}{6}$ ☐ $\frac{1}{5}$ ☒ $\frac{1}{4}$ ☐ $\frac{1}{3}$

E

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?

C

☐ 240

☐ 480

☒ 720

☐ 960

☐ 1,440

18.

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

Give your answer as a fraction.

2/7

$$a = \frac{\boxed{}}{\boxed{}}$$

19.

Of the total number of students enrolled at University U in the fall of 2008, $\frac{3}{8}$ were sophomores and $\frac{1}{50}$ 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.

AF

☒ 7,000

☐ 7,040

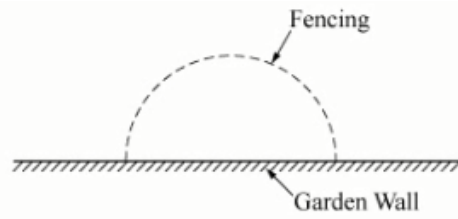
☐ 7,050

☐ 7,100

☐ 7,125

☒ 7,200

20.



D

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?

☐ $\frac{20}{\pi}$

☐ $\frac{50}{\pi}$

☐ $\frac{100}{\pi}$

☒ $\frac{200}{\pi}$

☐ $\frac{400}{\pi}$