KMF Math Sprint Practice - Section 2 Hard

Question: 1

Five different families received tax bills at the beginning of the year. Later, the four lowest tax bills were each reduced by $200 while the highest tax bill remained the same.

Quantity A	**Quantity B**
The standard deviation of the original five tax bills	The standard deviation of the resulting five tax bills after the four lowest tax bills were reduced

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

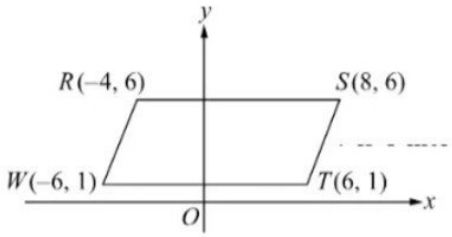
Question: 2

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

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

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

Question: 3



Quantity A	Quantity B
The perimeter of quadrilateral RSTW shown in the xy-plane	34

- ○ 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-y=1

Quantity A	Quantity B
$x^2 - y^2$	1

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

Question: 5

$a < 0$

The operation $\triangle$ is defined by $n^{\triangle}=(n-1)^2$ for all numbers n.

Quantity A	**Quantity B**
$\frac{(a+1)^{\triangle}}{a^2}$	1

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

Question: 6

r is a positive integer, k=2r+1, and h=5k-3

Quantity A	**Quantity B**
The units digit of h	2

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

Question: 7

$a > 0, x \neq 0$

Quantity A	**Quantity B**
ax^4	$(ax)^4$

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

Question: 8

In a survey, employees who want to switch jobs were asked what issues were most important in choosing another job. Half of those surveyed said "salary" and 35% said "location". If 32 percent of those surveyed said both "salary" and "location", what percent said either "salary" or "location" but not both?

- 15%
- 21%
- 38%
- 44%
- 53%

Question: 9

The larger of two right circular cylindrical containers has an inside radius of 3 inches, and the smaller has an inside radius of 1.5 inches; each of the containers has an inside height of 10 inches. If the smaller container were filled with water until the depth of the water was 9 inches, and then its water were poured into the empty larger container, what would be the depth of the water, in inches, in the larger container?

- 2.00
- 2.25
- 2.50
- 2.75
- 4.50

Question: 10

If an integer is chosen at random from the integers between 101 and 550, inclusive, what is the probability that the chosen integer will begin with the digit 1, 2 or 3, and end with the digit 4, 5, or 6?

- 0.02
- 0.05
- 0.10
- 0.15
- 0.20

Question: 11

A customer purchased n items at Store F. If 5 of the n items cost $7 each and the remaining items cost $9 each, then in terms of n, what was the total cost, in dollars, of the items purchased by the customer at Store F?

- 5n+35
- 7n-15
- 7n+10
- 9n-10
- 9n+35

Question: 12

If r and t are each positive integers less than 10, how many different ordered pairs (r, t) exist such that 7r+7t is a square of an integer?

- 4
- 5
- 6
- 7
- 8

Question: 13

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

Give your answer to the nearest whole percent.

_____%

Question: 14

Inventory of 500 Vehicles at a Car Dealership, Number of Vehicles by Type and Color

Vehicle Type		Vehicle Color						Total
		Black	Brown	Green	Red	Silver	White	
Sedan	4-door	25	34	42	33	30	36	200
	2-door	20	8	18	22	17	15	100
Specialty Vehicle	Minivan	12	6	10	10	8	14	60
	Sport-utility	12	16	22	9	3	18	80
	Station wagon	12	12	13	6	3	14	60
Total		81	76	105	80	61	97	500

For how many of the five vehicle types is the number of silver vehicles less than 20 percent of the total number of vehicles of that type?

- One
- Two
- Three
- Four
- Five

Question: 15

Inventory of 500 Vehicles at a Car Dealership, Number of Vehicles by Type and Color

Vehicle Type		Vehicle Color						Total
		Black	Brown	Green	Red	Silver	White	
Sedan	4-door	25	34	42	33	30	36	200
	2-door	20	8	18	22	17	15	100
Specialty Vehicle	Minivan	12	6	10	10	8	14	60
	Sport-utility	12	16	22	9	3	18	80
	Station wagon	12	12	13	6	3	14	60
Total		81	76	105	80	61	97	500

By approximately what percent does the total number of green vehicles exceed the total number of brown vehicles?

- 25%
- 29%
- 33%
- 38%
- 46%

Question: 16

Inventory of 500 Vehicles at a Car Dealership, Number of Vehicles by Type and Color

Vehicle Type		Vehicle Color						Total
		Black	Brown	Green	Red	Silver	White	
Sedan	4-door	25	34	42	33	30	36	200
	2-door	20	8	18	22	17	15	100
Specialty Vehicle	Minivan	12	6	10	10	8	14	60
	Sport-utility	12	16	22	9	3	18	80
	Station wagon	12	12	13	6	3	14	60
Total		81	76	105	80	61	97	500

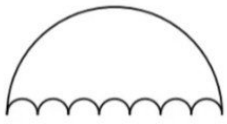
For the 5 vehicle types and 6 vehicle colors, what is the average (arithmetic mean) number of vehicles per type per color, rounded to the nearest whole number?

- ○ 17
- ○ 33
- ○ 45
- ○ 83
- ○ 100

Question: 17

What`s the remainder when 3^{73} is divided by 5?

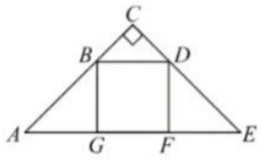
Question: 18



A certain closed curve consists of n semicircles having the same radius of $\frac{r}{n}$ together with a larger semicircle having a radius of r. The n semicircles are aligned along the diameter of the larger semicircle as indicated in the figure for n=7. The area of the region enclosed by the curve, in terms of n, and r, is which of the following?

- ○ $\frac{\pi r^2}{2}(1-\frac{1}{n})$
- ○ $\frac{\pi r^2}{2}(1-\frac{2}{n})$
- ○ $\frac{\pi r^2}{2}(1-\frac{8}{n})$
- ○ $\frac{\pi r^2}{2}(1-\frac{1}{2n})$
- ○ $\frac{\pi r^2}{2}(1-\frac{1}{4n})$

Question: 19



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

- ○ $\frac{1}{4}$
- ○ $\frac{1}{5}$
- ○ $\frac{1}{6}$
- ○ $\frac{1}{8}$
- ○ $\frac{1}{9}$

Question: 20

If $\sqrt{108} = a\sqrt{b}$, then the sum of a and b could be (a and b are both positive integers)?

Indicate all such numbers.

- ☐ 9
- ☐ 15
- ☐ 29
- ☐ 45
- ☐ 109