"Math is Cool" Masters – 2011-12

Sponsored by: Western Polymer Corporation

December 3, 2011

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 of problems dealing with money. In the case of problems requiring dollar answers, answer as a decimal rounded to the nearest 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 – December 3, 2011

Mental Math Contest

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#	Problem
1	Find the sum: one hundred twenty three plus eight hundred seventy six
2	What is forty squared minus twenty squared?
3	How many of these numbers are NOT divisible by three: one hundred forty four, [PAUSE] three hundred fifty six, [PAUSE] two hundred fifty two
4	What is the mean of the set: twelve, eight, sixteen, twenty four?
5	Find the positive difference, in square units, between the area of a square with side length seven units and a right triangle with leg lengths six and twelve units?
6	What is the ninth term in the arithmetic sequence three, nine, fifteen, and so on?
7	What is the probability of rolling either a sum of five or seven on one roll of two standard, six-sided dice?
8	What is the positive difference between the roots of the quadratic equation x squared minus ten x plus twenty four equals zero?

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7th & 8th Individual Contest

Tear this sheet off and fill out top of answer sheet on following page prior to the start of the test.

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- *Blank answer sheets and answer sheets with no name will be scored as a 0.*

INDIVIDUAL TEST - 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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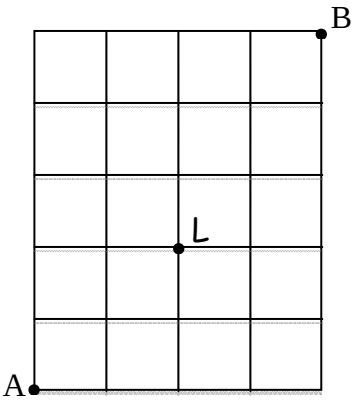
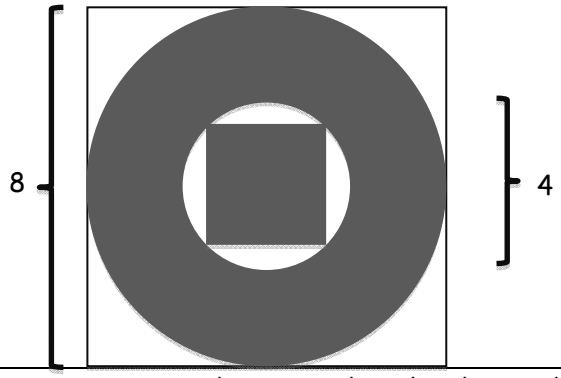
December 3, 2011

7^{th} & 8^{th} Individual Contest

	Questions 1-30: 2 points each
1	Let: A=2π B=18-3(5-2) C=25(3/5) - 4 Put the values A, B, C in order from smallest to largest.
2	The measures of two angles of a triangle are 65° and 40°. What is the measure in degrees of the third angle, in degrees?
3	Convert 1/10 of a mile to yards.
4	What is the slope of the line y= 7x+2
5	Find the product of 2.375 and 5.5, and express your answer as an improper fraction.
6	The greatest common factor of 28 and 70 is *a* and the greatest common factor of 36 and 42 is *b*. What is the least common multiple of *a* and *b*?
7	Find the smallest positive multiple of 13 that leaves a remainder of 2 when divided by 3.
8	Evaluate: 7^5
9	How many different ways can you arrange the letters in the word: MULTIPLE.
10	Which fraction is largest: $\frac{9}{11}, \frac{19}{22}$, or $\frac{26}{33}$?
11	The equation of a line in standard form is $4 = 2x + 4y$. If one solution to the equation has an x-coordinate of -8, what is the corresponding y-coordinate?
12	There are only chickens and llamas on a farm. If there are 21 heads and 68 legs on the farm, how many llamas are there?
13	Jack and Jill are racing to get to their math contest which is 64 miles away. Jack leaves at 11 am and takes the ferry which is travelling 10 mph. Jill leaves at 1 pm and takes the train which is travelling 16 mph. Who will arrive at the contest first?
14	Evaluate: $5 - 2(7-3)^2$
15	If today is Saturday, then what day of the week was it 325 days ago?
16	What is the sum, in degrees, of the interior angles of a decagon?

17	What is the sum of the positive integral factors of 48?
18	If 14 men and 5 elephants can carry 42 tons of wood in one day, and 4 men and 9 elephants can carry 65 tons of wood in one day, how much more wood, in tons, can an elephant carry than a man in one day? Give your answer as a decimal.
19	Sally is instructed to take her favorite number, add 6, divide by 3, multiply by 5, add 2, and multiply by 2. Sally mistook all of her addition signs for multiplication signs, and vice versa, but she ended up with the same value as the correct answer. Assuming she made no other mistakes, what is her favorite number?
20	What is the probability of rolling a pair of dice and getting a sum of anything but 6 or 9?
21	Calculate $63_{16} + 26_{16}$, and give your answer in base 4.
22	How many ways are there to go from point A to point B, if you can only go either to the right or up, and you must pass through point L (4x5 grid; L is at 2 over, 2 up) 
23	What is the area, in square cm, of a 210 degree sector of a circle with radius 10 cm?
24	The graphs of the equations $5x + 9y = 20$ and $4x + ky = 15$ are parallel. What is the value of k?
25	Fred can mow the lawn in 3 hours by himself. John can mow the same lawn in 2 hours by himself. How many hours would it take them to mow the lawn if they work together at the same time?
26	How many 4 digit codes can be made if the last digit has to be a letter, the first three must be numbers, and the second digit has to be prime? Numbers may repeat.
27	Find the sum of the following geometric series: 2+4+8+…+256
28	If the radius of a circle is increased by 70%, by what percent does the area increase?
29	What is the total surface area, in square cm, of a cylinder with radius 4 cm and height 5 cm?
30	Solve the equation: $\sqrt{x+4} = \sqrt{x} + 1$

Challenge Questions: 3 pts each

31	There are five students standing in a line with their hats. Suddenly the wind picks up the hats and randomly assigns each hat to a student. What is the probability that no student will get his or her own hat?
32	In the following diagram the square is inscribed in the inner circle. Find the area of the shaded region: 
33	On any given Saturday or Sunday, the chance that Sara will ski is 80%, but if it is snowing the chance that Sara will ski falls to 20%. Given that Saturday has a 50% chance of snow and Sunday has a 30% chance of snow, what is the probability that Sara skis on both Saturday and Sunday? Give your answer as a percent.
34	Let: $f(x) = 4x - 7$ and $g(x) = 2x^2 + 3x - 1.$ Find: $f(g(2))$
35	How many positive integers less than 400 have exactly 12 positive integer factors?
36	Jaeyoung went to the store and bought a scoop of garlic ice cream on a cone. The ice cream scoop is perfectly spherical and is placed on the cone such that it melts completely to fill the cone. The diameter of the cone and the ice cream scoop are the same. If the ice cream undergoes no volume change when it melts, and the volume of the scoop is $\frac{9\pi}{2}$ cubic inches, what is the height of the cone in inches?
37	A ball is dropped from a height of 80 feet and bounces back to 3/5 of its original height. How far in feet will the ball travel vertically before it comes to rest?
38	Mitchell is drinking milk with a straw from a cylindrical cup. The cup has a 6-inch radius and a 12-inch height and is filled with 420π cubic inches of milk. He drinks at a rate of 4π cubic inches per second, but as he is drinking, his friend Dongyang is pouring milk back into the cup at a rate of 2π cubic inches per second. After 2 MINUTES of this process what is the height, in inches, of the milk remaining in the cup?
39	If a student wants to end up with 200 ml of 16% acid solution by using a mixture of 10% acid solution and 25% solution, how many ml of the 10% should be used?
40	Grace wants to open her locker; however, she forgot her combination. Grace remembers that there are three distinct digits in her combination and that the first digit is not a 5 and the second digit is not a 7. How many different combinations are possible for her locker?

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8th Grade – December 3, 2011

Individual Multiple Choice Contest

USE THE FOLLOWING TABLE FOR PROBLEMS 1-3.

To the right is a list of the structures and their respective costs in the video game Starcraft. Minerals act as the money being spent and different types of structures can be purchased for the specific number of minerals as shown below.

Structures	Mineral Cost
Pylon	100
Gateway	150
Cybernetics Core	200
Fleet Beacon	300
Nexus	400

1 If I purchase 3 pylons, 1 nexus, and 2 fleet beacons, how many minerals will I have spent?

A) 900 B) 1150 C) 1200 D) 1300 E) Answer not given.

2 To start the game you are given 500 minerals. How many different groups of structures can you purchase with this sum of minerals, assuming you use up all 500 minerals?

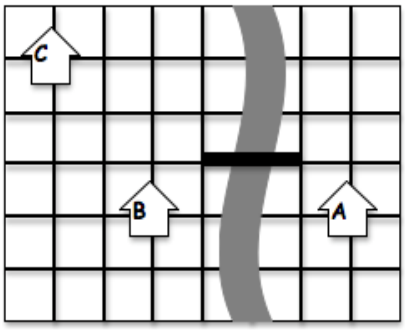
A) 8 B) 7 C) 6 D) 5 E) Answer not given.

3 The outer shell of a nexus is made from a composite of molybdenum and rhenium crystals. A nexus is in the shape of a regular tetrahedron and has a side length of 20 yards. The outer shell makes up 75% of the total cost of this structure. What is the cost, in minerals per square yard, of this composite material.

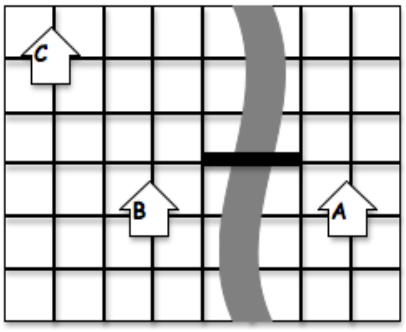
A) $\frac{\sqrt{3}}{4}$ B) $\frac{\sqrt{3}}{3}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{4\sqrt{3}}{3}$ E) Answer not given.

USE THE FOLLOWING SCENARIO FOR PROBLEMS 4-6.

To the right is a map of Tang Town with each side length of a square representing a constant unit of 1 block. Tang Town is comprised of a grid of roads which are all parallel or perpendicular to each other, a river with a bridge 2 blocks long (darkened), and 3 houses centered at the intersections of roads. While driving one can only move on roads and may only cross the river at the bridge.



4 Chad wants to drive from house A to house C, but must first pass house B. He drives at a rate of 1 block per 20 seconds. David is at the center of the bridge and he drives to house C at a rate of 1 block per 30 seconds. If they want to arrive at house C at the same time and both take the shortest paths available, how many seconds after Chad should David leave the bridge?

	A) 70 B) 40 C) 20 D) 0 E) Answer not given.
	USE THE FOLLOWING SCENARIO FOR PROBLEMS 4-6. To the right is a map of Tang Town with each side length of a square representing a constant unit of 1 block. Tang Town is comprised of a grid of roads which are all parallel or perpendicular to each other, a river with a bridge 2 blocks long (darkened), and 3 houses centered at the intersections of roads. While driving one can only move on roads and may only cross the river at the bridge. 
5	Chad's pet crow Mitchell also wants to visit houses B and C, but unlike Chad, he can fly and is not limited by the roads or the river. Starting from house A, what is the shortest distance Mitchell has to fly in order to visit both houses B and C? A) $4+\sqrt{5}$ B) $3\sqrt{5}$ C) $4+\sqrt{13}$ D) 9 E) Answer not given.
6	How many ways can Chad drive from house A to B to C taking the minimum distance every time? A) 90 B) 60 C) 36 D) 30 E) Answer not given.
	For problems 7-9, assume you are working with a standard 52-card deck. Aces have value 1 and face cards are jacks with value 11, queens with value 12, and kings with value 13. All numbered cards have face value.
7	When you draw once, what is the probability that you draw a card with a prime value? A) $\frac{5}{52}$ B) $\frac{3}{26}$ C) $\frac{6}{13}$ D) $\frac{7}{13}$ E) Answer not given.
8	How much greater is the probability of drawing either a 3 or a spade than the probability of drawing a black face card? A) $\frac{5}{26}$ B) $\frac{11}{52}$ C) $\frac{4}{13}$ D) $\frac{17}{52}$ E) Answer not given.
9	You draw a card without looking at it and show it to your friend. Your friend truthfully tells you that it is not a diamond. What is the probability that you draw a red card whose value is either a perfect square or a perfect cube? A) $\frac{1}{13}$ B) $\frac{4}{39}$ C) $\frac{5}{39}$ D) $\frac{2}{13}$ E) Answer not given.
10	What is the perimeter of a regular octagon with an area of $162+162\sqrt{2}$? A) 108 B) $72\sqrt{3}$ C) $72\sqrt{2}$ D) 54 E) Answer not given.

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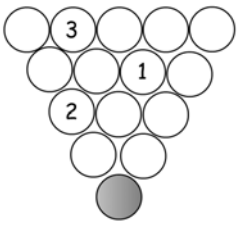
8th Grade – December 3, 2011

Team Contest

1	Rounded to the nearest whole percent, 800 is what percent of 45?
2	Let A♥B equal the sum of all positive integer factors that integers A and B have in common (eg, 4♥6 = 3 because 1 and 2 are the only factors shared by 4 and 6, and $1+2=3$). Parentheses indicate order of operations as usual. Find (6♥9)♥12.
3	Triangle ABC has sides of length 8, 5, and 10 inches. Triangle DEF is similar to triangle ABC. The longest side of triangle DEF is $x-9$ inches, and its shortest side is 7 inches. What is x?
4	Elaine has some pennies, nickels, and dimes. She has 40% more dimes than nickels, and 25% more nickels than pennies. What is the total value in dollars of Elaine's coins if she has 70 dimes?
5	How many seconds would it take to travel $\frac{3}{8}$ of a kilometer at 40 kilometers per hour? If your answer is not a whole number, express it as a decimal.
6	Let the symbol C_n represent the "centi-pal" of integer n, which is defined as the number that must be added to n so that the sum is 100 (eg, the centi-pal of 75 is 25). Evaluate $C_{82}-C_{-36}$.
7	A square number is the product of a counting number (positive integer) times itself. Mitchell lists the first 10 square numbers, and then adds them in pairs in all possible ways. How many of these pair-wise sums are square numbers?
8	The median of the following six numbers (5, x, $-\frac{8}{3}$, 3, $\frac{9}{2}$, 4) is x. Which of the following statements MUST be true of x? Give letters of all statements that must be true; if no statement must be true, answer "none". (A) The number x is an integer. (B) $x<5$ (C) $x>4$ (D) The number x can have only one value.
9	From the first 60 positive integers, Laura will choose a set of 3 different numbers whose sum is a multiple of 3. How many such sets (without regard to order of listing the numbers within the set) are there?
10	Billiard Billy discovered some interesting ways to arrange pool balls numbered 1 through 15. In one arrangement, each number can be determined by finding the positive difference of the two numbers immediately above it. Determine the number of the shaded ball. 

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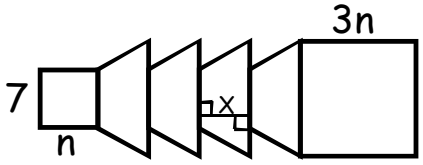
8th Grade – December 3, 2011

Pressure Round Contest

1	In how many ways can the letters of the two words COOL MATH be arranged into a two-"word" sequence? A "word" can be any sequence of one or more letters.
2	The figure below in constructed from two non-identical squares and four identical isosceles trapezoids. Find the length x in inches if the total area of the entire figure is 1106 square inches. 
3	Define A, B, C, and D as numbers of the form k^2-1, where k can equal any integer between 2 and 7, inclusive. If A, B, C, and D are chosen such that the expression $\frac{B-A}{2C}+\frac{D}{A}$ is made as small as possible, find the sum $A+C$.
4	What is the positive difference between the number of sides and the number of diagonals in a convex decagon?
5	How many combinations of three different prime numbers add up to 64?

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8th Grade – December 3, 2011

COLLEGE KNOWLEDGE BOWL ROUND #1 - SET 1

#	Problem	Answer
1	What is the probability of rolling a prime sum in one roll of a standard pair of dice?	5/12
2	What is the volume, in cubic centimeters, of a right circular cone with a radius of 6 centimeters and a height of 9 centimeters?	108 pi [cubic centimeters]
3	What is the y-intercept of the line that is perpendicular to the line with equation 2y equals 3x minus 8 and passes through the point 3 comma 1?	0 comma 3
4	How many positive integer factors are there for one-thousand two-hundred sixty?	36 [factors]
5	What is the perimeter, in inches, of a regular hexagon with an area of 100 root 3 square inches?	20 root 6 [inches]
6	What is the slope of the line negative 5x plus 6y equals 17?	5/6
7	If the sum of two numbers is two-hundred eleven and their positive difference is twenty one, what is the smaller of the two numbers?	95
8	What is the sum of the 5^{th} triangular number, the 5^{th} positive perfect square and the 5^{th} positive even number?	50
9	If for any given day the chance of rain is one-fifth and the chance of getting chocolate milk for lunch is three-fourths, what is the probability that you get chocolate milk while it is not raining?	3/5
10	For what value or values of "x" is the function "y" equals the quantity "x" squared plus 2 divided by the quantity "x" minus 1 undefined?	[x =] 1

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COLLEGE KNOWLEDGE BOWL ROUND #2 - SET 2

#	Problem	Answer
1	Evaluate eighteen-thousand, seventy-three divided by thirty-one.	583
2	Find the probability of flipping exactly 4 heads when flipping 7 fair coins.	35/128
3	Find the vertex of the parabola with equation 2x squared minus 12x plus 6?	3 comma negative 12
4	Brady is driving along and notices that his odometer reads sixteen thousand nine hundred sixty one, a palindrome. In how many miles will Brady's odometer read the next palindrome number?	110 [miles]
5	Logan wants to paint every face of his rectangular box with red paint. If each can of red paint can cover 50 square feet, how many cans of paint will Logan need if the length, width, and height of the box are 25 feet, 18 feet and 4 feet, respectively?	25 [cans]
6	How many positive integer factors does the number five-thousand, forty have?	60 [factors]
7	What is the area, in square inches, of a right triangle with whole number side lengths of "x", two "x" plus 2, and three "x" minus 2 if the triangle has a perimeter of 30 inches?	30 [square inches]
8	What is the total surface area, in square centimeters, of a right circular cylinder with a radius of 6 centimeters and a height of 11 centimeters? Give your answer in terms of pi.	204 pi [square centimeters]
9	Convert 67 base nine into a base 6 number.	One four one [base six]
10	What is the distance, in units, between the points negative 2 comma 6 and 14 comma negative 6?	20 [units]

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8th Grade – December 3, 2011

COLLEGE KNOWLEDGE BOWL ROUND #3 - SET 3

#	Problem	Answer
1	If four "x" plus seven "y" equals negative 1 and negative three "x" minus five "y" equals 2, find the product of "x" and "y".	negative 45
2	Convex quadrilateral ABCD has angles of two "x" minus 9, [PAUSE], "x" plus seven, [PAUSE], three "x" minus 10, and, [PAUSE], three "x" plus 3. Find the value of "x" in degrees.	41 [degrees]
3	What is the quotient of the complement of a 40-degree angle divided by the supplement of a 175-degree angle?	10
4	What is the largest prime factor of seven-thousand eight-hundred fifty-four?	17
5	What is the least common multiple of 72 and 56?	504
6	Find the area, in square inches, inside a square with edge length 8 inches, but outside a circle inscribed in the square?	64 minus 16 pi [square inches]
7	Two trains are moving toward each other at speeds of 13 miles per hour and 15 miles per hour, respectively. How many hours will it take them to meet if they start 504 miles away?	18 [hours]
8	What is the sum of the number of sides, corners and diagonals of a hexagon?	21
9	The ordered pairs, "M" comma zero and zero comma "N" are the x- and y-intercepts of the graph of the equation six "x" minus five "y" equals 150. What is the positive difference between "M" and "N"?	55
10	A trapezoid with a height of 8 inches has an area of 296 square inches. If one of the bases has a length of 19 inches, what is the length of the other base in inches?	55 [inches]

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COLLEGE KNOWLEDGE BOWL ROUND #4 - SET 4

#	Problem	Answer
1	If "h" is directly proportional to "g" and if "h" is 24 when "g" is 9, then what is "g" when "h" is 16?	6
2	Find the sum of the arithmetic sequence that has a 6^{th} term of 29, and a 17^{th} and last term of 84?	748
3	Mozart wrote 41 symphonies in his lifetime. He began writing his first symphony on his 8^{th} birthday and he finished writing his last symphony on his 33^{rd} birthday. Assuming all of his symphonies were finished by his 33^{rd} birthday, on average, how many months did it take Mozart to write one symphony in that span of time? Round your answer to the nearest tenth place.	7.3 [months]
4	At the end of Katie's bike ride, she finds that one of her wheels has rotated 314 times. If her bike wheels have a radius of 6 inches, how long, in *feet*, was her bike ride? Assume pi is equal to 3.14 and round your answer to the nearest whole number.	986 [feet]
5	Find the altitude to the hypotenuse of a six, eight, ten right triangle. Express your answer as a common fraction.	24/5 [units]
6	What is the ratio of the volume of a sphere with a radius of 4 units to that of a right circular cylinder with a radius of 2 units and a height of 8 units? Express your answer as a common fraction.	8/3
7	What is the height, in inches, of an equilateral triangle with an area of nine root three square inches?	3 root 3 [inches]
8	What is the area, in square units, of a circle with the equation the quantity "x" minus three, [PAUSE] squared plus the quantity "y" minus five, [PAUSE] squared is equal to twenty-five?	25 pi [square units]
9	What is the probability of getting at least 2 heads when flipping a fair coin 6 times?	57/64
10	Chris is locked out of his house. He has 8 keys on his key ring, one of which is the one that unlocks his house. He randomly chooses one key at a time to try on the lock and then discards the key if he finds that it does not work. If it takes him 5 seconds to try one key, what is the probability that he unlocks his house in 15 seconds or less?	3/8

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COLLEGE KNOWLEDGE BOWL ROUND #5 - SET 5

#	Problem	Answer
1	What is the volume, in cubic inches, of a sphere with a radius of 3 inches?	36 pi [cubic inches]
2	What is the longest chord in a circle called?	Diameter
3	Factor the expression two "x" squared plus "x" minus 21 completely.	(2x+7)(x-3) [the quantity 2x plus 7 times the quantity x minus 3] [in either order]
4	In a tennis tournament, people play a match with every other person exactly once. How many total games are played if there are 10 people in the tournament?	45 [games]
5	Forty-five aliens came to Earth to get fertilizer for their lawns on Mars. If each alien can carry fourteen one-pound bags of fertilizer from Earth and each lawn needs 35 pounds of fertilizer, how many lawns can the aliens fertilize?	18 [lawns]
6	4 to the third is the same as 16 to the "x". Find "x".	3/2
7	What is the area, in square inches, of a regular hexagon with a perimeter of 36 inches?	54 root 3 [square inches]
8	What is the square root of one hundred forty four times "x" to the 6^{th} power?	twelve x to the third
9	Superman has a one-half chance of hitting a bulls eye with a dart. If he hits the bulls eye, he has an equal chance of getting either a toad, giraffe, or a lion. If superman plays the game 3 times, what is the probability that he will get all three animals?	1/36
10	Ryan ate 11 ounces of vegetables on Friday, 19 ounces the next day and 18 ounces the day after that. How many total *pounds* of vegetables did Ryan eat in this three day period?	3 [pounds]

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8th Grade – December 3, 2011

COLLEGE KNOWLEDGE BOWL ROUND #6 - SET 6

#	Problem	Answer
1	You start with 2000 dollars and spend 257 dollars and 63 cents. How much money do you have left, in dollars?	[$] 1742.37
2	Find the sum as a common fraction: five-sixths plus three-sevenths plus one-eighth.	233/168
3	Express 83 base ten in base 3.	One zero zero zero two [base three]
4	Billy has twice as many candies as Colby. If Billy gives 4 of his candies to Colby, then they will have the same number of candies. How many candies does Colby have?	8 [candies]
5	If "x" is inversely proportional to "y", and "x" equals 32 when "y" equals 27, what is "x" when "y" equals 24?	36
6	Rationalize the following fraction, and answer in simplest form: 8 divided by the quantity 3 plus the square root of 5.	Six minus two root five
7	How many different ways can I make a total of 25 cents if I only have quarters, nickels and/or pennies?	7 [ways]
8	A s'more consists of 2 graham crackers, 1 marshmallow and 7 pieces of chocolate. If the volume of a single graham cracker is 2 cubic inches, a marshmallow is 3 cubic inches and a piece of chocolate is 4 cubic inches, what is the total volume of a s'more in cubic inches?	35 [cubic inches]
9	There are 5 red marbles, 3 blue marbles and 1 white marble in an urn. If Nish chooses 2 marbles from the urn one at a time without replacement, what is the probability that he gets a red marble and then a white marble?	5/72
10	What is the equation of the axis of symmetry of the graph of "y" equals three "x" squared plus six "x" plus 5?	x equals negative 1

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8th Grade – December 3, 2011

COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	What is the positive difference between the area of a trapezoid with a height of 2 units and bases of 6 and 8 units and a square with side length 3 units?	5 [square units]
2	Maja has 12 horses. If she wants to choose 3 horses, how many ways can she do this?	220 [ways]
3	Mrs. Yu pays six dollars and sixty cents for four identical socks. How much do three of these socks cost, in dollars?	[$] 4.95
4	The distance between City A and City B is 300 miles. David drives from City A to City B at 50 miles per hour and drives back 20% faster, how many hours did the round trip take?	11 [hours]
5	65 percent of what number is equal to 26?	40

Final Score:

KEY

(Out of 8)

"Math is Cool" Masters -- 2011-12

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	999		
2	1200		
3	1		
4	15		
5	13 [square units]		
6	51		
7	5/18		
8	2		

Math is Cool" Masters – 2011-12

8th Grade – December 3, 2011

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	A		
3	A		
4	B		
5	C		
6	E (40)		
7	C		
8	A		
9	B		
10	E (72)		

"Math is Cool" Masters – 2011-12

8th Grade – December 3, 2011

Final Score:

KEY

SCHOOL NAME_____Team # ____

First Score

(out of 10)

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	1778 [%]		
2	7		
3	[x=] 23		
4	[$] 9.90		
5	33.75 [sec]		
6	-118		
7	2 [sums]		
8	A, B, D [any order]		
9	11420		
10	5		

"Math is Cool" Masters – 2011-12

8th Grade – December 3, 2011

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	141120 [ways]
2	11 [inches]
3	51
4	25
5	2 [combinations]