"Math is Cool" Masters – 2014-15

December 6, 2014

Total Correct: KEY

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

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

GEOMETRY - Individual Contest – Score Sheet
DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	21		
2	12500		
3	-21		
4	14		
5	1010		
6	$215^{[\circ]}$		
7	200		
8	[x =] 5		
9	6 [interior angles]		
10	19 [quarters]		
11	37		
12	63		
13	27		
14	7		
15	8/27		
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16	84 [in^2]		
17	5/6		
18	[x=] 19		
19	8 [factors]		
20	70		
21	8		
22	360 [arrangements]		
23	77		
24	9/19		
25	Tuesday		
26	10		
27	$16\pi - 32$ [cm^2]		
28	3 [solutions]		
29	$30^{[\circ]}$		
30	[$] 3		
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31	1/4		
32	76 [triangles]		
33	3π [cm^2]		
34	Thursday		
35	54 [values]		
36	42 [paths]		
37	[x =] $\frac{11\sqrt{5}}{2}$ [inches]		
38	13		
39	$18\sqrt{3}$ [in^3]		
40	$\frac{875}{192}$ [m/s]		
31-40 TOTAL:			

GEOMETRY

Total Correct:

"Math is Cool" Masters – 2014-15

December 6, 2014

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

GEOMETRY - 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:			

GEOMETRY

"Math is Cool" Masters – 2014-15

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December 6, 2014

7th & 8th 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, both competitors and observers. Display of poor sportsmanship may result in disqualification.*
- *Calculators or any other aids may not be used on any portion of this contest.*
- *Unless stated otherwise, all rational, non-integer answers need to be expressed as reduced common fractions except in case problems dealing with money. In the case of problems requiring dollar answers, answer as a decimal rounded to the neares hundredth (ie, to the nearest cent).*
- *All radicals must be simplified and all denominators must be rationalized.*
- *Units are not necessary as part of your answer unless it is a problem that deals with time and in that case, a.m. or p.m. is required. 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 (name, team number, etc.) at the top of the sheet filled out.*
- *Tests will be scored as a 0 if answers are not recorded on the answer sheets.*
- *Blank answer sheets and answer sheets with no name will 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

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.*

"Math is Cool" Masters – 2014-15

Sponsored by: REC Silicon

7th & 8th Grade – December 6, 2014

Mental Math Contest

Mental Math – 30 sec per question

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

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.*

#	Problem
1	Let 7 times 6 equal 'a'. As a fraction, what is 1 divided by 'a'?
2	On Monday, Miley takes 6 selfies. On each of the next four days she takes six more selfies than she did the previous day. What is the total number of selfies that she takes during the five days?
3	There are 3 times as many vampires as werewolves. If there is a combined total of 68 vampires and werewolves, what is the number of vampires?
4	What is the number of perfect squares that are between fifty and one hundred twenty-five?
5	A square has an area of one hundred square centimeters. What is the number of centimeters in the circumference of a circle inscribed in the square? Give your answer in terms of pi.
6	Two standard six-sided dice are rolled and the numbers showing are added together. What is the probability of rolling a sum of nine?
7	Lisa runs at a rate of 5 miles per hour. What is the number of minutes that it takes her to run seven and one half miles?
8	Seven fortnuckles are equivalent to 3 speriwinkles and 9 speriwinkles are equivalent to 5 batmans. What is the number of fortnuckles that are equivalent to 15 batmans?

“Math is Cool” Masters – 2014-15

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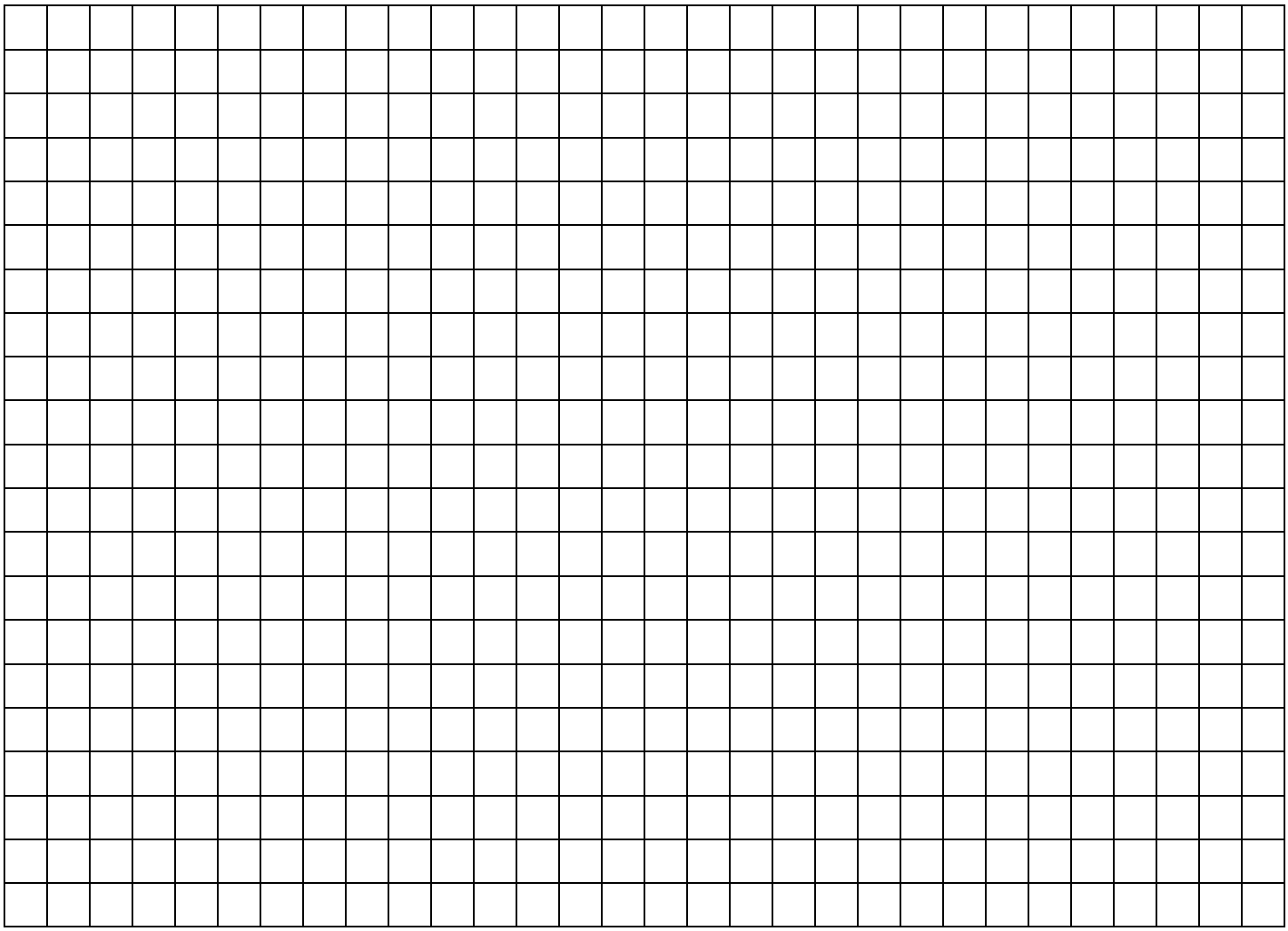
December 6, 2014

GEOMETRY - 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 – GEOMETRY - 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.



"Math is Cool" Masters – 2014-15

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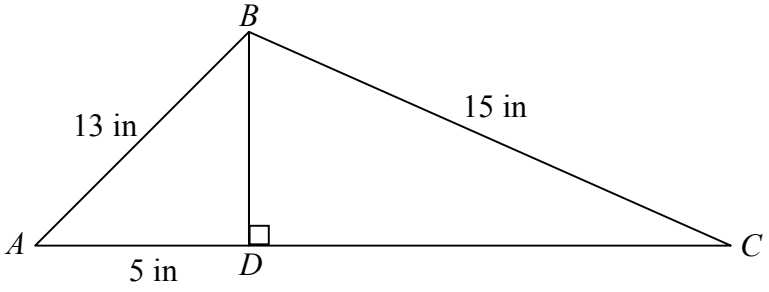
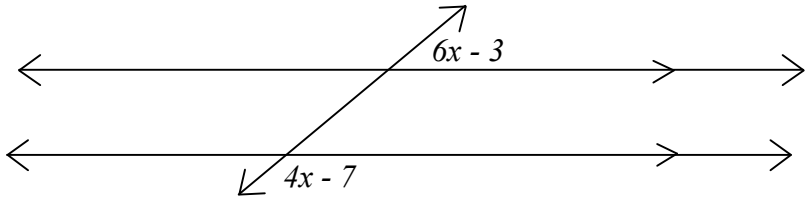
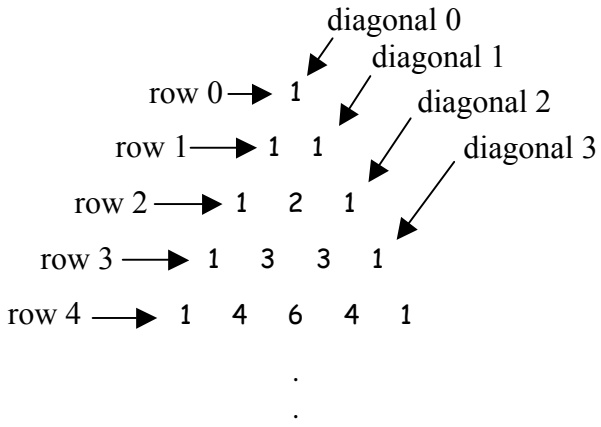
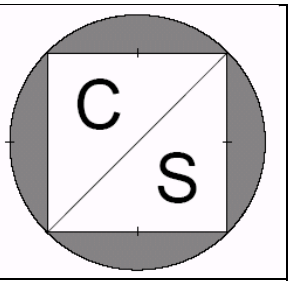
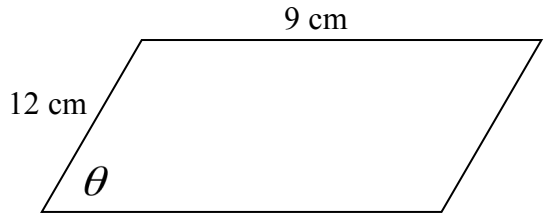
December 6, 2014

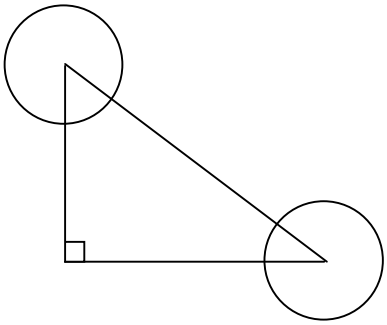
GEOMETRY - Individual Contest

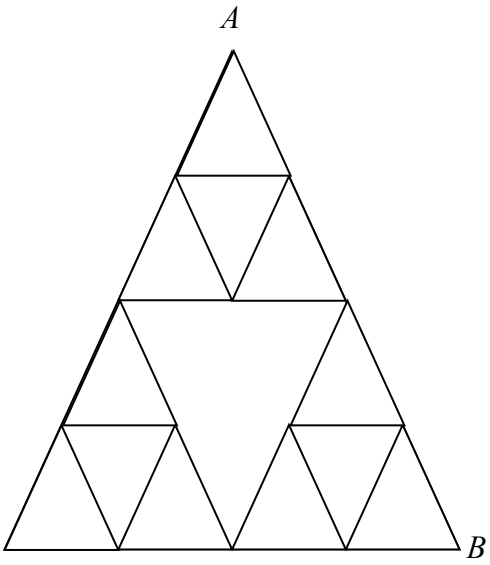
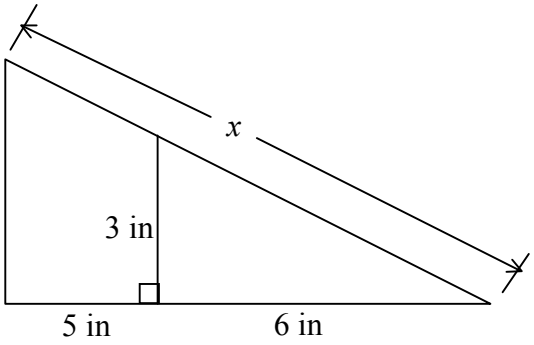
	Questions 1-30: 2 points each
1	What is the sum of the numbers 1 through 6?
2	Evaluate: $2^2 \cdot 5^5$
3	What is the next term in the series: 3, -3, -9, -15, …
4	If #112 = 4, #57 = 12, and #36 = 9, then what is #95?
5	What is the sum of the largest 3-digit palindrome and the smallest 2-digit palindrome?
6	Benny is facing north. He turns to his right 35°. From this position, how many degrees must he turn to his left in order to be pointing south?
7	What is 200% of 100?
8	Solve the following equation for x: $-3x + 7 = -8$
9	What is the number of interior angles in a hexagon?
10	What is the number of quarters in a stack of quarters worth $4.75?
11	Evaluate: $5(3^2 - 2) + 16 \div 8$
12	What is the positive difference between 4 times 9 and 11 times 9?
13	When $\frac{1}{7}$ is written as a decimal there is a string of six digits that repeat forever. What is the sum of those six digits?
14	If a and b are consecutive integers and $a < \sqrt[3]{37} < b$. what is $a + b$?
15	Write the following expression as a common fraction: 8×3^{-3}
16	In ΔABC , AB = 13 in, BC = 15 in, and AD = 5 in. What is the number of square inches in the area of ΔABC ? The figure is not drawn to scale. 
17	If $\frac{1}{2}$ is $\frac{3}{4}$ of $\frac{4}{5}$ of a certain number, what is that number?

18	Two parallel lines are crossed by a transversal as shown. What is the value x. 
19	What is the number of positive integer factors of the number 310?
20	In Pascal's Triangle, shown below, what number will be in row 8, diagonal 4?  .
21	The point $A(-3, 5)$ is rotated 90° clockwise about the origin. What is the sum of the coordinates of A'?
22	What is the number of distinct four-letter arrangements that can be formed using the letters in the word CYLINDER, that have no vowels? (Y is not a vowel.)
23	Miley's scores on her first three math tests are 64, 61, and 74. After taking her 4th test her mean test score equals her median test score. What was her score on the 4th test if it was her best score of the four tests?
24	Aaron randomly selects two distinct integers from 1 to 20 and adds them together. As a fraction, what is the probability that the sum is even?
25	Rowan and Molly are reading the same book. They started reading on different days and they have different pages-per-day reading rates. They also read the same number of pages every day until they finish the book. Molly and Rowan read during the day on Wednesday and when they finished reading that day they both had read exactly 60% of the book. Molly reads three times as many pages per day as Rowan and she finishes the book on Friday, after two more days of reading. On what day of the week did Rowan start the book?
26	The expression $2x^2 - 7x - 15$ can be written in two equivalent ways in the factored form $(ax + b)(cx + d)$, where a, b, c and d are all integers. It can also be written in an infinite number of equivalent ways in which a, b, c and d are not required to be integers. If, in one of these equivalent ways, $a = \frac{1}{2}$ and $b = -2.5$, what is the sum of $c + d$?

27	Joe, Bob, and Isaak were selected to design a logo for a computer company. If the diameter of the circle is 8 cm, what is the number of square centimeters in the area of the shaded region (not including the letters)? 
28	What is the number of solutions, *(x, y)*, to the equation $2y + 3x = 19$ in which both x and y are positive integers?
29	The area of the parallelogram shown is 54 square centimeters. What is the number of degrees in angle θ? The figure is not to scale. 
30	It costs \$17.00 to play a game in which you draw a card at random from a 52-card deck and roll two fair 6-sided dice. If you draw a Ten, Jack, Queen or King and roll a sum that is a prime number, you win \$156. Otherwise, you win nothing. What is the number of dollars in the expected gain or loss of playing this game?

Challenge Questions: 3 pts each

31	A point is chosen at random from within a circular region. What is the probability that the point is closer to the center of the region than it is to the boundary of the region?
32	How many distinct triangles can be formed whose vertices are three points on the grid shown? • • • • • • • • •
33	Two congruent circles are placed on the acute angles of a right triangle such that the circles are centered on the vertices of those angles, as shown. The combined area of the sectors of the circles that are outside of the triangle is 21π square centimeters. What is the number of square centimeters in the area of the sectors of the circles that are inside the triangle? 
34	Alice met a lion and unicorn under a tree. The lion lies on Mondays, Tuesdays, and Wednesdays but tells the truth on all the other days of the week. The unicorn lies on Thursdays, Fridays, and Saturdays but tells the truth on all the other days of the week. On the same day, they made the following statements: Lion: "Yesterday was one of my lying days." Unicorn: "Yesterday was one of my lying days." From these two statements, Alice was able to deduce the day of the week. What was it?
35	Monty has 9 bills in his wallet. He knows that each is either a $1 bill, a $5 bill, or a $10 bill. What is the number of distinct dollar values that his 9 bills could have?

36	In the diagram, when traveling from point *A* to point *B*, you may go down to the left or the right along a segment. When moving horizontally, you must go right along a segment. Following these rules, what is the number of distinct paths from point *A* to point *B*? 
37	What is the number of inches in the length of the side labeled *x*. 
38	Evaluate: $1+2\sqrt{3\cdot 2\sqrt{3\cdot 2\sqrt{3\cdot\ldots}}}$
39	A sphere has a volume of 27π cubic inches. What is the number of cubic inches in the volume of the largest cube that fits inside of the sphere?
40	In a relay race, four runners run around a 400 meter track one after the other passing off a baton to the next runner when one runner finishes off his lap. The math team decides to send its slowest runners first and faster runners last. The 1st runner runs at $\frac{3}{4}$ the speed of the 2nd runner, the 2nd runner runs at $\frac{3}{4}$ the speed of the 3rd runner, who runs at $\frac{3}{4}$ of the speed of the 4th runner. The math team finishes the relay in 4 minutes total. What is the speed of the 1st runner in meters per second?

GEOMETRY

"Math is Cool" Masters – 2014-15

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8th Grade – December 6, 2014

Individual Multiple Choice Contest

Refer to this chart for problems 1-3

	Buffalo Grass	Carpet Grass	Kentucky Blue Grass	Zoysia Grass	Rye Grass
Price per m^2	11$	7$	5$	20$	1$
Growth Rate per week	3 cm	1 cm	1.5 cm	3 cm	7 cm
Water Consumption per day	2 gallons	10 gallons	0.8 gallons	6 gallons	5.5 gallons

1	After three weeks, what is the number of centimeters in the positive difference between the amount of growth of rye grass and the amount of growth of Kentucky blue grass? A) 4.5 cm B) 14.5 cm C) 15.5 cm D) 16.5 cm E) 21 cm
2	Which grass has the largest ratio of growth rate per week to water consumption? A) Rye B) Zoysia C) Kentucky Blue D) Carpet E) Buffalo
3	Jayze wants to grow grass on his trapezoid-shaped lawn. The trapezoid shape of his lawn has bases of 10 meters and 6 meters and a height of 4 meters. What is the number of dollars he will spend to use carpet grass on his lawn? A) $112 B) $224 C) $352 D) $448 E) $840

Refer to these rules about Pythagorean triples for problems 4-6

Pythagorean triples are sets of three positive integers that satisfy the equation $a^2 + b^2 = c^2$. For example, {8, 15, 17} is a Pythagorean triple because $8^2 + 15^2 = 17^2$. Three rules for generating Pythagorean triples are as follows:

1. If a is an odd integer, then $b + c = a^2$, where b and c are consecutive integers. Some examples are shown below:

a	b	c	a^2
3	4	5	9
5	12	13	25
7	24	25	49
9	40	41	81
11	60	61	121
13	84	85	169

2. If a is an even integer, then $b + c = .5a^2$, where b and c are consecutive integers that differ by 2. Some examples are shown below:

a	b	c	$.5a^2$
4	3	5	8
6	8	10	18
8	15	17	32
10	24	26	50
12	35	37	72
14	48	50	98

3. Any set of multiples of a Pythagorean triple is also a Pythagorean triple. For example {6, 8, 10} and {9, 12, 15} are multiples of {3, 4, 5} and they are also Pythagorean triples.

4 What is the number of sets of multiples of {3, 4, 5}, including {3, 4, 5}, that have c-values less than 100?

A) 100 B) 99 C) 60 D) 20 E) 19

5 What is the largest value of b in a Pythagorean triple that is less than 100?

A) 84 B) 92 C) 97 D) 98 E) 99

6 What is the number of distinct integers less than 100 that can be values of c in a Pythagorean triple?

A) 99 B) 43 C) 42 D) 34 E) 33

Refer to these equations for problems 7-10

A	B	C
$y = \frac{2}{3}x + 2$	$y = 2x - 6$	$-4 + y = x$

7 What is the slope of the line perpendicular to the line with equation A?

A) $-\frac{3}{2}$ B) $-\frac{2}{3}$ C) 0 D) $\frac{2}{3}$ E) $\frac{3}{2}$

8 What is the number of square units in the area of the shape enclosed by the lines with equations A and B, the x-axis, and the y-axis.

A) 36 units^2 B) 24 units^2 C) 21 units^2 D) 15 units^2 E) 12 units^2

9 What is the number of units in the distance between the point of intersection of the lines with equations A and B and the point of intersection of the lines with equations A and C?

A) 4 units B) $4\sqrt{13}$ units C) 20 units D) $13\sqrt{8}$ units E) $16\sqrt{13}$ units

10 What is the number of cubic units in the volume of the 3-dimensional space that is enclosed when the line with equation B is rotated around the x-axis for $0 < x < 5$ $-3 < x < 5$?

A) 204π units^3 B) 140π units^3 C) 68π units^3 D) 148 units^3 E) $\frac{140}{3}\pi$ units^3

"Math is Cool" Masters – 2014-15

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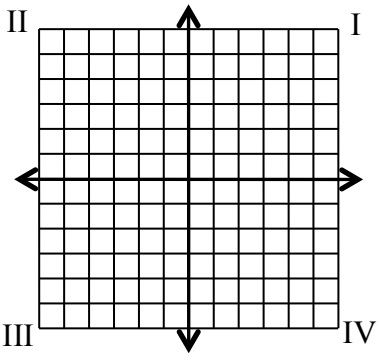
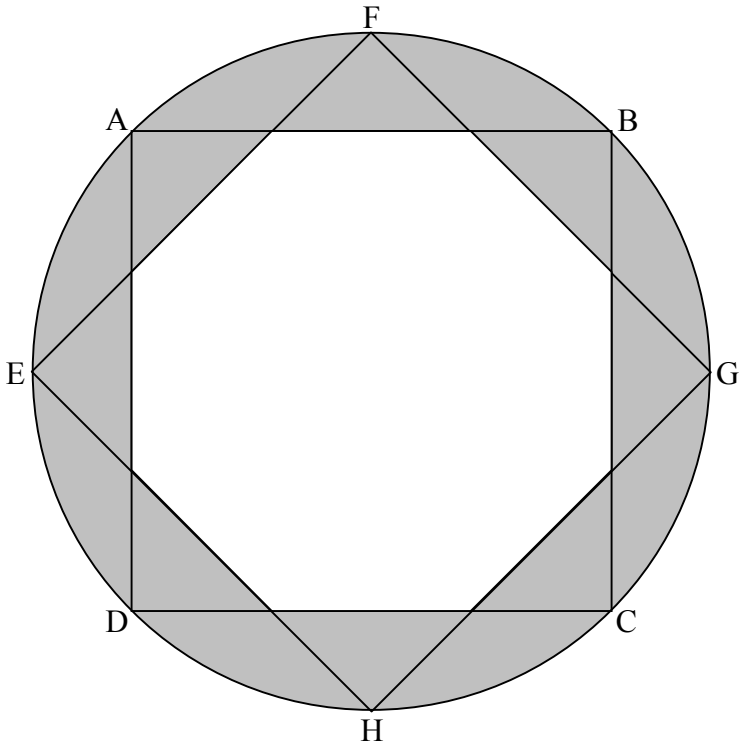
8th Grade – December 6, 2014

Team Contest

1	In how many distinct ways can you make 50 cents using nickels, dimes and quarters?
2	Billy multiplies his favorite number by 10. He then adds 10 to the resulting product. Then he divides the resulting sum by 10, after which he subtracts 10 from the resulting quotient. Finally he subtracts the resulting difference from his favorite number. What is the result?
3	In her first four seasons, Millie Ways has hit 20, 24, 18, and 14 home runs. What is the number of home runs she needs to hit this season in order to raise her overall average to exactly 20 home runs per season?
4	Two of the side lengths of a triangle are 3 cm and 4 cm in length. The length of the third side is also an integer number of centimeters. What fraction of the total possible number of triangles meeting this description are isosceles triangles?
5	Express the base-10 number 259 in base-4.
6	A train traveling at an average speed of 60 miles per hour goes from point A to point B in 15 minutes. As a common fraction, what is the number of minutes it would take the train to travel from A to B going at an average rate of 35 miles per hour?
7	In the equation $a\sqrt{b} = \sqrt{432}$ there are several solutions *(a, b),* where a^2 and b are positive integers whose product is 432. One solution is *(4, 27),* because $4\sqrt{27} = \sqrt{432}$ and $4^2 \cdot 27 = 432$. If $a^2 \neq 1$, what is the positive difference between the largest value of a and the largest value of b in any of the possible solutions?
8	The point of intersection of the two lines with equations 4x + 3y = 2 and y = 2x + 4 is the center of a circle with radius 5 units. As an (x, y) pair, what are the coordinates of the point of intersection that occurs in quadrant IV of the line with equation 4x + 3y = 2 and the circle? 
9	Two three digit numbers are chosen at random. The two numbers may be the same number. What is the probability that one of the two chosen numbers is a multiple of 3 or 5 and the other is not a multiple of 3 or 5?

10	A window has an octagonal pane of glass (the unshaded region) and a frame (the shaded region) as shown. The design of the frame includes two overlapping squares both inscribed in the same circle. The diagonal $\overline{EG}$ (not shown) in square EFGH is parallel to sides $\overline{AB}$ and $\overline{CD}$ of square ABCD. The eight isosceles right triangles formed by the overlapping squares are congruent to each other. If the diameter of the circle is 20 inches, what is the number of square inches in the frame? Give your answer rounded to the nearest ten square inches.	

“Math is Cool” Masters – 2014-15

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8th Grade – December 6, 2014

Pressure Round Contest

1	The least common multiple of two numbers is 72, and the greatest common factor of the same two numbers is 12. What is the sum of the two numbers?
2	A regular polygon has interior angles whose measures add to 2340 degrees. What is the number of diagonals in the polygon?
3	An equilateral triangle inscribed in a circle has sides of length 6 cm. What is the number of square centimeters in the positive difference between the area of the circle and the area of the triangle?
4	There are 1024 B in 1 KB, 1024 KB in 1 MB, and 1024 MB in 1 GB. How many total combined KB are there in 3 GB, 56 MB, and 4096 B?
5	What is the mean of the first 10 positive perfect squares? Answer as a decimal.

"Math is Cool" Masters – 2014-15

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7th & 8th Grade – December 6, 2014

COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	What is twenty times fourteen divided by two thousand and fourteen expressed as a common fraction?	$\frac{140}{1007}$ or '140 over 1007'
2	Two diagonals of a regular pentagon are chosen at random. What is the probability that they are parallel?	0 or '0 over 5' or '0 out of 5'
3	A horse runs at an average rate of twelve miles per hour. What is the number of miles run by the horse if it runs for one hundred minutes?	20 [miles]
4	What is the product of eighty-eight times eighty-two?	7216
5	What is the number of minutes that pass from two-oh-two AM to seven fifty-eight PM?	1076 [minutes]
6	What is the number of distinct arrangements of the letters in the word 'problem', spelled P-R-O-B-L-E-M?	5040 [arrangements]
7	In a group of fifty people everyone shakes hands exactly once with everyone else. What is the total number of handshakes that occur?	1225 [handshakes]
8	What is the number of cubic inches in the volume of a cube with surface area one thousand fourteen square inches?	2197 [inches^3]
9	What is the sum of the first eight positive multiples of eleven?	396
10	What is the sum of the two solutions to the equation 'x' squared plus six 'x' plus nine equals twenty-five.	-6

"Math is Cool" Masters – 2014-15

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7th & 8th Grade – December 6, 2014

COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	What is the remainder when two thousand fourteen is divided by seven?	5
2	A machine makes fifty-two pencils per minute. How many pencils does it make in nine minutes?	468 [pencils]
3	What is the number of cubic centimeters in the volume of a cube with side length one hundred centimeters?	1 million [cm^3] or 1000000 [cm^3]
4	To make a dinner dish you have three side choices, twelve entrée choices, and five dessert choices. If you have to choose one side, one entrée and one dessert, what is the number of distinct dinner dishes you can make?	180 [dinner dishes]
5	What is the product of the first five prime numbers?	2310
6	As a decimal, what is seven percent of the sum of one hundred two and fifty-eight?	11.2
7	What is the number of degrees in the larger angle formed by the hands of a clock when the time is seven o'clock?	210 [degrees]
8	What is the hundredths digit of the decimal representation of three thirteenths?	3
9	How many cups are in twenty-two gallons?	352 [cups]
10	What is the number of feet in the perimeter of an isosceles triangle with base forty-eight feet and a height of seven feet?	98 [feet]

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7th & 8th Grade – December 6, 2014

COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	What is the product of the largest and smallest two digit palindromes?	1089
2	Solve for 'x' if seventeen minus three 'x' equals thirty-three. Answer as a common fraction. $2x + 7 = 10$	$-\frac{16}{3}$
3	What is the remainder when twelve thousand three hundred forty five is divided by three?	0
4	What is the probability of rolling the same number twice in two rolls of a fair 6-sided die?	$\frac{1}{6}$ or '1 over 6' or '1 out of 6'
5	Jenna has four green socks, five red socks, six blue socks and seven brown socks in her sock drawer. Without looking, what is the minimum number of socks she must pull out of her drawer to be sure that she has a matching pair?	5 [socks]
6	What is ten percent of twenty percent of the sum of one hundred fifty-three plus forty-seven?	4
7	What is the number of degrees in the measure of one interior angle of a regular octagon?	135 [degrees]
8	What is nineteen squared times two?	722
9	What is the sum of all of the diagonals in a triangle, a pentagon, and an octagon?	25 [diagonals]
10	What is the probability of drawing three hearts in a row, without replacement, from a standard deck of cards?	$\frac{11}{850}$ or '11 over 850' or '11 out of 850'

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7th & 8th Grade – December 6, 2014

COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	How many different ways can you make twenty-five cents with pennies and nickels?	6 [ways]
2	The product of two thousand fourteen times four is the same as the product of sixteen and what number? Give your answer as a decimal.	503.5
3	What is the sum of the two largest two-digit prime numbers?	186
4	My number multiplied by five then divided by three equals fifteen. What is my number?	9
5	What is the number of cubic feet in the volume of a rectangular prism with side lengths of four, twelve, and thirteen feet?	624 [feet^3]
6	A fish swims one foot every one point five seconds. What is the number of feet that it travels in one point five minutes?	60 [feet]
7	A fair coin is tossed five times. What is the probability of getting exactly four heads or exactly four tails?	$\frac{5}{16}$ or '5 over 16' or '5 out of 16'
8	Solve for 'x' if the quantity 'x' plus one to the third power equals one hundred twenty-five.	[x =] 4
9	Jake makes fifteen percent of his free throws. If he wants to make sixty-three free throws, how many shots must he attempt?	420 [shots]
10	A rectangle has an area of six hundred fifty square meters and the lengths of its sides are integers. What is the number of meters in the smallest possible perimeter of a rectangle with this area?	102 [feet]

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7th & 8th Grade – December 6, 2014

COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	What is the sum of three-fifths and two-elevenths?	$\frac{43}{55}$ or '43 over 55'
2	A bag contains three red marbles and seven green marbles. What is the probability of drawing a red marble and then a green marble, without replacement?	$\frac{7}{30}$ or '7 over 30'
3	Tyson solves a Rubik's Cube three times with the times of fifty-nine, thirty, and fifty-eight seconds. What is the number of seconds in his mean solving time?	49 [seconds]
4	What is the product of two to the fourth power times five squared.	400
5	If 'x' equals four and 'y' equals two, evaluate 'x' squared plus 'xy' plus 'y' squared.	28
6	Sixty is what percent of seven hundred and fifty?	8 [percent]
7	What is the number of diagonals in a dodecagon?	54 [diagonals]
8	A machine can inflate thirty-six balloons per minute. What is the number of minutes it would take this machine to inflate eight hundred twenty-eight balloons?	23 [minutes]
9	A circle with radius five centimeters is drawn completely inside a circle with radius eight centimeters. What is the number of square centimeters in the area within the larger circle but outside the smaller circle?	39 pi [cm^2]π
10	What is the number of minutes it would take Amy to read an eight-hundred-and-fifty-two-page novel if she reads one page every forty-five seconds?	639 [minutes]

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7th & 8th Grade – December 6, 2014

COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	What is the product of the ninth and tenth positive multiples of six?	3240
2	What is the number of square inches in the area of a circle with diameter twenty-six inches?	169 pi [inches^2]
3	What is the probability of rolling three threes in three tosses of a fair 6-sided die?	$\frac{1}{216}$ or '1 over 216' or '1 out of 216'
4	Evaluate twenty-two to the power of two, plus two.	486
5	A musician plays one thousand eight hundred forty-one notes in a two- hundred-sixty-three-second-long song. On average, what is the number of notes per second the musician plays?	7 [notes per second]
6	What is the number of prime numbers between one and fifty?	15 [prime numbers]
7	Hanna has some cats and some canaries as pets. If there are a total of thirteen heads and thirty-six feet, what is the number of canaries she has as pets?	8 [canaries]
8	What is the number of gallons in five hundred seventy-six pints?	72 [gallons]
9	A one-hundred-milliliter mixture contains seventy milliliters of water and thirty milliliters of bubble solution. How many milliliters of bubble solution must be added to make the mixture sixty-five percent bubble solution?	100 [milliliters]
10	Andrew walks four miles per hour on average. From point A, he walks eight miles south and then six miles west to point B. What is the number of minutes he would have saved if he had walked in a straight line from point A to point B?	60 [minutes]

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COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	A train leaves the station traveling thirty-five miles per hour on average. As a decimal, what is the number of miles it will have traveled after two hundred and ten minutes?	122.5 [miles]
2	What is the number of full dozens you can divide five thousand three hundred thirty-five cookies into?	444 [dozens]
3	A circle is inscribed in a square. The area of the circle is one hundred forty-four pi square inches. What is the number of inches in the perimeter of the square?	96 [inches]
4	What is the number of minutes in twenty-four hours?	1440 [minutes]
5	A regular hexagon with side length 6 inches is cut along its longest diagonal creating two congruent trapezoids. What is the number of inches in the positive difference between the perimeter of the original hexagon and the perimeter of one of the trapezoids?	6 [inches]

Extra

Final Score:

KEY

(Out of 8)

"Math is Cool" Masters -- 2014-15

School: _____ Room # _____ Team # _____

Name: _____ Proctor: _____

7th & 8th Grade Mental Math – 30 sec per question

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

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	1/42		
2	90 [selfies]		
3	51 [vampires]		
4	4 [perfect squares]		
5	10π [square centimeters]		
6	1/9		
7	90 [minutes]		
8	63 [fortnuckles]		

Math is Cool" Masters – 2014-15

8th Grade – December 6, 2014

Final Score:

KEY

Student Name _____

Proctor Name _____ Room # _____

First Score

(out of 20)

SCHOOL NAME _____ **Team #** _____

INDIVIDUAL MULTIPLE CHOICE - 15 minutes – 10 problems – 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. It is not necessary to write your personal name on the test, but you may put it at the bottom of the test so your coach will be able to give you back the correct test. This test is taken individually, but it is part of your team score, including zeros for missing team members. Your team score will be calculated by taking the mean of your four team members' scores. When you are prompted to begin, tear off the colored sheet and begin testing. ***Since this is a multiple choice test, ONLY a letter response should be indicated as an answer on the answer sheet.*** *No talking during the test.*

DO NOT WRITE IN SHADED REGIONS

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

"Math is Cool" Masters – 2014-15

8th Grade – December 6, 2014

Final Score: KEY

First Score (out of 10)

SCHOOL NAME _____ **Team #** _____

Proctor Name _____ Room # _____

Team Contest – Score Sheet

TEAM TEST - 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 **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	10 [ways]		
2	9		
3	24 [home runs]		
4	$\frac{2}{5}$		
5	$10003_{[4]}$		
6	$\frac{180}{7}$ [minutes]		
7	96		
8	(2, -2)		
9	$\frac{112}{225}$		
10	150 [in^2]		

"Math is Cool" Masters – 2014-15

8th Grade – December 6, 2014

Final Score: KEY

Proctor Name _____ Room # _____

First Score

SCHOOL NAME _____ **Team #** _____

PRESSURE ROUND - 10 minutes – 5 problems - 5 rounds – 15% of team score

When it is time to begin, you will be handed a packet of five problems. There is a copy of the problems for each team member. Two minutes after the start of the test you are expected to submit an answer for one of the problems (it can simply be a guess). The maximum value of this answer is 1 point. In another two minutes you are expected to submit another answer to one of the four remaining problems; its maximum value is two points. This process will continue until all the problems are answered and each consecutive problem's worth will go up by one point. You must submit your answers on the colored sheets given to you. If you do not have an answer at the end of a two minute period, you must still submit an answer sheet with an identified problem number on it. Failure to do so will result in loss of points. This event is timed, and you will be given a verbal 5 second warning and told to hold your answer sheet up in the air. You may keep working as the sheets are collected. If a team answers the same question more than once, only the first answer will be scored and the other attempts will be ignored.

Pressure Round Answers

	Answer
1	84
2	90 [diagonals]
3	$12\pi - 9\sqrt{3}$ [cm^2]
4	3203076 [KB]
5	38.5

Final Score:

(Out of 8)

"Math is Cool" Masters -- 2014-15

School: _____ Room # _____ Team # _____

Name: _____ Proctor: _____

7th & 8th Grade **Mental Math** – 30 sec per question

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

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			
2			
3			
4			
5			
6			
7			
8			

Math is Cool" Masters – 2014-15

8th Grade – December 6, 2014

Final Score:

Student Name _____

Proctor Name _____ Room # _____

First Score
(out of 20)

SCHOOL NAME _____ **Team #** _____

INDIVIDUAL MULTIPLE CHOICE - 15 minutes – 10 problems – 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. It is not necessary to write your personal name on the test, but you may put it at the bottom of the test so your coach will be able to give you back the correct test. This test is taken individually, but it is part of your team score, including zeros for missing team members. Your team score will be calculated by taking the mean of your four team members' scores. When you are prompted to begin, tear off the colored sheet and begin testing. ***Since this is a multiple choice test, ONLY a letter response should be indicated as an answer on the answer sheet.*** *No talking during the test.*

DO NOT WRITE IN SHADED REGIONS

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

"Math is Cool" Masters – 2014-15

8th Grade – December 6, 2014

Final Score:

SCHOOL NAME _____ **Team #** _____

First Score
(out of 10)

Proctor Name _____ Room # _____

Team Contest – Score Sheet

TEAM TEST - 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			