OKLAHOMA SCHOOL of SCIENCE and MATHEMATICS

17th Annual OSSM Middle School Math:

An Awesome Contest—Round Two

7th and 8th Grade Test

Spring 2019

Before you begin:

- 1. Please write your name on your answer sheet.
- 2. On your name tag you have been given a three-digit OSSM student id number. On the answer sheet, in the lower right-hand corner, there is a place to fill in the three-digit student id number (use the first three boxes). Fill in the appropriate bubbles for your OSSM student id.

Directions: Use the scratch paper provided to do your work. Calculators are needed. Choose the appropriate answer, and then fill in the corresponding bubble ON THE ANSWER SHEET. DO NOT MAKE ANY STRAY MARKS ON YOUR ANSWER SHEET; it may cause the machine to misread your answer sheet and may disqualify your score.

This is a 40-question, 1-hour contest. All questions are multiple-choice. Figures are not to scale. Each question is worth one point. Your score will be the number of correct answers. There is no partial credit or penalty for wrong answers. Please continue working or reworking problems until time is called.

There is a Prize Question on the back page. Write your answer ON THE BACK OF THE ANSWER SHEET. All students should answer the Prize Question.

Do Not Open or Turn Over Until Instructed To Do So

Fill in your answers ON THE ANSWER SHEET by filling in the corresponding bubble.

DO NOT MAKE ANY STRAY MARKS ON YOUR ANSWER SHEET!

You may use this space for scratch paper

WRITE YOUR ANSWERS ON THE ANSWER SHEET. DO NOT MAKE ANY STRAY MARKS ON YOUR ANSWER SHEET

						1.
1.	If $x + 8 = 0$, and $\sqrt{y} = 4$, then what is the value of $\frac{2x+y}{y}$?					
	a 16	b7	c. 0	d. 2	e. 16	a. b 🕜. d. e.
2.	A triangle has ar a. 0.8	n area of 25 and a b. 1	height of 10. What c. 1.25	t is the width of the d. 5	e base? e. 10	2. a. b. c.ᠿ e.
3.	cookies, and Lou cookies do they	uis Pasteur brings teach eat?	ookies to a party, N three cookies, but t	they all share equa	ally, how many	3. a. b.ⓒ d. e.
	a. 3	b. 6	c. 7	d. 9	e. 21	4.
4.	house as picture laid against the s	d. Each step is 11 steps, what would l	ading to the porch of inches deep. If a be the slope of the c. $\frac{2}{3}$	board is		4. a.(b) c. d. e.
5.	sides are proportional. Consider the triangles with side lengths given. Which triangles are similar?					
		II. 5-12-13 III. 9-12-15		V. 10-20-26		
	a. I & III only	d. I & IV only	b. II & V only		I, III, & IV only ilar, as are II & V	
6.	If $2A - B = -1$ a a2	nd $-3A + 2B = 2$, b1	then $B - A =$ c. 1	d. 2	e. 3	6. a. b.ⓒ d. e.
7	Which of the foll	owing is equivalent	$t t_0 \frac{15x^{-4}y^{11}z^3}{2}$			7.
1.	a. $\frac{3y^4z^2}{x}$	b. $\frac{10y^4z^2}{x}$	C. $\frac{5x^{-3}y^7z}{z^{-3}}$	d. $\frac{10y^4z}{x^{-7}}$	e. $3x^{-1}y^4z$	(a. b. c. d. e.
0	If $\sqrt{\alpha} = \alpha$ and $\sqrt{\alpha}$	$-\pi$ and $\sqrt{\pi} - 16$	thop or -			8.
0.	a. 16^3	$v = z$ and $\sqrt{z} = 16$, b. 16^4	c. 16^6	d. 16 ⁸	e . 16 ¹⁶	a. b. c. đ. e.
9.			head. If he lost 10 is closest to the n c. 6 ⁶			9. a. b. c. d.e.
10.	10. If $y = 1 - \frac{1}{\frac{n}{m}+1}$, which of the following is equal to $\frac{1}{y}$?					
	a. $\frac{m+n}{n-2m}$	b. $\frac{m+n}{n}$	C. $\frac{n}{m}$	d. $\frac{nm+m}{1-m}$	e. $\frac{1-m}{n+m}$	a.(b) c. d. e.
11.	Which two are lin	I. $y = 5x + 2$ II. $y = \frac{1}{5}x - 7$	ndicular to one ano	ther? IV. $y = -5x - 2$ V. $y = -\frac{1}{5}x^2$		11. a. b. c.@ e
	a. I&II	III. $y = 10x + 2$ b. & III	c. I & V	d. II & IV	e. III & IV	

12. A famer is using 200 feet of hence to enclose a divided rectangular pen along her barn wall. She will not need a fence on the barn side of the enclosure. Which of these is closest to the area of the largest total enclosure is her can create? a. 2500 ft^2 b. 2800 ft^2 c. 3200 ft^2 d. 3300 ft^2 e. 5000 ft^2 13. On Round 2 of An Awesome Contest last year there were 180 participants. $\frac{1}{5}$ of the participants got between 0 and 9 questions correct, $\frac{2}{3}$ of them got 10 to 19 questions correct. No participants are in more than one group. How many participants got 30 to 40 questions correct? a. 0 b. 3 c. 6 d. 8 e. 9 14. To the nearest whole number, what percentage of the large triangle shown here is shaded? a. 33% b. 36% c. 40% d. 42% e. 45% 15. Which of the following equations is satisfied by all of the numbers -2 , -1 , 1 , and 2 ? a. $(x - 2)(x + 2) = 0$ b. $(x + 1)^2(x + 2)^2 = 0$ c. $(x - 1)^2(x - 2)^2 = 0$ d. $(x^2 - 1)(x^2 - 2) = 0$ e. $(x^2 - 1)(x^2 - 4) = 0$ 16. In the figure below, segments AB and DC are parallel and point E lies on DT . If $AB = 8$, $CD = 28$, and the area of triangle ABE is 24, then what is the area of triangle ABE is 24, then what day of the week is December 31, 2020? a. Monday b. Wednesday c. Thursday d. Friday e. Sunday 17. There are 365 days in 2019, and 366 days in 2020 (since it's a leap year). If January 1, 2019, is a Tuesday, then what day of the week is December 31, 2020? a. Monday b. Wednesday c. Thursday d. $Friday e$ e. Sunday 18. The fraction 22/7 is sometimes used as an approximation for π . What is the 2019th digit after the decimal point when 22/7 is written out as a decimal? a. 2 b. 4 c. c. 5 d. 7 e. 8 19. A <i>kite</i> is a quadrilateral which has two pairs of equal-length sides, and each pair of equal-length sides shares an endpoint. Which of the tollowing is true of every possible kite? a. Its two diagonals is longer than each of its four sides e. The sum of its angles is 180°.						12.
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correct, $\frac{1}{10}$ got 20 to 29 questions correct. The rest got 30 to 40 of the questions correct. No participants are in more than one group. How many participants got 30 to 40 questions correct? a. 0 b. 3 c. 6 d. 8 e. 9 14. To the nearest whole number, what percentage of the large triangle shown here is shaded? a. 33% b. 36% c. 40% d. 42% e. 45% 15. Which of the following equations is satisfied by all of the numbers $-2, -1, 1, \text{ and } 2?$ a. $(x - 2)(x + 2) = 0$ b. $(x + 1)^2(x + 2)^2 = 0$ d. $(x^2 - 1)(x^2 - 2) = 0$ c. $(x - 1)^2(x - 2)^2 = 0$ d. $(x^2 - 1)(x^2 - 2) = 0$ e. $(x^2 - 1)(x^2 - 4) = 0$ 16. In the figure below, segments \overline{AB} and \overline{DC} are parallel and point <i>E</i> lies on \overline{DC} . If $AB = 8, CD = 28$, and the area of triangle ABE is 24, then what is the area of trapezoid $ABCD?$ a. 54 b. 72 c. 94 d. 108 e. 112 17. There are 365 days in 2019, and 366 days in 2020 (since it's a leap year). If January 1, 20. 19, is a Tuesday, then what day of the week is December 31, 2020? a. Monday b. Wednesday c. Thursday d. Friday e. Sunday 18. The fraction 22/7 is sometimes used as an approximation for π . What is the 2019th digit after the decimal point when 22/7 is written out as a decimal? a. 2 b. 4 c. 5 d. 7 e. 8 19. A <i>kite</i> is a quadrilateral which has two pairs of equal-length sides, and each pair of equal- length sides shares an endpoint. Which of the following is true of every possible kite? a. Its two diagonals intersect each other t. Its two diagonals are congruent to each other c. Its two diagonals are perpendicular to each other c. Its two diagonals are intersect. Given the different possible arrangements of the three lines, how many different values could the number of points in the plane where at least two of the three lines intersect. Eigh on the so the arrangements of the three lines, how many different values could the number N possibly have? a. more than 4 b. 4 c. 3 d. 2 e. 1 21. If M is the largest number less than 1000 that is both a perfect squ	13. On Round 2 of	An Awesome Con	test last year the	re were 180 part	icipants. $\frac{1}{5}$ of the	a. b.(c) d. e.
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15. Which of the following equations is satisfied by all of the numbers -2 , -1 , 1 , and $2?$ a. $(x - 2)(x + 2) = 0$ b. $(x + 1)^2(x + 2)^2 = 0$ d. $(x^2 - 1)(x^2 - 2) = 0$ c. $(x - 1)^2(x - 2)^2 = 0$ d. $(x^2 - 1)(x^2 - 2) = 0$ e. $(x^2 - 1)(x^2 - 4) = 0$ 16. In the figure below, segments \overline{AB} and \overline{DC} are parallel and point <i>E</i> lies on \overline{DC} . If $AB = 8$, $CD = 28$, and the area of triangle ABE is 24, then what is the area of trapezoid $ABCD?$ a. 54 b. 72 c. 94 d. 108 e. 112 17. There are 365 days in 2019, and 366 days in 2020 (since it's a leap year). If January 1, 2019, is a Tuesday, then what day of the week is December 31, 2020? a. Monday b. Wednesday c. Thursday d. Friday e. Sunday 18. The fraction 22/7 is sometimes used as an approximation for π . What is the 2019th digit after the decimal point when 22/7 is written out as a decimal? a. 2 b. 4 c. 5 d. 7 e. 8 19. A <i>kite</i> is a quadrilateral which has two pairs of equal-length sides, and each pair of equal-length sides shares an endpoint. Which of the following is true of every possible kite? a. Its two diagonals intersect each other c. Its two diagonals are perpendicular to each other d. Each of its two diagonals is 180° 20. Three different lines are situated in a plane. Let <i>N</i> be the number of points in the plane where at least two of the three lines intersect. Given the different possible arrangements of the three lines, how many different values could the number <i>N</i> possibly have? a. more than 4 b. 4 c. 3 d. 2 e. 1 21. If M is the largest number less than 1000 that is both a perfect square and a perfect cube, what is the sum of the digits of M?	shown here is a. 33% c. 40%	whole number, wh	at percentage of b. 36%		c	14. a. b. c. đ.)e.
16. In the figure below, segments \overline{AB} and \overline{DC} are parallel and point <i>E</i> lies on \overline{DC} . If $AB = 8$, $CD = 28$, and the area of triangle ABE is 24, then what is the area of trapezoid $ABCD$? a. 54 b. 72 c. 94 d. 108 e. 11216. a. b. c. () e17. There are 365 days in 2019, and 366 days in 2020 (since it's a leap year). If January 1, 2019, is a Tuesday, then what day of the week is December 31, 2020? a. Monday b. Wednesday c. Thursday d. Friday e. Sunday17. a. b. (c) d. e18. The fraction 22/7 is sometimes used as an approximation for π . What is the 2019th digit after the decimal point when 22/7 is written out as a decimal? a. 218. (a) b. 419. A kite is a quadrilateral which has two pairs of equal- length sides shares an endpoint. Which of the following is true of every possible kite? a. Its two diagonals are perpendicular to each other c. Its two diagonals are congruent to each other d. Each of its two diagonals is longer than each of its four sides e. The sum of its angles is 180° 20. a. (b) c. d. e20. Three different lines are situated in a plane. Let N be the number of points in the plane where at least two of the three lines intersect. Given the different possible arrangements of the three lines, how many different values could the number N possibly have? a. more than 420. c. 320. d. 220. e. 120. Three different lines are situated in a plane. Let N be the number of points in the plane where at least two of the three lines intersect. Given the different possible arrangements of the three lines, how many different values could the number N possibly have? a. more than 420. c. 320. d. 221. a. b. c. d) e21. If M is the largest number less		(2) = 0	b. $(x+1)^2(x-2)^2 = 0$	$(x + 2)^2 = 0$ d. $(x^2 - 1)$		15. a. b. c. d.e
17. There are 365 days in 2019, and 366 days in 2020 (since it's a leap year). It January 1, 2019, is a Tuesday, then what day of the week is December 31, 2020? a. Monday b. Wednesday c. Thursday d. Friday e. Sundaya. b. C d. e18. The fraction 22/7 is sometimes used as an approximation for π . What is the 2019th digit after the decimal point when 22/7 is written out as a decimal? a. 2 b. 4 c. 5 d. 7 e. 818. (a) b. c. d. e19. A <i>kite</i> is a quadrilateral which has two pairs of equal-length sides, and each pair of equal- length sides shares an endpoint. Which of the following is true of every possible kite? 	\overline{DC} are paralle \overline{DC} . If $AB = 8$, of triangle ABE area of trapezo a. 54 c. 94	l and point E lies or CD = 28, and the a C is 24, then what is pid $ABCD$? b. 72	n Irea	A		a. b. c.@ e.
18. The fraction 22/7 is sometimes used as an approximation for π . What is the 2019th digit after the decimal point when 22/7 is written out as a decimal? a. 2(a) b. c. d. ea. 2b. 4c. 5d. 7e. 819. A kite is a quadrilateral which has two pairs of equal-length sides, and each pair of equal- length sides shares an endpoint. Which of the following is true of every possible kite? a. Its two diagonals intersect each other at their midpoints b. Its two diagonals are perpendicular to each other c. Its two diagonals are congruent to each other d. Each of its angles is 180°19. a (b. c. d. e20. Three different lines are situated in a plane. Let N be the number of points in the plane where at least two of the three lines intersect. Given the different possible arrangements of the three lines, how many different values could the number N possibly have? a. more than 420. a. (b) c. d. e21. If M is the largest number less than 1000 that is both a perfect square and a perfect cube, what is the sum of the digits of M?21. a. b. c.(d) e	2019, is a Tue	sday, then what day	y of the week is [December 31, 20)20?	17. a. b. C. d. e.
 19. A kite is a quadrilateral which has two pairs of equal-length sides, and each pair of equallength sides shares an endpoint. Which of the following is true of every possible kite? a. Its two diagonals intersect each other at their midpoints b. Its two diagonals are perpendicular to each other c. Its two diagonals are congruent to each other d. Each of its two diagonals is longer than each of its four sides e. The sum of its angles is 180° 20. Three different lines are situated in a plane. Let N be the number of points in the plane where at least two of the three lines intersect. Given the different possible arrangements of the three lines, how many different values could the number N possibly have? a. more than 4 b. 4 c. 3 d. 2 e. 1 21. If M is the largest number less than 1000 that is both a perfect square and a perfect cube, what is the sum of the digits of M? 	after the decim	al point when 22/7	is written out as	a decimal?	· ·	18. (a) b. c. d. e.
20. Three different lines are situated in a plane. Let N be the number of points in the plane where at least two of the three lines intersect. Given the different possible arrangements of the three lines, how many different values could the number N possibly have? a. (b) c. d. e a. more than 4 b. 4 c. 3 d. 2 e. 1 21. If M is the largest number less than 1000 that is both a perfect square and a perfect cube, what is the sum of the digits of M? 21. a. (b) c. d. e	19. A <i>kite</i> is a qua- length sides sh a. Its two diag b. Its two diag c. Its two diag d. Each of its	drilateral which has hares an endpoint. ^v onals intersect eac onals are perpendi onals are congruer two diagonals is lor	two pairs of equ Which of the follo h other at their m cular to each oth t to each other	al-length sides, a owing is true of e idpoints er	and each pair of equal-	19. a(b. c. d. e
cube, what is the sum of the digits of M?	where at least of the three lin	two of the three line es, how many diffe	es intersect. Give rent values could	en the different p the number <i>N</i> p	ossible arrangements ossibly have?	20. a.b c. d. e.
	21. If M is the larg	est number less that	an 1000 that is bc	oth a perfect squ	are and a perfect	<u> </u>
a. 12 D. 14 C. 10 U. 10 E. 20		•		ط 10	c 20	
	a. 12	D. 14	G. TO	u. Io	e. 20	

22. In the figure below (not necessarily drawn to scale), lines <i>n</i> and <i>p</i> are parallel, and lines <i>l</i> , <i>m</i> , and <i>p</i> meet at a point. What is the value of <i>x</i> ? a. 45 b. 50 c. 55 d. 60 e. 65	22. a. b. c. ⓓ e.
23. You have <i>n</i> identical wooden cubes. If you set them up side by side into a long chain, glue adjacent cubes together, and then paint the outside of this new solid red, how many square faces of the original cubes did you paint in total?	23.
a. $4n + 2$ b. $4n + 6$ c. $5n$ d. $5n + 1$ e. $5n + 2$	(a) b. c. d. e.
24. 20% of 80% of 20 is equal to which of the following? a. 50% of 50% of 20 b. 80% of 20% of 80 c. 20% of 20% of 80 d. 20% of 20% of 20% of 20% of 20 e. 20% of 20% of 20% of 20% of 20% of 20% of 20	24. a. b. c. d. e
25. How many line segments appear in the following geometric design? a. 27 b. 30 c. 33 d. 36 e. 42	25. a. <u>6</u> . c. d. e
26. A <i>perfect power</i> is a number which can be written as a^b where a and b are positive whole numbers, and $b \ge 2$. For example, $6^2 = 36$ and $2^3 = 8$ are both perfect powers. How many two-digit perfect powers are there?	26.
a. 4 b. 5 c. 6 d. 7 e. 8	a. b. c. d (e)
27. $ 0 - 1 - 2 - 3 - 4 - 5 = $	27.
a. 1 b. 2 c. 3 d. 4 e. 5	(a) b. c. d. e
28. A Sophie Germain prime is a prime number p such that $2p + 1$ is also prime. For example, the prime number 3 is a Sophie Germain prime because $2 \cdot 3 + 1 = 7$ is also prime. Which one of the numbers below is a Sophie Germain prime?	28.
a. 37 b. 39 c. 41 d. 43 e. 47	a. b (), d. e
 29. On Day 1, Bernhard Riemann eats 1 pound of spaghetti. On Day 2, he eats 2 pounds of spaghetti. On Day 3, he eats 3 pounds of spaghetti, and so on. At the end of Day 3 he will have eaten 6 pounds of spaghetti, <u>total</u>. Assuming he keeps this up, on which day will he finally have eaten over 10,000 pounds of spaghetti, <u>total</u>? a. Day 141 b. Day 142 c. Day 143 d. Day 144 e. Day 145 	29. (a) b. c. d. e
30. When my hamster runs in her hamster wheel, the wheel spins at a rate of 20 revolutions per minute. If its diameter is 10 inches, then how far has my hamster effectively run after 30 seconds?	30.
a. 50 π inches b. 100 π inches c. 150 π inches d. 200 π inches e. 250 π inches	a(b). c. d. e.
31. Grace Hopper reaches into a drawer that contains 2 black socks and 2 white socks. She	31.

					· · · · · · · · · · · · · · · · · · ·
-		-			32. a. b. c. d.(e)
a. $x + y = 24$	b. $x + y = 17$	c. $x - y = 17$	d. $xy = 80$	e. $\frac{-}{y} = 5$	33.
8. Archimedes and Zeno each run at constant (but different) speeds. Archimedes gives Zeno a 10-mile head start in a long footrace. And they're off! After 1 hour, Archimedes reaches Zeno's starting point, but meanwhile Zeno has run forward 1 mile. How much <u>more</u> time will it take Archimedes to completely catch up with Zeno? a. 1/11 of an hour b. 1/10 of an hour c. 11/100 of an hour d. 1/9 of an hour					
e. Archimedes w	vill never catch up	with Zeno no mate	ter how long they	both run	34.
For example 3! = operation—for ex	$3 \times 2 \times 1 = 6$, and 4 cample, $3!! = (3 \times 2)$	$4! = 4 \times 3 \times 2 \times 1 = 24$	4. We can also re	epeat the factorial	34. a. b. c. @ e.
					35. a. b. c.(d) e.
•	-		es, what is the pro	obability that it	u. b. c. u. c.
a. $\frac{1}{12}$	b. $\frac{1}{4}$	C. $\frac{1}{3}$	d. $\frac{6}{35}$	e. $\frac{7}{12}$	
The mean (avera when arranged in	ige) of the number numerical order)	s on his list is 22 a is 4. If <i>N</i> is the sm	and the median (r nallest possible va	niddle number	36. a. b. c. d.€
side length?	-			-	37. (a) b. c. d. e.
a. 6 <i>x</i>	b. 6 <i>x</i> ²	c. 10 <i>x</i>	d. $10x^2$	e. 24x	00
from its lower left square into five r the triangle forme	corner in such a egions of equal ar ed by connecting t	way that they cut t ea. What is the ar	he ea of	100	38. a. b. c. đ.e. 39.
39. How many ping-pong balls could you place in a single layer, without stacking, on the surface of a ping-pong table?					
	c. about 30,000			000	
	right corner. At ea	of the rectangle b the step it moves of	elow will make its either upward,	3	40. a.b c. d. e.
	a. $x + y = 24$ Archimedes and Zeno a 10-mile h reaches Zeno's s <u>more</u> time will it t a. 1/11 of an hou e. Archimedes w The factorial of n For example 3! = operation—for ex- numbers is the la a. 65536!! In my drawer I ha Harry Potter mov would be one Ha a. $\frac{1}{12}$ Srinivasa Raman The mean (avera when arranged in number on his liss a. 9 A rectangle has a side length? a. 6x A square with sic from its lower left square into five re- the triangle former middle line segm a. 1600 d. 1800 A caterpillar at th	a. $x + y = 24$ b. $x + y = 17$ Archimedes and Zeno each run at Zeno a 10-mile head start in a long reaches Zeno's starting point, but r more time will it take Archimedes t a. 1/11 of an hour c. 11/100 of an e. Archimedes will never catch up The factorial of n, written n!, is the For example $3! = 3 \times 2 \times 1 = 6$, and 4 operation—for example, $3!! = (3 \times 2)$ numbers is the largest? a. 65536!! b. 256!!! In my drawer I have 12 Marvel mov Harry Potter movies. If I randomly would be one Harry Potter and one a. $\frac{1}{12}$ b. $\frac{1}{4}$ Srinivasa Ramanujan wrote down a The mean (average) of the number when arranged in numerical order) number on his list, what is the sum a. 9 b. 10 A rectangle has a side of length $2x$ side length? a. $6x$ b. $6x^2$ A square with side length 100 has a from its lower left corner in such a b square into five regions of equal ar the triangle formed by connecting t middle line segments, as shown? a. 1600 b. $1200\sqrt{2}$ d. 1800 e. $1350\sqrt{2}$ How many ping-pong balls could ye surface of a ping-pong table? a. about 300 c. about 30,000	a. $x + y = 24$ b. $x + y = 17$ c. $x - y = 17$ Archimedes and Zeno each run at constant (but diffe Zeno a 10-mile head start in a long footrace. And the reaches Zeno's starting point, but meanwhile Zeno h more time will it take Archimedes to completely catch a. 1/11 of an hour b. 1/10 of an hour e. Archimedes will never catch up with Zeno no matth The factorial of n, written n!, is the product of all the w For example $3! = 3 \times 2 \times 1 = 6$, and $4! = 4 \times 3 \times 2 \times 1 = 22$ operation—for example, $3!! = (3 \times 2 \times 1)! = 6! = 6 \times 5 \times 4$ numbers is the largest? a. 65536!! b. 256!!! c. 16!!!! In my drawer I have 12 Marvel movies, 9 DC Comics Harry Potter movies. If I randomly take out two movie would be one Harry Potter and one Marvel movie? a. $\frac{1}{12}$ b. $\frac{1}{4}$ c. $\frac{1}{3}$ Srinivasa Ramanujan wrote down a list of seven posit The mean (average) of the numbers on his list is 22 a when arranged in numerical order) is 4. If <i>N</i> is the sm number on his list, what is the sum of the digits of N? a. 9 b. 10 c. 11 A rectangle has a side of length 2 <i>x</i> , and its area is 12 side length? a. $6x$ b. $6x^2$ c. $10x$ A square with side length 100 has four segments dra from its lower left corner in such a way that they cut the square into five regions of equal area. What is the arr the triangle formed by connecting the ends of the two middle line segments, as shown? a. 1600 b. $1200\sqrt{2}$ c. 1750 d. 1800 e. $1350\sqrt{2}$ How many ping-pong balls could you place in a single surface of a ping-pong table? a. about 3000 c. about 30,000 e. about 3,000, A caterpillar at the lower left corner of the rectangle to the caterpillar at the lower left corner of the rectangle to the set of	a. $x + y = 24$ b. $x + y = 17$ c. $x - y = 17$ d. $xy = 80$ Archimedes and Zeno each run at constant (but different) speeds. Arc Zeno a 10-mile head start in a long footrace. And they're off! After 1 hor reaches Zeno's starting point, but meanwhile Zeno has run forward 1 r more time will it take Archimedes to completely catch up with Zeno? a. 1/11 of an hour b. 1/10 of an hour d. 1/9 of an hor c. 11/100 of an hour d. 1/9 of an hor e. Archimedes will never catch up with Zeno no matter how long they The <i>factorial</i> of <i>n</i> , written <i>n</i> !, is the product of all the whole numbers frr For example $3! = 3 \times 2 \times 1 = 6$, and $4! = 4 \times 3 \times 2 \times 1 = 24$. We can also re operation—for example, $3!!! = (3 \times 2 \times 1)! = 6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$. W numbers is the largest? a. 65536!! b. 256!!! c. 16!!!! d. 4!!!!! In my drawer I have 12 Marvel movies, 9 DC Comics movies, 6 Tolkie Harry Potter movies. If I randomly take out two movies, what is the privould be one Harry Potter and one Marvel movie? a. $\frac{1}{12}$ b. $\frac{1}{4}$ c. $\frac{1}{3}$ d. $\frac{6}{35}$ Srinivasa Ramanujan wrote down a list of seven positive whole number The mean (average) of the numbers on his list is 22 and the median (r when arranged in numerical order) is 4. If <i>N</i> is the smallest possible var number on his list, what is the sum of the digits of <i>N</i> ? a. 9 b. 10 c. 11 d. 12 A rectangle has a side of length 2 <i>x</i> , and its area is $12x^2$. What is the re- side length? a. $6x$ b. $6x^2$ c. $10x$ d. $10x^2$ A square with side length 100 has four segments drawn from its lower left corner in such a way that they cut the square into five regions of equal area. What is the area of the triangle formed by connecting the ends of the two middle line segments, as shown? a. 1600 b. $1200\sqrt{2}$ c. 1750 d. 1800 e. $1350\sqrt{2}$ How many ping-pong balls could you place in a single layer, without sf surface of a ping-pong table? a. about 3000 c. about 3000 d. about 3000	Archimedes and Zeno each run at constant (but different) speeds. Archimedes gives Zeno a 10-mile head start in a long footrace. And they're off! After 1 hour, Archimedes reaches Zeno's starting point, but meanwhile Zeno has run forward 1 mile. How much more time will it take Archimedes to completely catch up with Zeno? a. 1/11 of an hour b. 1/10 of an hour c. 11/100 of an hour d. 1/9 of an hour e. Archimedes will never catch up with Zeno no matter how long they both run. The factorial of n, written n!, is the product of all the whole numbers from n down to 1. For example $3! = 32\times 1 = 6$, and $4! = 4x_3 \times 2 \times 1 = 24$. We can also repeat the factorial operation—for example, $3!! = (3\times 2\times 1)! = 6! = 6\times 5\times 4\times 3\times 2\times 1 = 720$. Which of these numbers is the largest? a. 65536! b. 256!! c. 16!!! d. 4!!!!! e. 2!!!!!! In my drawer I have 12 Marvel movies, 9 DC Comics movies, 6 Tolkien movies, and 9 Hary Potter movies. If I randomly take out two movies, what is the probability that it would be one Harry Potter and one Marvel movie? a. $\frac{1}{12}$ b. $\frac{1}{4}$ c. $\frac{1}{3}$ d. $\frac{6}{35}$ e. $\frac{7}{12}$ Srinivasa Ramanujan wrote down a list of seven positive whole numbers, all different. The mean (average) of the numbers on his list is 22 and the median (middle number when arranged in numerical order) is 4. If <i>N</i> is the smallest possible value for the largest number on his list, what is the sum of the digits of N? a. 9 b. 10 c. 11 d. 12 e. 13 A rectangle has a side of length 2x, and its area is $12x^2$. What is the rectangle's other side length? a. 6x b. $6x^2$ c. $10x$ d. $10x^2$ e. $24x$ A square with side length 100 has four segments drawn from its lower left corner in such a way that they cut the square into five regions of equal area. What is the area of the triangle formed by connecting the ends of the two movid 100 is lower left corner in such a way that they cut the square into five regions of equal area. What is the area of the triangle formed by connecting the ends of the two movid 100 is about 3

Prize Question

WRITE YOUR ANSWER ON THE BACK OF YOUR ANSWER SHEET

Every participant should write down any whole number of their choosing between 1 and 1000. The participant who writes down the number that is closest to $\frac{2}{3}$ of the average of all of the numbers written down by participants for this question will win a small prize.

You may use this space for scratch paper,



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