"Math is Cool" Championships – 2015-16

November 6, 2015

Total Correct: KEY

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

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

7th & 8th Grade Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	[+] 1688		
2	$\sqrt{3}, 2\sqrt{3}$		
3	207/22		
4	[x =] 5		
5	(5/3, 0)		
6	138 [°]		
7	35 [ways]		
8	-9		
9	3 [cm]		
10	7 [units]		
11	-7		
12	[$] 25 [.00]		
13	30 [hours]		
14	[$] 1.05		
15	70 [miles]		
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16	$8x^{17}y^{25}$		
17	32 [%]		
18	39 [units]		
19	$x \leq 3$ or $(-\infty, 3]$		
20	120 [minutes]		
21	12		
22	90 [minutes]		
23	27 [students]		
24	20 [miles]		
25	40 [mph]		
26	5/12		
27	1.5 [ounces]		
28	52 [square units]		
29	$743_{[8]}$		
30	4		
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31	20 [cubic yards]		
32	350 [yards]		
33	$3 - 2\sqrt{2}$ [inches]		
34	972		
35	95 [questions]		
36	9		
37	10 [eggs]		
38	$\frac{625\pi}{36}$ [square units]		
39	3 [sets]		
40	7106		
31-40 TOTAL:			

Total Correct:

"Math is Cool" Championships – 2015-16

November 6, 2015

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

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

7th & 8th 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:			

"Math is Cool" Championships – 2015-16

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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 <u>all</u> 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.*

<u>Mental Math</u> – 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.*

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7th & 8th Grade – November 6, 2015

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	What is the positive difference between 831 and 295?
2	Solve the equation: 5 times "x" minus 11 equals 34
3	Carla had 47 pencils. She gave as many whole pencils to her 22 math team members to use at the math contest, while still giving each the same number of pencils. How many did she have left over for herself?
4	A field has 30 goats and chickens in it. There are a total of 100 feet in the field. How many chickens are in the field?
5	Four fair coins are flipped. What is the probability they all land tails up?
6	How many different ways can 5 different beads be arranged on a bracelet?
7	How many numbers between one and one hundred have exactly one five in them?
8	A store advertised their sale as follows: "Buy three tires for the regular price, and pay seven dollars for the fourth tire." Mac paid a total of two hundred and thirty-eight dollars for four tires. How much is the regular price of one tire, in dollars?

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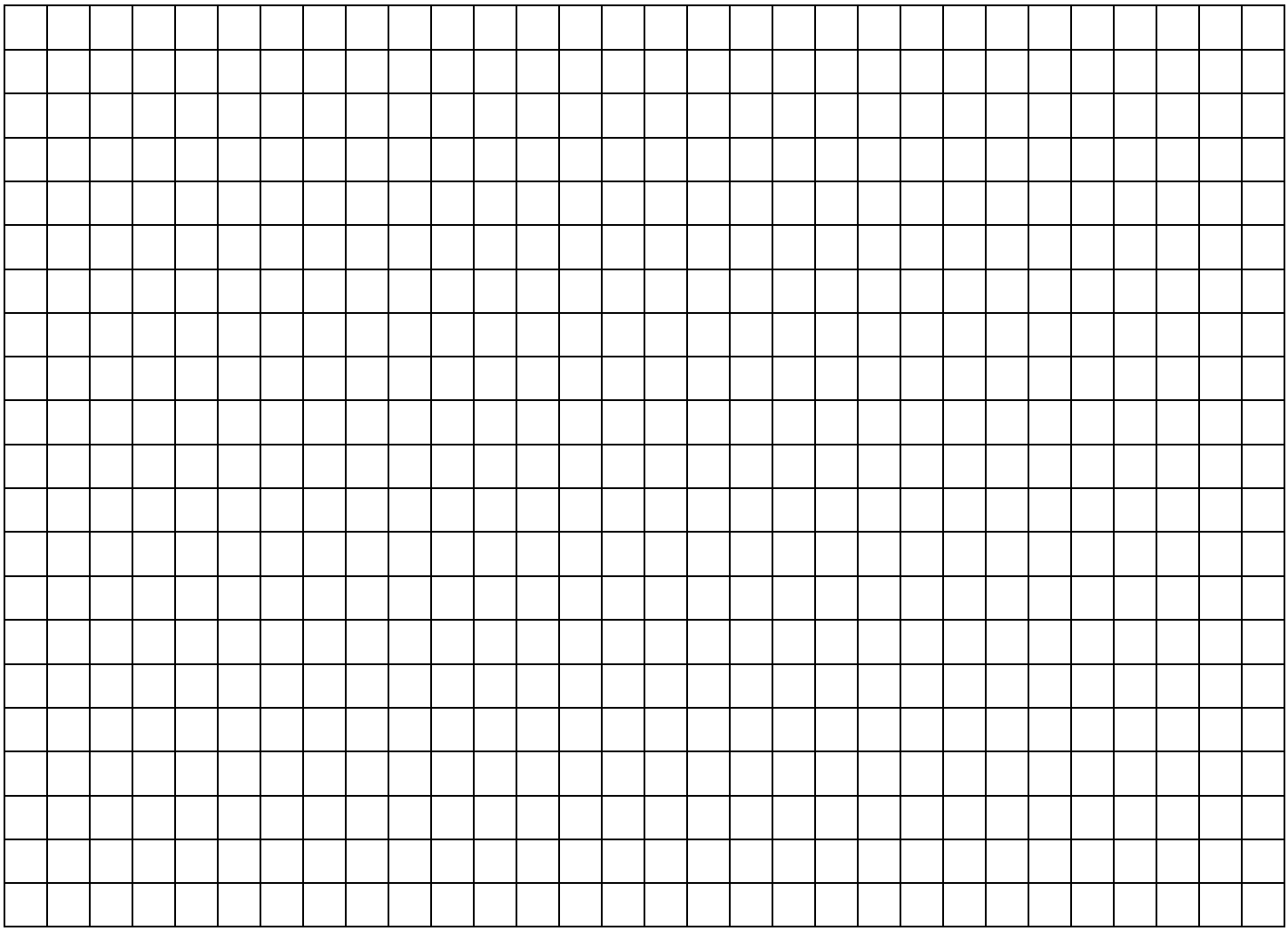
7th & 8th Grade Individual Contest

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 – 7th & 8th Grade - 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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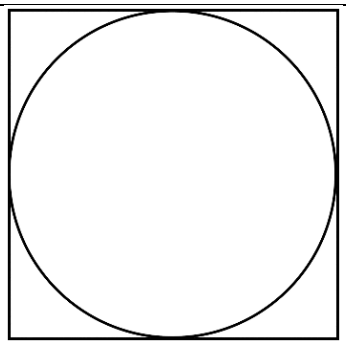
7th & 8th Grade Individual Contest

	Questions 1-30: 2 points each
1	What is the positive difference between 10,021 and 8,333?
2	From the following set of numbers, choose two irrational numbers whose product is rational. $\{\frac{2}{3}, \frac{3}{2}, -4, 3, \sqrt{3}, 2\sqrt{3}, 7, \pi\}$
3	Evaluate: $12\frac{4}{11} - 2\frac{21}{22}$ and write the answer as a reduced improper fraction.
4	Solve for x: 3x - 8 = 7
5	What are the coordinates of the x-intercept for the line given by the equation 6x + 3y = 10?
6	Two angles are supplementary. The measure of one angle is 42^0. What is the measure, in degrees, of the other angle?
7	I have 3 identical math books and 4 identical English books. In how many ways can I order them on my shelf?
8	What is the slope of a line passing through the points (-4, 7) and (-2, -11)?
9	The volume of a circular cone is 9π cubic centimeters. The area of the base is 9π square centimeters. What is the altitude of the cone?
10	What is the radius of a circle with an area of 49π square units?
11	Evaluate: $\frac{a^3+b^2}{\lvert a\rvert-1}$ if a = -2 and b = -1.
12	The following function D(t) = 25t + 150 models how much money, in dollars D(t), Millie has in her saving account after t weeks. How much, in dollars, does Millie save each week?
13	How many hours would it take to travel 630 miles at 21 miles per hour?
14	Twelve tomatoes cost $2.52. How much, in dollars, would 5 tomatoes cost?
15	Fred lives 30 miles away from school. Early in the morning, he begins driving to school. When he is 10 miles from school he realizes he forgot his calculator and drives back home to get it. How many total miles did he travel before making it to school?
16	Simplify and write with only positive exponents: $\frac{(4x^5y^6)^3}{8x^{-2}y^{-7}}$

17	Nellie increased all the prices in her store by 10%. The following week, she decided to raise all the increased prices by 20%. What is the overall percent increase on the prices?
18	What is the length of the hypotenuse of a right triangle with leg lengths of 15 and 36?
19	What is the domain of the function $f(x) = \sqrt{3 - x}$?
20	Alfred starts at point A on a highway traveling due east at 60 mph. At the same time Bernice starts at point B, which is 100 miles due east of point A on the same highway, and heads due west at 70 mph. How many minutes will it take for them to be 160 miles apart?
21	What is the geometric mean of 6 and 24?
22	Frank and Hank are farmers. Frank can plant a field in 3 hours, but when he works with Hank, they can plant a field in 1 hour. How long, **in minutes**, would it take Hank to plant a field by himself?
23	Mr. Sampson had all of his students arranged in groups of 3 ready to start the day's activity when another student arrived. So he arranged his students in groups of 4 and had 2 less groups than what he had before. How many students were initially present?
24	Every day, Joe leaves his house at noon and drives to math practice. One day he drove to math practice at 30 mph and was 6 minutes late. The next time he drove to math practice, he drove at 50 mph and was 10 minutes early. How many miles does Joe drive to math practice?
25	Frank drove at 30 mph from point A to point B. He returned along the same path at 60 mph. What was his overall average speed for the trip in miles per hour?
26	I roll two regular 6-sided dice. What is the probability the sum of the two dice is greater than 7?
27	A full glass of water weighs 45 ounces, while a glass of water 1/3 of the way full weighs 1 pound. How much, in ounces, does an empty glass weigh? Express your answer as a decimal.
28	Three vertices of a parallelogram are (2, 1), (5, 5), and (15, 1). What is the area, in square units, of the parallelogram?
29	Write 3413_5 as a base 8 number.
30	What is the tens digit of 3^{85}?

Challenge Questions: 3 pts each

31	The Archimedes Landscaping Company is pouring a concrete patio that is 36 feet by 45 feet by 4 inches thick. How many cubic yards of concrete will be needed for the patio?
32	Shirley and Margret start at the same point on a track running in opposite directions. Both start at the same time and run at a constant speed. The first time they met, Shirley had run 200 yards. The second time they met, Margret had run 150 yards after they met the first time. How long, in yards, is the track?
33	A circle of diameter 1 inch is inscribed in a square as shown. Find the diameter, in inches, of a circle inscribed in one of the corner regions. 
34	What is the largest number that can be made by multiplying a set of counting numbers together where the sum of the numbers is 19?
35	In a nine-round math competition, a math team had correctly solved 30 math problems by the eighth round. In the final round, the team got 8 out of ten problems correct making the percentage of math problems correctly answered 40%. What was the total number of questions the math team was asked?
36	If the sum of the digits of a counting number $\boldsymbol{a}$ is equal to the sum of the digits of the number $\boldsymbol{2a}$, what is the largest number that $\boldsymbol{a}$ is guaranteed to be divisible by?
37	Four chickens can lay 20 eggs in 7 days. How many eggs can fourteen chickens lay in one day?
38	A circle has an arc AB that is half the length of arc AC, and both arc AB and AC are less than 180^{o}. B is contained inside the minor arc AC. Also the length of chord AB is 5 units and the length of chord AC has a length of 8. What is the area, in square units, of the circle?
39	Biff is holding up three cards so that Eho can only see one side with numbers 56, 64, and 70 on them. On the other side of the cards are three prime numbers. Biff tells Eho that the sum of the two numbers on each card is the same for all three cards. If all the prime numbers are less than 50, how many different sets of prime numbers could be on the back of the cards?
40	What is the sum of all positive three digit numbers **ABC** such that $\mathbf{A^2+B^2+C^2}=65$?

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Individual Multiple Choice Contest

For questions 1-3, use the following information:

$f(x) = -x^2 - 3x + 5$

1 Evaluate f(-2)

A) 7 B) 15 C) -15/2 D) -7/2 E) Answer not given

2 What is the implied domain of f(x)?

A) x>5 B) x<-3 C) x≤5 D) x≥-3 E) Answer not given

3 What is the range of f(x)?

A) f(x)≤29/4 B) (-3/2, 29/4) C) f(x)>29/4 D) f(x)<-29/4 E) Answer not given

For questions 4-5, use the following information:

Sammy is selling tickets to a concert. The seats cost $12 and $8. Sammy sold 1500 tickets for a total of $14,000 worth of tickets.

4 Which system could be used to model the situation?

X = the number of $12 tickets sold

Y = the number of $8 tickets sold

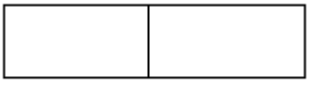
A) $\begin{matrix} y + x = 1500 \\ 8x + 12y = 14000 \end{matrix}$ B) $\begin{matrix} y = 1500 + x \\ 8x + 12y = 14000 \end{matrix}$

C) $\begin{matrix} x + y = 1500 \\ 8y + 12x = 14000 \end{matrix}$ D) $\begin{matrix} y + x = 14000 \\ 8x + 12y = 1500 \end{matrix}$ E) Answer not given

5 How many $12 tickets did Sammy sell?

A) 850 B) 700 C) 1000 D) 500 E) Answer not given

6 A farmer wants to build a corral that looks like the following. The farmer has 600 feet of fence. What is the maximum area, in square feet, the farmer can enclose?



A) 14,000 B) 10,000 C) 22,500 D) 15,000 E) Answer not given

7 A rancher has more cows "C" than he has horses "H". List all the statements that are true. The rancher has at least 2 horses.

A) $\frac{H+C}{C} > \frac{H+C}{H}$ B) $\frac{C}{C+H} > \frac{H+C}{2}$ C) $\frac{H}{C} > \frac{C}{H}$ D) $\frac{C-H}{C} > C - \frac{H}{C}$ E) None are true

8	Eho told Biff that all functions that have exponents that are one are linear. Biff said that is not true. List all the functions that are not linear. A) $f(x) = \frac{1}{x+3}$ B) $f(x) = \frac{1}{4}x - 5$ C) $f(x) = \frac{1}{4x} - 5$ D) $f(x) - 3x = 12$ E) $f(x) = \frac{3x+5}{17x}$
9	Anita, Bill, Cari, and Doug are competing at state cross country. The probability of each contestant winning the race is 1/8, 3/8, 3/16, and 5/16 respectively. Bill got sick and wasn't able to race, what is the probability that Anita will win the race? A) 3/10 B) 1/2 C) 2/5 D) 3/5 E) Answer not given
10	What is the second-to-the-largest 4 digit number that: has four different digits; is divisible by 3, 5, and 7; and when the number is divided by 81 its remainder is larger than 70? A) 8820 B) 6720 C) 3150 D) 315 E) Answer not given

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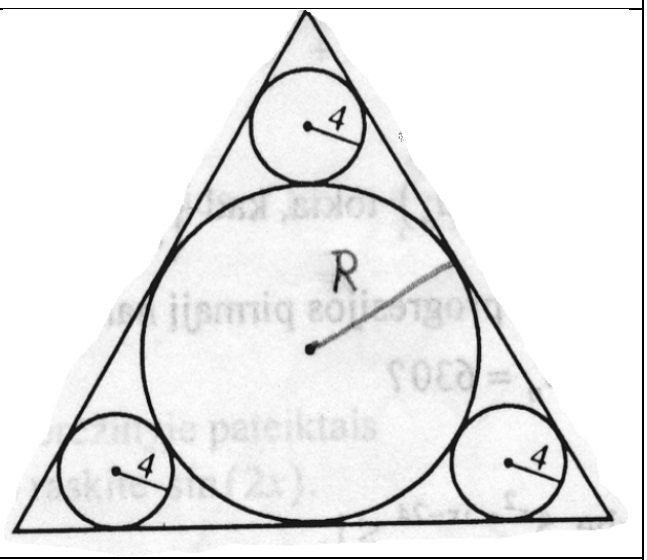
Team Contest

1	Given the equation of a circle $(x-3)^2 + (y + 6)^2 = 169$ and three points on the circle A (8, 6), B (15, -1), and C (-2, -18), find the fourth point "D" on the circle so that ABCD is a rectangle.
2	Write $.\overline{23}$ as a reduced fraction.
3	Find the value of "b" such that the 2 x-intercepts and the y intercept in $f(x) = bx^2 - 4$ form an equilateral triangle.
4	At 4:35, what is the measure of the acute angle, in degrees, between the hour and minute hand? Express your answer as a decimal.
5	My digital clock reads 3:00 PM, which is the correct time. My clock loses 90 seconds every hour. What time will it be when the clock has the correct time again?
6	What is the sum of the first seven non-prime counting numbers?
7	Given the following equilateral triangle with three congruent circles of radius 4 units, what is the radius, in units, of the larger circle? 
8	Rectangle ABCD has an area of 16 square units. Let P be the point where the diagonals intersect. If angle APB is 60^o, what is the length of AB in units?
9	Two points are chosen at random on a circle of diameter 2 units. What is the probability that the chord connecting the two points is of at least length 1 unit?
10	Given the point P (-7, -3); point A is the reflection of the point P over the x-axis; point B is the reflection of point P over the origin; and point C is the reflection of point P over the y-axis. What is the area of PABC?

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Pressure Round Contest

1	For any real number x, what is the smallest possible value of $(x-1)^2 + (x-2)^2 + (x-3)^2 + (x-4)^2 + (x-5)^2$?
2	A garden has 30 pounds of vegetables in it. Every morning the gardener picks some vegetables. Each day the garden increases the number of pounds by 20%. What is the maximum number of pounds of vegetables the gardener can pick each day and still allow the garden to sustain itself indefinitely?
3	Becky needs to average 50 mph on a trip to make it on time. She only averaged 45 mph on the first ¾ distance of the trip. What speed must she average on the last ¼ distance of the trip to arrive on time?
4	What is the smallest counting number $x > 1$ such that $\boldsymbol{a}$ and $\boldsymbol{a}^x$ have the same units digit for all counting numbers $\boldsymbol{a}$.
5	Alvin and Bob can mow a lawn in 5 hours together. When the lawn was half mowed Alvin's lawn mower broke down and Bob finished mowing the lawn by himself. This took a total of 6 hours to mow the lawn. How long, in hours, would it take Alvin to mow the lawn by himself? Answer as a decimal.

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COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	Sixty-four teams enter a math tournament. In each round, one team competes against one another in a math game and the loser is eliminated. How many games are necessary to determine the winner?	63 [games]
2	How many prime factors does the number 2015 have?	3 [factors]
3	What is the sum of the positive odd numbers less than 100?	2500
4	How many different ways can you arrange the letters in the word twenty T-W-E-N-T-Y?	360 [ways]
5	What is the product of 47 and 53?	2491
6	Two fair six-sided dice are rolled and the numbers showing are added. What is the probability that the sum is five as a reduced fraction?	1/9
7	If x equals 6 and y equals 10, what is x-squared plus two times x times y plus y-squared?	256
8	A car is going from Seattle to Spokane, a distance of 300 miles at 58 miles per hour and another is leaving Spokane coming to Seattle along the same road at 66 miles per hour. If they both leave at 1:00pm, how many miles apart are they at 2:30pm?	114 [miles]
9	What is the degree measure of the smaller angle between the hands of an analog clock at six-thirty?	15 [degrees]
10	A hexagon has five angles that each measures three times the smallest angle. What is degree measure of the smallest angle?	45 [degrees]

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COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	What is the sum of the number of edges, the number of faces and the number of corners in a cube?	26
2	What is 54 squared?	2916
3	Sixty-four meters are used to enclose a rectangular area. What is the ratio of the area that can be enclosed with a side length of 16 to the area of one with a side length of 8?	$\frac{4}{3}$ or 4 to 3
4	What is the remainder when the number one hundred twenty-three thousand, four hundred fifty-six is divided by eleven?	3
5	Tom paid twelve dollars and eighty-four cents for his dinner including the tip. If he tipped twenty percent, how much was his tip as a decimal number of dollars?	[$] 2.14
6	Three boys and three girls sit in a line at the movies. In how many ways can they be seated so that no two girls sit next to each other?	72 [ways]
7	What is the largest rectangular area in square feet that can be enclosed using 100 feet of fence?	625 [sq ft]
8	What is the sum of the positive even numbers less than the eleventh prime number?	240
9	There are 3 children in the Jane's family and there is at least one girl. What is the probability that all three children are girls?	1 / 7 or one seventh
10	The sum of two numbers is 11 and their product is 20. What is the sum of their squares?	81

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COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	What is the least common multiple of 42 and 111?	1554
2	Jose wants to know how much cardboard cereal companies waste on the boxes. If the box of cereal has a height of 18 centimeters, a length of 10 centimeters, and a width of 3 centimeters, what is its surface area?	528 [sq cm]
3	What is the length, in units, of the hypotenuse of a right triangle, that has legs with lengths of 9 units and 40 units?	41 [units]
4	How many prime numbers are between 1 and 50?	15 [primes]
5	What is the probability of getting exactly 1 tail when flipping 8 fair coins?	1 / 32
6	Claire and Emma are twins. Claire has 3 jackets, 5 bottoms, and 2 pairs of shoes. Emma has 5 jackets, 3 bottoms, and 3 pairs of shoes. However, Claire sometimes takes Emma's clothes for the day. How many outfits can Claire make between both their clothes, given that an outfit is a jacket, a bottom and a pair of shoes?	320 [outfits]
7	Mack is going to the mall, which is 4 miles away from his house. If he walks at a constant speed of 3 miles per hour to the bus stop, which is half a mile from his house, then takes the bus for the next 3 miles, at a constant speed of 30 miles per hour, and then walks the remaining half mile at the constant speed of 3 miles per hour, how long did it take Mack, in minutes, to get from his house to the mall?	26 [minutes]
8	Casey runs a business selling custom shirts to businesses. In order to assure he makes a profit, he charges a flat fee on top of the price of each individual shirt. One sale resulted in him selling 16 shirts for 330 dollars. If each shirt had the price of 18 dollars, how much was the flat fee on top of that, in dollars?	42 [dollars]
9	What is the sum of the reciprocals of the following numbers: 2, 4, 8, 16?	15/16
10	What is the radius of a circle with a circumference of 8 units?	4 / pi or 4 over pi [units]

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COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	How many ways can you arrange the 6 Star Wars movies in a row on a shelf?	720 [ways]
2	How many positive factors does 100 have?	9 [factors]
3	A bag contains 3 purple marbles, 4 orange marbles, and 1 green marble. What is the probability that if I take out 2 marbles, they will both be purple?	3/28
4	Donald Duck has 4 point 35 million followers on Twitter, and only 10 percent of them will vote for him. How many of his Twitter followers will vote for him, in thousands?	435 [thousand]
5	At USA High School, there are 36 students enrolled in calculus, 32 students enrolled in statistics, and 16 enrolled in both. How many students at USA High School are enrolled in calculus, but not in statistics?	20 [students]
6	Rachel's bathtub can contain up to 60 gallons of water. Starting from an empty tub, she fills it with water at a rate of 15 gallons per minute. She doesn't notice it's also draining at a rate of 7 gallons per minute. After filling it up to 32 gallons for a bath, before realizing it was draining and closing the drain, how much water was wasted?	28 [gallons]
7	Bradley surveyed 15 students about their thoughts on their math class. Eleven thought that their math class was too hard, while 4 thought that their math class was too easy. He represented this on a pie chart. What is the larger of the two central angles of the chart, in degrees?	264 [degrees]
8	The sum of three consecutive integers is 54. What is the product of the smallest and largest of the three integers?	323
9	A lion can run a mile in 3 minutes. Every mile after the first, it takes 2 minutes longer than the previous mile for the lion to run an additional mile. How long, in minutes, does it take a lion to run 5 miles?	35 [minutes]
10	In a soccer tournament where 12 teams competed, each team played each other team twice. Each team has 11 players, and after each game, every player shook hands with every player on the opposing team. How many handshakes took place in the duration of the tournament?	15972 [handshakes]

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COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	A triangle has side lengths of seven inches, twenty-four inches and twenty-five inches. In square inches, what is the area?	84 [sq in]
2	On Facebook, I get 2 new friends every day except Sunday when I lose 5 friends. If I start on a Monday, after how days will I have a net gain of 100 friends?	99 [days]
3	If I drive 120 miles at 40 miles per hour and then 60 miles per hour back home the same distance, what was my average speed?	48 [mph]
4	The eighth grade at River Middle School has one hundred eighty two students and the ratio of boys to girls is six to seven. How many girls are there in the school?	98
5	What is the volume of a pyramid with a square base of perimeter 20 and height 6?	50 [cu un]
6	Solve for x in the equation: 5x minus 8 equals 2x minus 2.	2
7	Mr. Jones can grade the papers for his class in 1 hour and 20 minutes while his assistant can grade the papers in 2 hours. How many minutes will it take them to grade the papers working together?	48 [minutes]
8	What is the distance between the point negative two comma eight, and the point six comma negative seven?	17
9	Rainier Middle School won 75% of their first 20 games. How many of the next 30 games must they win to average 80% wins overall?	25
10	How many positive numbers less than one hundred are not divisible by 2 and also not divisible by 5?	40

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7th & 8th Grade – November 6, 2015

COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	What is the cube root of 216?	6
2	What is the digital root of fifty one thousand eight hundred sixty three?	5
3	What is the unit's digit when 23 is raised to the forty-fifth power?	3
4	In how many ways can you order the letters in the word "school", spelled S-C-H-O-O-L?	360 [ways]
5	Drawing two cards from a standard 52 card deck, what is the probability that the first card is a 7 and the second card is red?	1 / 26
6	A triangle on the Cartesian plane has vertices at the points 3 comma 9 [PAUSE], 6 comma 9, [PAUSE] and 3 comma 15. What is the area of the triangle, in square units?	9 [square units]
7	A population of hamsters doubles every day. If the population begins at 6 hamsters on the twenty-ninth of July, what is the population on the second of August?	96 [hamsters]
8	The Fibonacci sequence begins with 1 comma 1 comma 2, where each term is the sum of the 2 previous terms. What is the positive difference of the thirteenth term and the twelfth term of the Fibonacci sequence?	89
9	How many three digit numbers contain at least one three?	252 [numbers]
10	The sum of the lengths of the two legs of a right triangle is 119 units, and their difference is 79 units. What is the length of the hypotenuse, in units?	101 [units]

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COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	A dodecahedron has 12 faces of regular pentagons. How many edges does it have?	30 [edges]
2	As a decimal, what is 30 percent of 40 percent of 80?	9.6 or nine point six.
3	I flip a fair coin three times, what is the probability that I get at least one tail after getting a head?	1 / 2 or one-half
4	What is the volume of a cube that has a total edge length of 84 centimeters?	343 [cu cm]
5	What is the sum of the prime numbers less than 20?	77
6	How many minutes are there between 11:45 AM and 2:25 PM of the same day?	160 [minutes]
7	What is the remainder when eight factorial is divided by nine?	0

Final Score:

KEY

(Out of 8)

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Student Name _____ Team #_____

School Name _____ Proctor Name_____ Room #_____

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	[+] 536		
2	[x=] 9		
3	3 [pencils]		
4	10 [chickens]		
5	1/16		
6	12 [ways]		
7	18 [numbers]		
8	[$] 77 [.00]		

"Math is Cool" Championships – 2015-16

7th & 8th Grade – November 6, 2015

Final Score: KEY

Student Name _____

Proctor Name _____ Room #_____

SCHOOL NAME _____ **Team #**_____

First Score

(out of 20)

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	A		
2	E		
3	A		
4	C		
5	D		
6	D		
7	E		
8	A,C,E [All answer choices needed]		
9	E (1/5)		
10	E (4935)		

"Math is Cool" Championships – 2015-16

7th & 8th Grade – November 6, 2015

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	(-9, -11)		
2	23/99		
3	[B =] 3/4		
4	72.5 [°]		
5	3:00 PM		
6	50		
7	[R =] 12 [units]		
8	$\frac{4}{\sqrt[4]{3}}$ *or* $\frac{4\sqrt[4]{27}}{3}$ [units]		
9	2/3		
10	84 [square units]		

"Math is Cool" Championships – 2015-16

7th & 8th Grade – November 6, 2015

Final Score:
KEY
First Score

Proctor Name _____Room # _____

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	10
2	5 [pounds]
3	75 [mph]
4	[x=] 5
5	17.5 [hours]

Final Score:

(Out of 8)

"Math is Cool" Championships – 2015-16

Student Name _____ Team #_____

School Name _____ Proctor Name_____ Room #_____

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" Championships – 2015-16

7th & 8th Grade – November 6, 2015

Final Score:

Student Name _____

Proctor Name _____ Room #_____

SCHOOL NAME _____ **Team #**_____

First Score
(out of 20)

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" Championships – 2015-16

7th & 8th Grade – November 6, 2015

Final Score:

SCHOOL NAME _____ **Team #** _____

Proctor Name _____ Room # _____

First Score
(out of 10)

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			
2			
3			
4			
5			
6			
7			
8			
9			
10			