"Math is Cool" Masters – 2017-18

April 21, 2018

6th Grade Mental Math Contest

Follow along as your proctor reads these instructions to you. Your Mental Math score sheet is on the back.

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by all involved. Bad sportsmanship may result in disqualification.*
- *Calculators or any other aids may not be used on any portion of this contest.*
- *Unless stated otherwise:*
  - *For problems dealing with money, a decimal answer should be given.*
  - *Express all rational, non-integer answers as reduced common fractions.*
- *For fifth and sixth grade, all fractions and ratios must be reduced.*
- *Counting or natural numbers refer to the numbers 1,2,3,4 and so on and do NOT include 0.*
- *Units are not necessary unless it is a problem that deals with time and, in that case, am or pm is needed. However, if you choose to use units, they must be correct.*
- *Leave all answers in terms of π where applicable.*
- *Do not round any answers unless stated otherwise.*
- *Record all answers on the colored cover sheets in the answer column only.*
- *Make sure all answer sheets have all the information filled out at the top of the sheet.*
- *Tests will be scored as a 0 if answers are not recorded correctly on the answer sheets.*
- *Blank answer sheets and answer sheets with no name will also be scored as a 0.*

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. ***You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.*** *Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

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6th Grade Mental Math Contest

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

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#	Problem
1	A round pecan pie has a radius of six inches. One quarter of the pie has already been eaten. What is the area of what is left, in square inches and in terms of pi?
2	As a common fraction, what is the probability of rolling a twenty-sided die and getting a multiple of three?
3	The mean of a set of five numbers is nineteen. What is the sum of the five numbers?
4	Solve the equation five X plus seven equals forty-two, for X.
5	What is the sum of the next two numbers in the sequence: five, two, seven, four, nine, six, and so on …?
6	Jill is at a party with a piñata. She is blindfolded and spun around six hundred and thirty degrees clockwise. How many more degrees should she continue moving clockwise until she will be facing the piñata again?
7	How many positive integer factors does twenty-eight have?
8	Shaina bikes two miles from home to school at six miles per hour. She then realizes she forgot her backpack and bikes home and back to school again at twelve miles per hour. How many minutes did she bike in total?

"Math is Cool" Masters – 2017-18

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Total Correct: KEY

STUDENT NAME: _____ **School Name:** _____

Proctor Name: _____ Team #: _____ Room #: _____

6th GRADE - Individual Contest – Score Sheet
DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	7		
2	34 [minutes]		
3	405 [students]		
4	1.25		
5	20		
6	[x =] 11		
7	6 [ways]		
8	7/10		
9	1/4		
10	5 [lines of symmetry]		
11	11		
12	12341234		
13	27		
14	50		
15	63 [jolly ranchers]		
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16	4		
17	4 [numbers]		
18	35 [puzzles]		
19	62 [inches]		
20	13 [cards]		
21	E		
22	747 [cents]		
23	123		
24	2.8 [miles]		
25	50 [%]		
26	28π [in^2]		
27	3 [values]		
28	6		
29	2.625×10^{20}		
30	7/28		
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31	207.36 [in^3]		
32	4.6		
33	9 [different-sized hands]		
34	1/5		
35	50		
36	2940 [cm^2]		
37	6		
38	362880 [ways]		
39	9720		
40	16 [marbles		
31-40 TOTAL:			

6th GRADE

"Math is Cool" Masters – 2017-18

April 21, 2018

Total Correct:

STUDENT NAME: _____ **School Name:** _____

Proctor Name: _____ Team #: _____ Room #: _____

6th GRADE - Individual Contest – Score Sheet
DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
31-40 TOTAL:			

6th GRADE

"Math is Cool" Masters – 2017-18

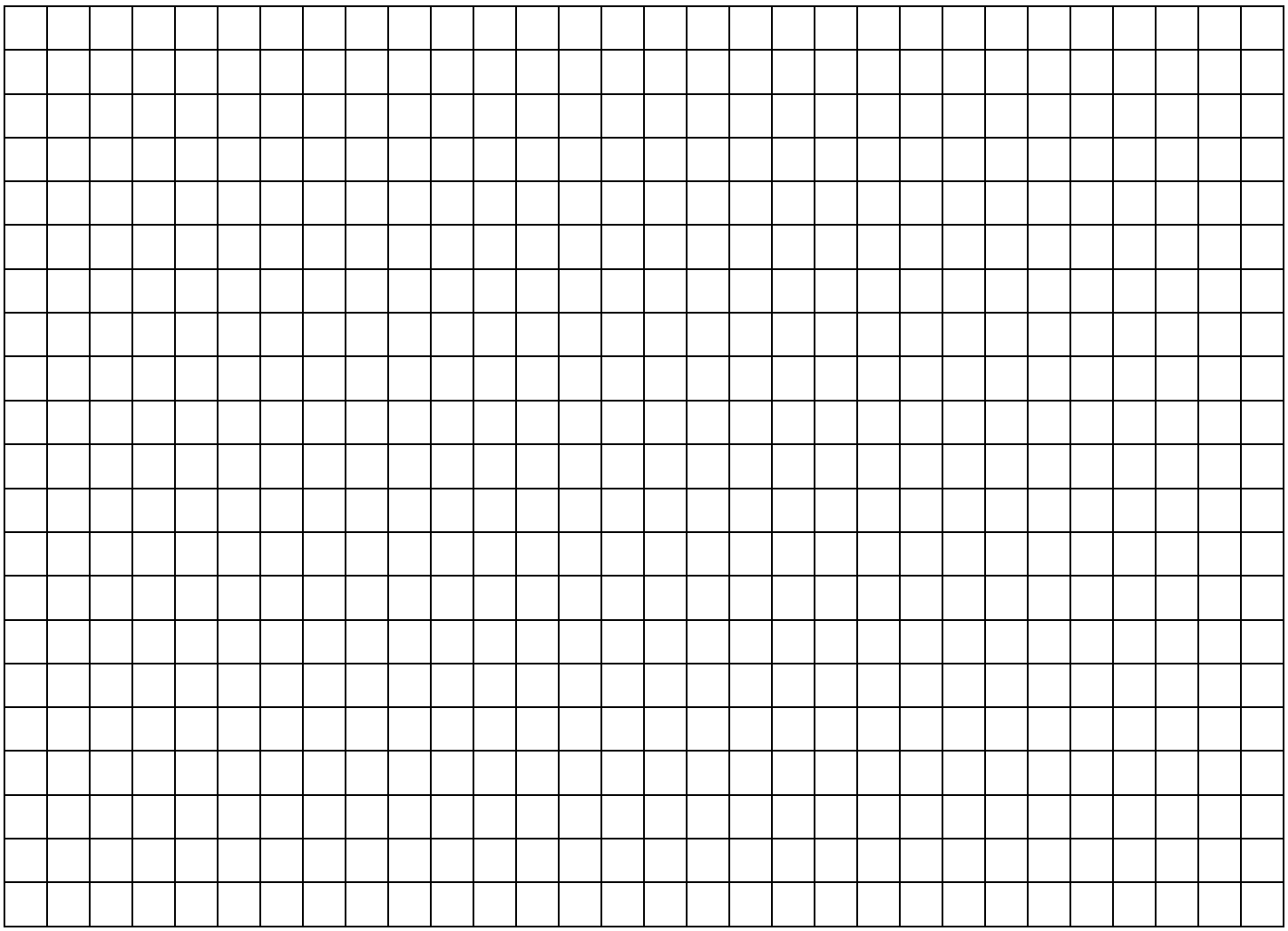
April 21, 2018

6th GRADE - Individual Contest

Tear this cover sheet and scratch paper off and fill out the top of the colored answer sheet prior to the start of the test. The graph below is for your use, if needed.

INDIVIDUAL TEST – PRE-ALGEBRA - 35 minutes

You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When you are prompted to begin, tear off the colored sheet and begin testing. Make sure your name and school are recorded on the answer sheet. The raw score will be 2 points for correct answers to problems 1-30 and 3 points for 31-40. Record your answers on the score sheet. No talking during the test. You will be given a 5 minute time warning.



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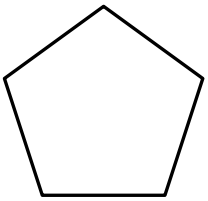
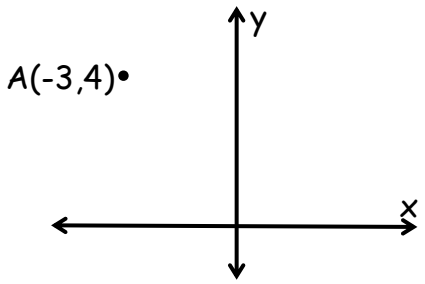
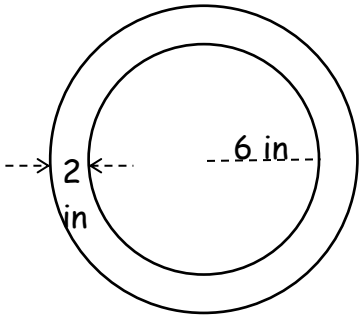
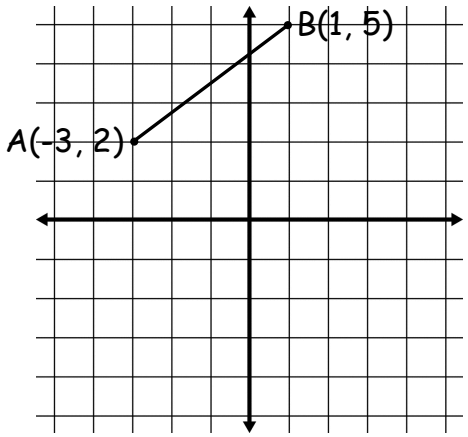
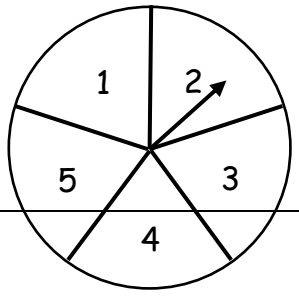
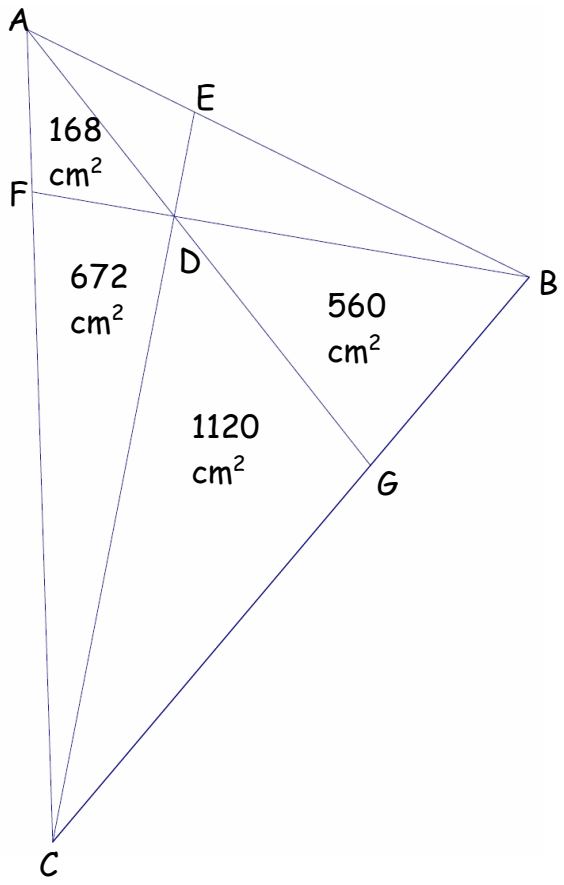
6th GRADE - Individual Contest

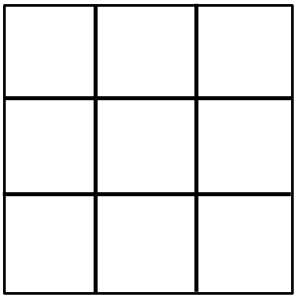
	Questions 1-30: 2 points each
1	What is the largest single-digit prime number?
2	What is the number of minutes that elapse from 11:37 AM to 12:11 PM on the same day?
3	A K-through-6 elementary school has 57 kindergarteners, 73 first graders, 62 second graders, 55 third graders, 58 fourth graders, 51 fifth graders, and 49 sixth graders. What is the total number of students in the school?
4	As a decimal, what is the average of $\frac{1}{2}$ and 2?
5	When $\frac{7}{8}$ is expressed as a decimal, what is the sum of its digits?
6	Solve for x: $7x - 24 = 4x + 9$
7	What is the number of distinct ways to put the five letters A, B, C, D, and E in order if the first letter must be B and the fourth letter must be A?
8	During any given hour a particular traffic light is red for a total of 18 minutes. As a common fraction, what is the probability that the light will not be red when I drive past this traffic light?
9	As a common fraction, what is the ratio of $\frac{y}{x}$ if $2x = 8y$?
10	How many lines of symmetry does a regular pentagon have? 
11	What is the remainder when 95 is divided by 14?
12	What is the product of 1234 and 10001?
13	Evaluate: $9(4 - 7) + 2 \cdot 3^3$
14	In the following sequence, every term starting with 4 and moving right is determined by adding the two previous terms together. What is the value of x? 9, -5, 4, -1, 3, 2, 5, ___, ___, ___, ___, x
15	Eight gummy bears cost the same as twelve starburst chews. Fifteen starburst chews cost the same as twenty-one jolly ranchers. How many jolly ranchers cost the same as thirty gummy bears?

16	The point A(-3, 4) is reflected over the y-axis on a coordinate plane. What is the y-coordinate of the image A'? 
17	The 5 x 5 times table shown has the first row and column filled in. If the rest of the numbers were filled in there would be a total of twenty-five numbers in the table. Within the table of twenty-five numbers (not including the numbers above or to the left of the dark lines), how many numbers appear exactly once each? **x** | **1** | **2** | **3** | **4** | **5** **1** | 1 | 2 | 3 | 4 | 5 **2** | 2 | | | | | **3** | 3 | | | | | **4** | 4 | | | | | **5** | 5 | | | | |
18	When David and Audrey finished crossword puzzle number 40 in their book of 200 crossword puzzles, they realized they had completed $\frac{1}{5}$ of the puzzles in the book. How many more puzzles do they need to solve in order to have solved $\frac{3}{8}$ of the puzzles in the book?
19	A rectangle has one side of length 24 inches and the length of one of its diagonals is 25 inches. What is the number of inches in the perimeter of the rectangle?
20	Alex, Brenda, and Calvin are trading baseball cards. Calvin gives Brenda all of his cards in exchange for her Felix Hernandez card. Brenda then gives Alex four cards in exchange for his Robinson Cano card. Alex now has 12 cards, Brenda has 10 cards, and Calvin has 1 card. What is the maximum possible number of cards Calvin could have had before these two trades occurred?

21	Given that x divided by y is a positive even integer, write the letter(s) of the following statement(s) that must always be true in the answer space. A) y is an integer B) x is an even integer C) $x > y$ D) $xy > 1$ E) None of the above
22	Raimie bought three yo-yos at an average cost of $2.50 per yo-yo. If no two yo-yos cost the same amount and all three yo-yo's cost at least one cent, what is the maximum number of cents that she could have paid for one of the yo-yos?
23	What is the smallest three-digit number having the property that the sum of its digits equals the product of its digits?
24	Juliana rollerblades around a lake at an average rate of 9 miles per hour. At this rate, it takes her 18 minutes and 40 seconds to make one complete trip around the lake. As a decimal, what is the number of miles in the length of the path around the lake?
25	Marsenne primes are prime numbers with the form $2^n - 1$, where n is an integer. For example, $2^3 - 1 = 7$, so 7 is a Marsenne prime. For n = {1, 2, 3, 4, 5, 6, 7, 8}, what percent of the numbers in the form $2^n - 1$ are Marsenne primes?
26	A circular mirror has a frame that is uniformly 2 inches wide. The radius of the mirror is 6 inches. In terms of π, what is the number of square inches in the area of the frame? 
27	The 3-digit number 3*a*4 has 4 as its ones digit, *a* as its tens digit, and 3 as its hundreds digit. If the quotient of 3*a*4 and 8 is an integer, then what is the number of single-digit values that *a* could have?
28	A positive integer, *p*, is the product of a multiple of three and a perfect square. Additionally, *p* is the product of three and an even number. What is the smallest possible value of *p*?
29	According to www.worldometers.info there are currently approximately 7,500,000,000 humans alive on earth. According to National Geographic there are

	an estimated 35,000,000,000 skin cells in a human body. In scientific notation, what is the total number of human skin cells on earth?
30	A fortnight is a time period consisting of 2 weeks or 14 days. If today is April 21, or 4/21, what date will it be seven fortnights from today? Give your answer in the form m/dd if the month is represented by a one-digit number, or in the form mm/dd if the month is represented by a two-digit number.
Challenge Questions: 3 pts each	
31	A rectangular plastic tarp has a thickness of 6 one-thousandths of an inch and a length and width of 12 feet by 20 feet. As a decimal, what is the number of cubic inches in the volume of plastic that the tarp is made of?
32	A segment has endpoints A(-3, 2) and B(1, 5). Point C is placed on $\overline{AB}$ such that AC:BC = 4:1. As a decimal, what is the sum of the coordinates of point C? 
33	Bonita has a deck of 50 cards. In the deck, the numbers from 1 to 10 are on 5 cards each. Bonita wants to have a hand of cards that add up to sixteen. How many different-sized hands of cards will achieve this? For example, one size of hand is two cards, if she has a 10 and a 6.
34	For the spinner shown, assume each number has an equal probability of being spun. The spinner is spun 5 times and the 5 results are used to generate a 5-digit number. For example, if the 1st spin results in 2, the 2nd spin results in 5, the 3rd spin results in 2, the 4th spin results in 1, and the 5th spin results in 3, then the 5-digit number generated would be 25213. As a common fraction, what is the probability that the 5-digit number is divisible by 4? 

35	A data set with eight distinct positive integers has a mean of 40 and a median of 31. When they are put in order from least to greatest, with the first term being the least and the eighth term being the greatest, what is the positive difference between the largest and smallest possible value for the sixth term?
36	Triangle ABC is divided into six smaller triangles by three line segments from the vertices, all through the same interior point, point D, as shown. Some of the areas of the smaller triangles are given in the diagram. What is the number of square centimeters in the area of ΔABC? 

37	Two intelligent, honest students are sitting together at lunch one day when their math teacher hands them each a card. "Your cards each have an integer on them," the teacher tells them. "The product of the two numbers is either 12, 15 or 18. The first to correctly guess the number on the other's card wins." The first student looks at her card and says, "I don't know what your number is." The second student looks at her card and says, "I don't know what your number is, either." The first student then correctly says, "*Now* I know your number." What number is on the loser's card?
38	What is the number of distinct ways that the digits 1 through 9 can be arranged in a 3-by-3 sudoku square? 
39	What is the largest four-digit integer having the prime factorization $2^a \times 3^b \times 5^c$, where a, b and c are each positive integers?
40	An urn contains some black and some white marbles. What is the minimum possible number of total marbles that can be in the urn such that the probability of drawing two black marbles in a row without replacement is $\frac{1}{8}$?

6th GRADE

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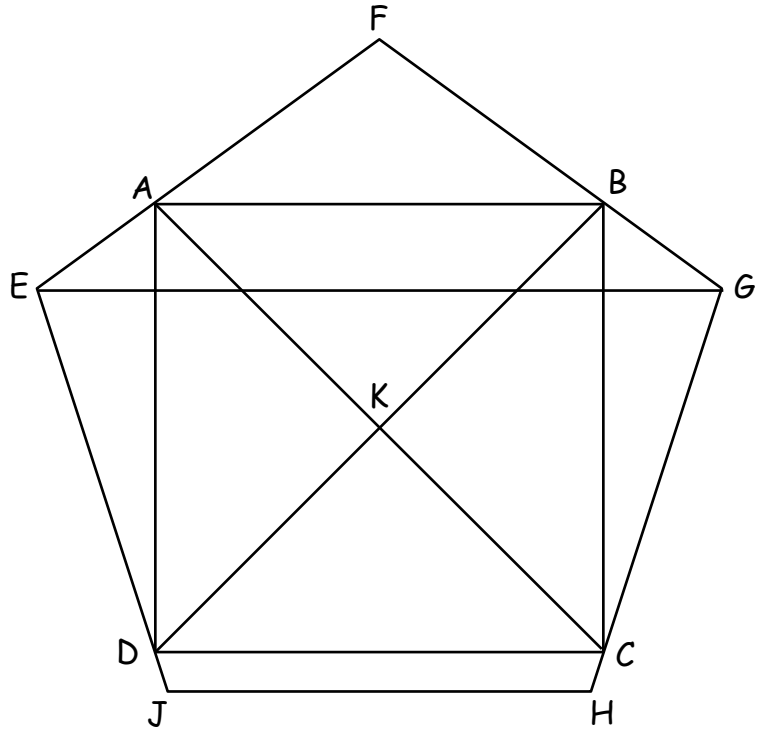
6th Grade Team Multiple Choice Contest

Use for questions 1-4.

Square ABCD has been inscribed inside regular pentagon EFGHJ such that $\overline{CD}$ is parallel to $\overline{JH}$. (Note: the word regular means that each of the interior angles in the pentagon is the same number of degrees and each of the sides of the pentagon is the same length.) Each of the vertices of ABCD lies on one of the remaining four sides of EFGHJ. The sum of the three interior angles of any triangle is 180°, the sum of the four interior angles of any quadrilateral is 360°, and the sum of the five interior angles of any pentagon is 540°. The diagonals of square ABCD intersect at point K.



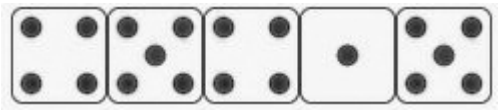
1	What is the number of degrees in the measure of ∠AKB? Note: the middle letter in the name, ∠AKB, is the location of the vertex of the angle. A) 45° B) 80° C) 90° D) 92° E) 96°
2	What is the number of degrees in the measure of ∠F? A) 72° B) 96° C) 104° D) 108° E) 112°
3	Which angle is congruent (has the same degree measure) to ∠FEG? A) ∠ABF B) ∠AFB C) ∠GFE D) ∠BAC E) ∠DEG
4	Which pair of angles are complementary (their measures add up to 90°)? A) ∠AKD & ∠ADK B) ∠AED & ∠JDC C) ∠FEG & ∠FGE D) ∠CBK & ∠CGE E) ∠CDJ & ∠GCB

Use for questions 5-7.

In the game of Yahtzee a person's turn consists of rolling five standard dice. After the first roll, the person can save any one or more of the dice and reroll the others. This same option is available after the second roll. After each player has had the chance to roll three times, their scores are determined. Some of the highest scoring rolls are shown in the following table.

Categories	Descriptions	Scores	Examples
Three Of A Kind	At least three dice the same	Sum of all dice	 scores 17
Four Of A Kind	At least four dice the same	Sum of all dice	 scores 24
Full House	Three of one number and two of another	25	 scores 25
Small Straight	Four sequential dice (1-2-3-4, 2-3-4-5, or 3-4-5-6)	30	 scores 30
Large Straight	Five sequential dice (1-2-3-4-5 or 2-3-4-5-6)	40	 scores 40
Yahtzee	All five dice the same	50	 scores 50
Chance	Any combination	Sum of all dice	 scores 13

5 Emmet has these numbers showing after the second roll and decides to reroll the die showing 1 for his third roll. What is the probability that he will get a full house?



A) $\frac{1}{6}$ B) $\frac{2}{3}$ C) $\frac{1}{3}$ D) $\frac{1}{4}$ E) $\frac{1}{2}$

6 What is the probability that Wyldstyle gets five sixes on the first roll?

A) $\frac{1}{7776}$ B) $\frac{5}{1296}$ C) $\frac{5}{7776}$ D) $\frac{1}{1296}$ E) $\frac{25}{7776}$

7 Batman told his friends that he got a Yahtzee on his first roll, but in fact he didn't get a Yahtzee until his second roll when he rerolled all five dice. What is the probability of not getting a Yahtzee on the first roll and then getting a Yahtzee on the second roll when rerolling all five dice?

A) $\frac{1}{6^4}$ B) $\frac{1}{6^8}$ C) $\frac{1295}{6^4}$ D) $\frac{1295}{6^8}$ E) $\frac{7775}{6^8}$

Use for questions 8 – 10. a ¥ b = $\frac{(a+b)}{11}$

8 Evaluate: 303 ¥ 533

20 r 10 B) 66 C) 70 D) 76 E) 77

9 Solve the equation for x: x ¥ -212 = 23

A) 41 B) 465 C) -9 r 5 D) 39 E) 235

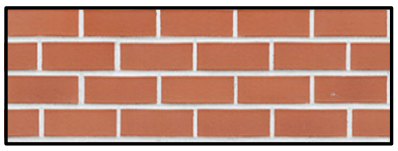
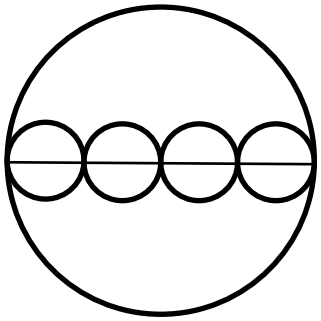
10 What is the number of ordered pairs (a, b), where a and b are both positive integers less than 50, such that a ¥ b has a solution that is a positive integer?

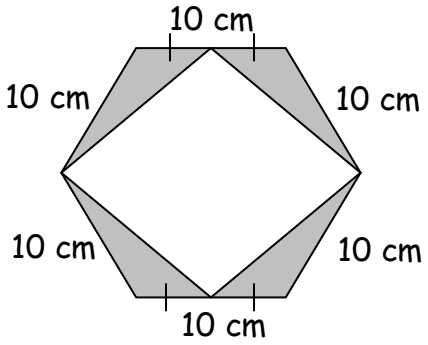
A) 110 B) 215 C) 216 D) 217 E) 396

"Math is Cool" Masters – 2017-18

April 21, 2018

6th Grade Team Contest

1	Thomas the Tank Engine leaves the station heading west at a rate of30 kilometers per hour. What is the number of kilometers he has traveled after 100 minutes?
2	Gerry is building a brick wall. The height of each brick is 2.25 inches. There is a mortar joint between each row of bricks that is 0.5 inches tall and the first row of bricks is laid on a bed of mortar that is 0.5 inches tall. What is the minimum number of rows of bricks needed to ensure that the wall is at least 4 feet tall? 
3	As a common fraction, what is the probability of randomly selecting a ginger cookie first from jar 1 and then an oatmeal cookie from jar 2? Jar 1 contains: 4 ginger cookies 5 sugar cookies  Jar 2 contains: 3 ginger cookies 4 sugar cookies 5 oatmeal cookies 
4	In the figure there is a large circle with circumference C and four congruent small circles each with circumference c. Adjacent pairs of the four congruent circles are tangent to each other and the two outer ones are internally tangent to the large circle. As a common fraction, what is the ratio of c to C? 

5	One of the common sizes of vinyl record is a 78 rotation per minute (rpm) record that has a diameter of 25 centimeters. As a fraction in lowest terms and in terms of π, what is the speed of a speck of dust fixed to the outside edge of the record in meters per second while the record is playing? There are 100 centimeters in a meter.
6	What is the greatest common factor of 324, 540, and 900?
7	The results of a survey of 72 people about pets is shown. As a common fraction, what is the probability that a person surveyed has a cat, given than they also have a dog? | | Has a dog | Doesn't have a dog | Total | | Has a cat | 37 | 21 | 58 | | Doesn't have a cat | 17 | 7 | 24 | | Total | 54 | 28 | 82 |
8	A quadrilateral is drawn inside a regular hexagon as shown. Two vertices of the quadrilateral correspond with two of the hexagon's vertices. The other two vertices of the quadrilateral correspond with the midpoints of two opposite sides of the hexagon. The sides of the hexagon are each 10 centimeters long. In simplest radical form, what is the number of square centimeters in the shaded area? 
9	Nix has six pennies and six dimes in her pocket. If she randomly takes two coins out of her pocket, as a common fraction, what is the probability that the monetary value of the two coins is 11 cents?
10	The sum of two numbers is 30 and the product of the two numbers is three-seventeenths of the square of one of the numbers. As a decimal, what is the smaller of the two numbers?

"Math is Cool" Masters – 2017-18

April 21, 2018

6th Grade Robert Dirks' Relay Contest Questions & Key

RELAYS - 5 minutes per relay – 15% of team score

There is no talking during this event and you must always be facing forward. Person #1 will be given an answer sheet(s) and will need to fill out the top. The proctor will hand out a strip of paper to each person. These need to be face down on your desk until it is time for the relay to start. Once the relay begins, everyone may turn over their strip of paper and begin working. You may write on the strip of paper to come up with your answer. However, when person #1 figures out his/her problem, he/she will record ***just his/her final answer*** *on the answer sheet and pass only the answer sheet back to the person behind. This continues until person #4 puts an answer on the answer sheet and gives it to the proctor. A correct answer from person #1, #2 and #3 is worth 1 point each. A correct answer from person #4 is worth 2 points making each relay worth 5 points. You will see the expression* ***TNYWG*** [Proctor: write this on the board] *which means: "the number you will get". This is where you put your teammate's answer that they pass back to you, and then you should be able to solve your question. Once the relay begins, turn over your strip of paper and* ***make sure you have the right person number.*** *Remember, no talking and remain facing forward to avoid being disqualified!*

	Relay #1	**Answer**
Person 1	What is 2^4?	16
Person 2	How many positive integer factors does TNYWG have?	5
Person 3	A bubble machine blows a bubble every TNYWG seconds. How many bubbles will it blow in 15 minutes?	180 [bubbles]
Person 4	A rectangle has an area of TNYWG square feet. How many feet are in the perimeter of the rectangle if the width is 80% of the length?	54 [feet]
	Relay #2	**Answer**
Person 1	Find the value of x in the following equation: $12x - 5 = 67$	[x=] 6
Person 2	Francis knows how to make 3 different flavors of cake, 5 kinds of icing, and TNYWG types of decorative designs on top. How many unique cakes can she make, using one flavor, one type of frosting and one decorative design?	90 [cakes]
Person 3	A shark is swimming across a lagoon at a rate of TNYWG centimeters per second. How many meters wide is the lagoon if it takes the shark a total of 6 minutes to swim across it?	324 [meters]
Person 4	What is the median of all the positive integer factors of TNYWG?	18

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6th GRADE - April 21, 2018

COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	What is the product of fourteen, one-fifth, and twenty-five?	70
2	What is the slope of the line represented by the equation: two X plus Y equals five?	-2
3	As a common fraction, what is the product of one-sixth times twelve-thirteenths?	2/13 or "2 over 13" or "2 out of 13"
4	A triangle has a hypotenuse of thirteen centimeters and a leg of length five centimeters. How many centimeters are in the length of the other leg of the triangle?	12 [cm]
5	Mara has a bag of skittles, but she only likes the yellow ones. If the bag has five yellow, two red, six purple, and one orange, what is the probability, as a common fraction, that the first one she pulls out is yellow?	5/14 or "5 over 14" or "5 out of 14"
6	Art, Ben, Cal, and Dan are playing doubles tennis. What is the number of distinct ways two teams can be formed with these four players?	3 [ways]
7	What is the measure, in degrees, of the smaller angle made by the hands of a clock at eleven thirty am?	165 [degrees]
8	Starting on the first of January, Chris reads one book every fifteen days. Assuming it is not a leap year, how many books will he have completely read by May first?	8 [books]
9	What is the seventeenth term in the arithmetic sequence whose first four terms are five, thirteen, twenty-one, twenty-nine?	133
10	A bird flies due north for seventy-two minutes and then due east for ninety-six minutes, all at an average speed of five miles per hour. How many minutes would it take the bird to fly in a straight line directly back to her starting point, still at an average speed of five miles per hour?	120 [mins]

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COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	What is the volume, in cubic inches, of a cube with surface area one hundred and fifty square inches?	125 [inches cubed]
2	Kate shoots fifteen free throws and nine make it in the basket. At this rate, how many free throws could she expect to make if she shoots one hundred times?	60 [free throws]
3	As a common fraction, what is the probability of rolling three identical numbers on three fair six-sided dice?	1/36 or "1 over 36" or "1 out of 36"
4	What is the remainder when ninety-one is divided by seven?	0
5	Seven pirates have a chest of gold pieces that they intend to share. During the night, one pirate sneaks off with half of it. The next day the remaining six pirates evenly split up the rest, leaving a remainder of three pieces. What is the smallest number of gold pieces that could've been in the chest?	18 [gold pieces]
6	Leo can draw one portrait in eighteen minutes. As a decimal, how many hours would it take him to draw fifteen portraits?	4.5 [hours]
7	The area of a rectangular yard is one hundred and ninety-six square feet. What is the length, in feet, of the smallest possible perimeter it could have?	56 [feet]
8	What is the remainder when two-thousand and eighteen is divided by nine?	2
9	If I write down all the prime numbers between one and forty, how many times will I write the digit three?	5
10	Marcus has a drawer full of unmatched socks in multiple colors. He realizes that if he closes his eyes and pulls out six socks, he can be sure he has at least one matched pair. He has four pairs of each color of sock he owns. How many individual socks are in the drawer?	40 [socks]

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COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	An equilateral triangle has a perimeter of forty-eight centimeters. What is the number of centimeters in the length of one side?	16 [cm]
2	Which two-digit prime number has the largest sum when you add its two digits together?	89
3	What is forty percent of one hundred and twenty-five?	50
4	A circular dart board has a radius of ten inches. In the center of the board is a smaller circle with radius two inches. Jade throws one dart and it hits the board somewhere. As a common fraction, what is the probability that it hit inside the smaller circle?	1/25 or "1 over 25" or "1 out of 25"
5	What is the product of two thousand times eighteen?	36000
6	What is the sum of the number of sides on a heptagon and the number of edges on a cube?	19
7	Moana is sailing from one island to another at an average speed of thirty miles per hour. After ninety minutes, the wind shifts and her average speed increases to forty miles per hour. How many miles will she have travelled after a total of three hours of sailing?	105 [miles]
8	As a common fraction, what is the quotient of three-sevenths divided by fifteen-forty-seconds?	6/5 or "6 over 5"
9	Amy has ten cards numbered one through ten and she draws three cards, one at a time without replacement. As a common fraction, what is the probability that she first draws six, then seven, and then eight?	1/720 or "1 over 720" or "1 out of 720"

10	Breanna has a stride of three point two five feet, and Sue has a stride of two point seven five feet. If they start back to back and each walk thirty strides away from each other, how many inches apart will they be?	2160 [inches]

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COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	Zelda picks a number in her head, adds forty to it, multiplies the result by three-halves and then adds five. The final result is seventy-seven. What was her number to begin with?	8
2	What is the sum of the digits in the decimal representation of five-eighths?	13
3	What is the sum of the prime numbers between fifty and sixty?	112
4	What is the product of forty-three times eight?	344
5	Josh flips a coin with one hand while rolling a die with the other. As a common fraction, what is the probability of him getting both a head and a six?	1/12 or "1 over 12" or "1 out of 12"
6	A trapezoid of height six inches has bases of length fifteen and seventeen inches. How many square inches are in the area of the trapezoid?	96 [sq in]
7	As a common fraction, what is the median of the following data set: one-half, six-sevenths, three-eighths, and three-fourths?	5/8 or "5 over 8"
8	A boat is sailing at an average rate of forty-five miles per hour. How many minutes will it take the boat to travel one hundred and twenty miles?	160 [mins]
9	In a class of twenty students, nineteen students earn an average of exactly seventy-nine percent on a test. The student who was absent needs to take the test. What is the percentage this student needs to earn in order to bring the class average up to exactly eighty percent.	99 [%]
10	Laura has seven DVDs on her shelf. Her three Lord of the Rings DVDs must always be next to each other, but it does not matter to her in what order. In how many different ways can her seven DVDs be arranged on her shelf?	720 [ways]

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COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	What is the sum of the fourth powers of each of the first four positive integers?	354
2	As a common fraction, what is the probability of rolling a prime number on a twenty sided die?	2/5 or "2 over 5" or "2 out of 5"
3	A wizard casts a spell on a cube that doubles each of its side lengths. As a common fraction, what is the ratio of its starting volume to its ending volume?	1/8 or "1 over 8" or "1 out of 8"
4	What is the product of eighty-four times five?	420
5	Which positive integer value of X is a solution to the equation: X times X plus X equals thirty?	[X=] 5
6	What is the measure, in degrees, of the complement to a thirty-two-degree angle?	58 [degrees]
7	I am thinking of a three-digit number that has four distinct prime factors. If the greatest of these prime factors is seven, what is the largest number I could be thinking of?	840
8	A mouse is traveling through a maze at an average rate of ten inches per minute. It takes the mouse thirty-six minutes to complete the maze, but twenty-five percent of that time was spent sleeping, and fifty percent of the time was spent on paths that led to dead ends. How many inches long was the correct path?	90 [inches]
9	A pumpkin pie has an area of thirty-six pi square inches. Jared cuts the pie into six equal slices with three cuts through the center of the pie along a diameter. How many inches total did his knife cut?	36 [inches]
10	How many positive integer factors of one hundred and twenty are multiples of three?	8 [factors]

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COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	As a common fraction, what is the quotient of five divided by three eighths?	40/3 or "40 over 3'
2	On any given day, the probability of Buffy slaying a vampire is eighty percent. On days when she slays a vampire, there is a fifty percent chance she'll finish her homework. As a percentage, what is the probability that today she slays a vampire and finishes her homework?	40 [%]
3	The prime factorization of two thousand can be written in the format "A to the B power times C to the D power". What is the sum of A, B, C, and D?	14
4	What is the number of centimeters in the height of a trapezoid with an area of forty-two square centimeters and bases of length five and seven centimeters?	7 [cm]
5	There are frogs and ducks gathered around a pond. In total, there are fifty-two legs and twenty-four wings. How many frogs are there?	7 [frogs]
6	What is the value of X in the following equation: X plus twenty-four equals five X?	[X=] 6
7	A packet of gummy bears has three red, three green, and three yellow and two are pulled out at random. As a common fraction, what is the probability that they will both be the same color?	$\frac{1}{4}$ or "1 over 4" or "1 out of 4"
8	A wheel on a cart has a diameter of one foot. The wheel rotates twenty times as the cart is rolled along a path. Rounded to the nearest whole number, what is the number of feet in the length of the path?	63 [feet]
9	As a common fraction, what is the sum of the reciprocals of two, five, and eighteen?	34/45 or "34 over 45"
10	As a decimal, what is the mean of the following data set: six point two five, five-fourths, twelve, and five-halves?	5.5

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COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	I have a deck of thirty cards with the numbers one through thirty written on them. As a common fraction, what is the probability of drawing a card with the digit two on it?	2/5 or "2 over 5" or "2 out of 5"
2	Circle A has a radius of four inches, and circle B has a circumference of twelve pi inches. As a common fraction, what is the ratio of the area of Circle A to the area of Circle B?	4/9 or "4 to 9" or "4 over 9" or "4 out of 9"
3	What is the remainder when three hundred is divided by thirteen?	1
4	What is the product of the first five prime numbers?	2310
5	What is the value of X in the following equation: four X plus five equals five X minus seven?	[X=] 12
6	Rose is in a chili-pepper-eating contest. After each pepper she takes a breather for ninety seconds multiplied by the number of peppers she has already eaten. If each pepper takes ten seconds to eat, and there are five peppers in all, how many total seconds will have elapsed when she finishes the last pepper?	950 [secs]

Final Score:

KEY

(Out of 8)

"Math is Cool" Masters -- 2017-18
6th Grade

Student Name _____ Team #_____

School Name _____ Proctor Name_____ Room #_____

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score
You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. ***You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.*** *Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

	Answer	1 or 0	1 or 0
1	27 pi [sq in]		
2	3/10 or "3 over 10" or "3 out of 10"		
3	95		
4	[x=] 7		
5	19		
6	90 [degrees]		
7	6 [factors]		
8	40 [minutes]		

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6th Grade

Final Score:
KEY

School Name_____Team #_____

Proctor Name _____Room #_____

First Score

(out of 20)

Team Multiple Choice Contest – 15 minutes – 20% of team score

This test is the only test where you will be penalized for incorrect responses. You will receive 2 points for a correct letter response, 0 points for leaving it blank and -1 point for an incorrect response. When you are prompted to begin, tear off the colored sheet, pass out a copy of the test to each team member, and begin testing. ***Since this is a multiple choice test, ONLY a letter response should be listed as an answer on the answer sheet.***

Correct responses are worth 2 points, incorrect responses are worth -1 point and no response is 0 points.

DO NOT WRITE IN SHADED REGIONS

Answer		-1, 0 or 2	-1, 0 or 2
1	C		
2	D		
3	A		
4	E		
5	C		
6	A		
7	D		
8	D		
9	B		
10	C		

"Math is Cool" Masters – 2017-18
6th Grade

Final Score:
KEY

School Name_____Team #_____

Proctor Name_____Room #_____

First Score

(out of 10)

Team Contest – Score Sheet – 15 minutes – 30% of team score

When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as a 1 or 0. Record all answers on the colored answer sheet.

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	50 [km]		
2	18 [rows]		
3	$\frac{5}{27}$		
4	$\frac{1}{4}$		
5	$\frac{13\pi}{40}$ or $\frac{13}{40}\pi$ [meters per second]		
6	36		
7	$\frac{37}{54}$		
8	$50\sqrt{3}$ [cm^2]		
9	$\frac{6}{11}$		
10	4.5		

"Math is Cool" Masters -- 2017-18

6th Grade

KEY

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
16	5	180 [bubbles]	54 [feet]
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 2

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
[x=] 6	90 [cakes]	324 [meters]	18
90 [cakes]	1 or 0	1 or 0	2 or 0

Final Score:
(Out of 8)

"Math is Cool" Masters -- 2017-18
6th Grade

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	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			

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6th Grade

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Answer		-1, 0 or 2	-1, 0 or 2
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

“Math is Cool” Masters – 2017-18
6th Grade

Final Score:

School Name_____Team #_____

Proctor Name_____Room #_____

First Score

(out of 10)

Team Contest – Score Sheet – 15 minutes – 30% of team score

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DO NOT WRITE IN SHADED REGIONS

Answer		1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			