KMF Math Sprint Practice - Section 7 Hard

Question: 1

After a bird feeder was filled with x pounds of birdseed, 12 ounces of birdseed were consumed each day for the next 8 days. (1 pound=16 ounces)

Quantity A	Quantity B
At the end of the 8 days, the weight of the birdseed in the bird feeder that was not consumed	x-5 pounds

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

Question: 2

$|a|=4$ and $|b|=6$

Quantity A	Quantity B
$\|a+b\|$	5

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

Question: 3

S is the set of all ordered pairs (x, y) of integers such that $-10 \leq x \leq 10$ and $-5 \leq y \leq 15$.

Quantity A	Quantity B
The number of ordered pairs (x, y) in S such that x=y	16

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

Question: 4

$x > 0$

Quantity A	Quantity B
$\frac{1}{9}$ of x	11% of x

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

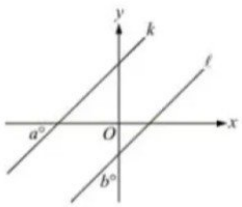
Question: 5

n is a positive integer and 26n is a multiple of 12.

Quantity A	Quantity B
n	11

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

Question: 6



Lines k and l lie in the xy-plane and are parallel.

Quantity A	Quantity B
a	b

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

Question: 7

$r > s$

List L consists of r values, and the average (arithmetic mean) of the values in L is 52.8. List M consists of s values, and the average of the values in M is 54.2. List K consists of the values in L and the values in M.

Quantity A	**Quantity B**
The average of the values in K	53.5

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

Question: 8

Paul's family put m dollars in a new savings account on May 2, 1990, and put the same number of dollars in the account on May 2, 1991, and again on May 2, 1992. If the annual interest rate on this account was 4 percent compounded annually and there were no other deposits to the account or withdrawals from the account, which of the following represents the total number of dollars in the account on May 2, 1993, just after interest had been compounded for the third time, in terms of m?

- ○ $m(1.04)$
- ○ $3m(1.04)$
- ○ $m(1.04)+2m(1.04)+3m(1.04)$
- ○ $m(1.04)+m(1.04)^2+m(1.04)^3$
- ○ $m(1.04)+m^2(1.04)^3+m^3(1.04)^3$

Question: 9

The integer k is the product of four different prime numbers. If the result when k is divided by 10 is a multiple of 11, which of the following could be the result when k divided by 5?

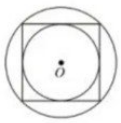
- ○ 50
- ○ 55
- ○ 66
- ○ 121
- ○ 198

Question: 10

Three variables, x, y, and z, in a scientific experiment are related by the equation $z = x^2y$. In the experiment, if the value of x decreases by 40 percent while the value of y increases by 50 percent, what is the percent decrease in the value of z?

- 10%
- 18%
- 24%
- 36%
- 46%

Question: 11



The two circles in the figure above both have center O. The square is inscribed in the larger circle and circumscribed about the smaller circle. If x is the radius of the larger circle, what is the area of the smaller circle, in terms of x?

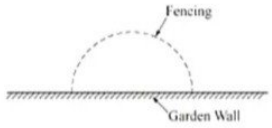
- $\frac{3\pi x^2}{4}$
- $\frac{2\pi x^2}{3}$
- $\frac{\pi x^2}{2}$
- $\frac{\pi x^2}{3}$
- It cannot be determined from the information given.

Question: 12

If x is an integer, then what is the least possible value of $3^x + 3^{-x}$?

- 0
- 2
- $2\frac{1}{3}$
- 3
- $3\frac{1}{3}$

Question: 13



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?

- $20/\pi$
- $50/\pi$
- $100/\pi$
- $200/\pi$
- $400/\pi$

Question: 14

Percent of Country *M*'s Population by Region and Blood Type

Region of Country *M*	Blood Type: *O*-Rh$^+$	*O*-Rh$^-$	*A*-Rh$^+$	*A*-Rh$^-$	*B*-Rh$^+$	*B*-Rh$^-$	*AB*-Rh$^+$	*AB*-Rh$^-$	Total
R_1	4.8	0.8	5.7	1.0	1.1	0.2	1.3	0.1	15.0
R_2	15.4	1.2	14.2	1.4	1.6	0.8	1.1	0.1	35.8
R_3	14.1	2.5	15.3	2.4	4.0	0.7	0.7	0.2	39.9
R_4	1.0	0.6	2.6	0.8	0.8	0.5	0.3	0.1	6.7
R_5	0.8	0.3	0.9	0.2	0.1	0.1	0.2	*	2.6
Total	36.1	5.4	38.7	5.8	7.6	2.3	3.6	0.5	100.0

*less than 0.05

Total Population of Country *M*: 2,011,000

If a person is randomly chosen from Country M, approximately what is the probability that the person will have one of the two most common of the eight blood types?

- $\frac{1}{8}$
- $\frac{1}{5}$
- $\frac{1}{4}$
- $\frac{2}{5}$
- $\frac{1}{2}$

Question: 15

Percent of Country *M*'s Population by Region and Blood Type

Region of Country *M*	Blood Type: *O*-Rh$^+$	*O*-Rh$^-$	*A*-Rh$^+$	*A*-Rh$^-$	*B*-Rh$^+$	*B*-Rh$^-$	*AB*-Rh$^+$	*AB*-Rh$^-$	Total
R_1	4.8	0.8	5.7	1.0	1.1	0.2	1.3	0.1	15.0
R_2	15.4	1.2	14.2	1.4	1.6	0.8	1.1	0.1	35.8
R_3	14.1	2.5	15.3	2.4	4.0	0.7	0.7	0.2	39.9
R_4	1.0	0.6	2.6	0.8	0.8	0.5	0.3	0.1	6.7
R_5	0.8	0.3	0.9	0.2	0.1	0.1	0.2	*	2.6
Total	36.1	5.4	38.7	5.8	7.6	2.3	3.6	0.5	100.0

*less than 0.05

Total Population of Country *M*: 2,011,000

In region R_3, for how many of the eight blood types are there fewer than 100,000 people with that blood type?

- Two
- Three
- Four
- Five
- Six

Question: 16

Percent of Country M's Population by Region and Blood Type

Region of Country M	Blood Type: O-Rh$^+$	O-Rh$^-$	A-Rh$^+$	A-Rh$^-$	B-Rh$^+$	B-Rh$^-$	AB-Rh$^+$	AB-Rh$^-$	Total
R_1	4.8	0.8	5.7	1.0	1.1	0.2	1.3	0.1	15.0
R_2	15.4	1.2	14.2	1.4	1.6	0.8	1.1	0.1	35.8
R_3	14.1	2.5	15.3	2.4	4.0	0.7	0.7	0.2	39.9
R_4	1.0	0.6	2.6	0.8	0.8	0.5	0.3	0.1	6.7
R_5	0.8	0.3	0.9	0.2	0.1	0.1	0.2	*	2.6
Total	36.1	5.4	38.7	5.8	7.6	2.3	3.6	0.5	100.0

*less than 0.05

Total Population of Country M: 2,011,000

Approximately how many people who live in region R_4 have blood type B-Rh+?

- 400,000
- 160,000
- 40,000
- 16,000
- 4,000

Question: 17

If the sum of two numbers is 9, what is the greatest possible value of the product of the two numbers?

Give your answer as a decimal.

Question: 18

In the xy-plane, line segment RS is a side of a square. The coordinates of R are (2, 10) and the coordinates of the midpoint of RS are (7, 12). Which of the following CANNOT be the coordinates of a vertex of the square?

- (6, 0)
- (8, 4)
- (8, 24)
- (12, 14)
- (16, 4)

Question: 19

ANSWER

In the xy-plane, the circle with radius 50 and center (0, 0) passes through which of the following points?

Indicate all such points.

- ☐ (-30, 40)
- ☐ (0, -50)
- ☐ (25, 25)
- ☐ (14, 48)
- ☐ (70, -20)

Question: 20

ANSWER

In the four quarters of 2013, denoted by Q1, Q2, Q3 and Q4, Company C hired the same number of employees in Q2 as in Q1 and twice as many employees in Q3 as in Q2. The number of employees hired by the company in Q4 was greater than the number of hired in Q3; however, the number hired in Q4 was also less than 3 times the number hired in Q3. All of the employees were hired only once. If an employee is to be selected at random from all the employees hired during the four quarters, which of the following values could be the probability that the employee will be one who was hired in Q4?

Indicate all such values.

- ☐ $\frac{1}{3}$
- ☐ $\frac{3}{8}$
- ☐ $\frac{5}{12}$
- ☐ $\frac{1}{2}$
- ☐ $\frac{11}{20}$
- ☐ $\frac{3}{5}$

Question: 19

In the xy-plane, the circle with radius 50 and center (0, 0) passes through which of the following points?

Indicate all such points.

- ☐ (-30, 40)
- ☐ (0, -50)
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Question: 20

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- ☐ $\frac{1}{3}$
- ☐ $\frac{3}{8}$
- ☐ $\frac{5}{12}$
- ☐ $\frac{1}{2}$
- ☐ $\frac{11}{20}$
- ☐ $\frac{3}{5}$