"Math is Cool" Championships – 2011-12
Sponsored by:
9th, 10th, 11th & 12th Grade – October 19, 2011
Mental Math Contest

<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.*

#	Problem
1	What is four raised to the fifth power?
2	What is the sum of the integers from negative two to positive ten?
3	What is the least common multiple of two, four, six, eight and ten?
4	What is the measure, in degrees, of each interior angle of a regular eighteen-sided polygon?
5	What is the value of logarithm base eight of sixteen?
6	If x equals five and y equals eight, what is x-squared plus y-squared minus two xy?
7	John travels two hours at forty miles per hour and then three more hours at thirty miles per hour. What is John's average speed on his trip in, miles per hour?
8	The graph of the equation y equals x-squared plus four x plus one passes through three of the four quadrants. Which quadrant does it not pass through?

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October 19, 2011
High School Individual Contest

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

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.*
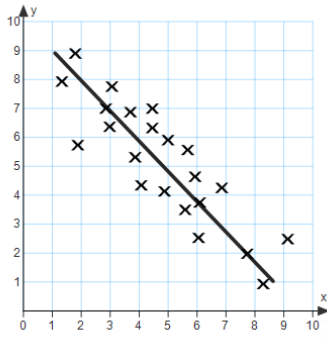
INDIVIDUAL TEST – 35 minutes

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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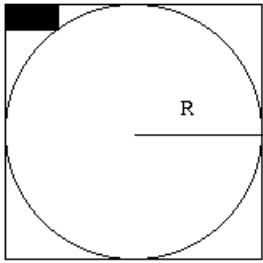
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October 19, 2011
High School Individual Contest

	Questions 1-30: 2 points each
1	Solve for x: 3(2x - 1) + 3 = 5(4x - 2) + 5
2	Let: $A = \pi$ B = 5 – 3(4 - 8) C = 18 – 4(20)　　　　Put the values A, B, C in order from smallest to largest.
3	Simplify and write as a reduced fraction. 2^{-3}
4	If f(x) = 5x – 4, find x when f(x) = 11.
5	Evaluate: 6 + 12 / 3 – 2 (2 – 5)
6	Does the following graph show a positive or negative correlation?
7	What is the next number in the sequence: 3, -6, 12, -24, 48, ____
8	Solve for x:　$x^2 - x - 20 = 0$.
9	A diagonal drawn in a square has length 8 cm. What is the area of the square, in square centimeters?
10	The average of the four numbers: 20, 17, 26 and x is 25. What is the value of x?
11	The length of the hypotenuse of a right triangle is 26 and one of its legs is length 10. What is the length of the other leg, in units?

12	The measures of two angles in a triangle are $34°$ and $75°$, what the measure, in degrees, of the third angle?
13	The area of a circle is 121π inches squared. What is the diameter of the circle in, inches?
14	What is the volume, in cubic feet, of a cone with altitude of 8 feet and a base radius of 3 feet?
15	What is the slope of the line y = 5x + 3
16	Pete's Pizza delivers pizza with the following charges: a $10.00 delivery charge and $6.50 per pizza. Fort Vancouver High School Math Team is having a 24 hour math-a-thon and pooled their money to order pizza and came up with $73.83. What is the maximum number of pizza's they can order?
17	Which equation represents the set of data? x -1 0 1 2 y 2/9 2 18 162 A) $y = (2 \cdot 3)^{2x}$ B) $y = 2 \cdot 3^{2x}$ C) $y = (2 \cdot 3^2)^{x}$
18	Given the statement, "If I am in the school cafeteria, then I am in the grade school." What is its inverse? A) If I am in the grade school, then I am in the school cafeteria. B) If I am not in the school cafeteria, then I am not in the grade school? C) If I am not in the grade school, then I am not in the school cafeteria.
19	Is the following statement True or False? If the converse of a statement is true, then the inverse statement is also true.
20	If $\ln\sqrt[a]{e^5} + \dfrac{6\ln\sqrt[b]{e^4}}{a} - \dfrac{5\ln\sqrt[a]{e^3}}{3} = 16$, where a and b are numbers greater than 1, what is the value of ab?
21	A circle with a radius of 12 meters passes through two vertices of an equilateral triangle ABC, with its center located at vertex C. The side AC extends through C and intersects the circle at D. What is the measure, in degrees, of angle ADB?
22	In a certain village hidden in the mist, 3 newspapers (labeled A, B and C) are published. 20% of the population read A, 16% read B, 14% read C, 8% read A and B, 5% read A and C, 4% read B and C, and 2% read all 3 newspapers. A person in this village is selected at random. Determine the probability that the person reads either newspaper A or B. Express your answer as a reduced fraction.
23	Berta and Stacie are remodeling their basement. They arrange twelve square tiles, each with a side length of 1 inch, in a rectangle without overlapping them. What is the sum, in inches, of all the possible distinct perimeters?
24	For how many integers, x, is the following inequality true? $\left|3x - 7\right| \leq 11$

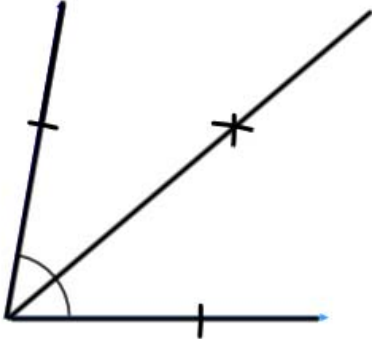| 25	What is the smallest three-digit prime number whose digits are distinct prime numbers?
26	Emma and Francis are playing a game where a round consists of each player tossing a single fair die at the same time. A player wins the round if the number on his or her die is greater than the number on the other player's die, but being the gentleman that he is, Francis concedes all ties as wins for Emma. If a player wins the game when he or she wins 3 rounds in a row, what is the probability that Francis wins the game in 4 rounds?
27	Two circles with radii 26 inches and 14 inches have centers that are 37 inches apart. What is the length, in inches, of their common external tangent?
28	A group of friends split the cost of dinner. If there had been 3 more people, each person would have paid 2 dollars less. If there had been 5 fewer people, each person would have paid 6 dollars more. How much did their dinner cost, in dollars?
29	6 friends plan to occupy 2 chairs on a ski lift, with each chair seating 3 people. 2 of the friends refuse to sit in the second chair, while 1 friend refuses to sit in the first chair. In how many ways can these 6 people be seated if all preferences are met?
30	Bob needs to walk through a circle of fire to retrieve a treasure. The treasure is positioned on the circumference of the ring of fire, and Bob is standing such that the straight path from him to the treasure touches the circle at 2 points. Bob is planning to take this shortest path to the treasure. If the tangent distance from Bob to the ring is 20 feet, and the distance he will travel within the ring of fire is 9 feet, how far will Bob have to travel to reach the treasure, in feet?

Challenge Questions: 3 pts each

31	Two basketball players, two football players, and two tennis players meet at an annual sports meeting and sit at a round table with 6 equally spaced chairs. How many distinct (different under rotational symmetry) ways can they sit so that no two athletes of the same sport are seated next to each other?
32	Consider the polynomial $P(x) = x^4 + ax^3 + bx^2 + c$. If $P(2) = 1$, $P(3) = 11$, and P is an even function, what is the value of $\frac{a-b}{c}$?
33	A spinner is divided into 55 regions with equal chance of being selected. There is one chance of getting a 1, two chances of getting $2^2 = 4$, three chances of getting $3^2 = 9$, and so on until ten chances of getting 100. On a random spin, what is the expected (average) value obtained?
34	What is the angle of intersection of the two lines $7x - y = 5$ and $3x - 4y = 7$? Express your answer in degrees.
35	What is the area, in square units, of the largest rectangle that can be inscribed in the following ellipse: $9x^2 + 4y^2 = 36$?
36	Berta is looking to bake a cake with a cylindrical top stacked on top of a square base. An overhead view of the cake looks like the figure. Stacey removes a rectangular slice of the cake, as shown above by the shaded region. The rectangular slice she removes has one vertex on the circle and two sides on the square's sides. If the rectangular slice she removes has dimensions 9 centimeters by 18 centimeters, what is the radius of the circle in, centimeters?
37	The equation of the plane containing the point (20, 0, 3) that is parallel to the plane containing the points (2,1, 1), (4, 4, -2), and (2, -1, 2) can be expressed in the form of Ax + By + Cz = D, where A, B, and C are integer coefficients and D is a constant. What is the value of D when A = 3?
38	What is the area, in square units, of the figure formed by the following polar points: $\left(2, \frac{\pi}{3}\right), \left(2, \frac{2\pi}{3}\right), \left(2, \frac{\pi}{6}\right), \left(2, \frac{5\pi}{6}\right)$
39	A frustum of a right circular cone has a smaller radius, height and larger radius which form a geometric sequence with a common ratio of 2. If the volume of the frustum is 350π cubic inches, what is the product of the 2 radii and the height?
40	If a three-digit number with distinct digits is formed from the digits 0 through 5, how many ways are there to form such a number so that it is divisible by 3?

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9th & 10th Grade – October 19, 2011
Individual Multiple Choice Contest

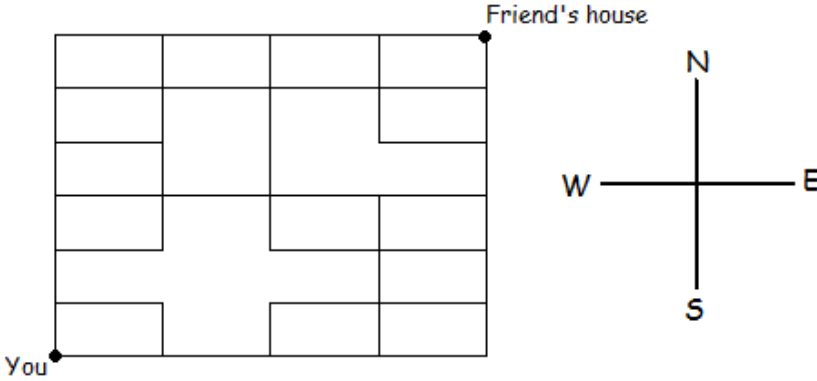|	
1	What is the name of the construction shown below? [Figure not drawn to scale] A) Perpendicular Bisector B) Angle Bisector C) Sixty degree angle D) Perpendicular Lines E) Answer not given
2	A triangle and circle overlap each other. The overlap comprises 60% of the area of the triangle and 40% of the area of the circle. If the area of the triangle is 15, what is the area of the circle? A) 20 B) 104/5 C) 45/2 D) 24 E) Answer not given.
3	What is the y-coordinate of the vertex of the parabola $y = 2x^2 + 8x - 11$? A) -19 B) -13 C) -5 D) 5 E) Answer not given.
4	A rectangular box that has three faces with areas 96cm², 160cm², and 240cm² is used to ship spherical objects. What is the surface area, in cm², of the largest sphere that can be shipped using such a box? A) 36 π B) 48 π C)100 π D) 144 π E) Answer not given.
5	Two people are playing a game in which a fair coin is flipped several times. Player A wins if the sequence heads-heads-heads comes up before tails-heads-heads. Player B wins if tails-heads-heads comes up before heads-heads-heads. What is the probability that player A wins? A) 1/8 B) 1/4 C) 3/8 D) 1/2 E) Answer not given.

6	What is the area of the triangle with vertices at (2,4), (4,7), and (8,1) in square units? A) 10 B) 12 C) 14 D) 16 E) Answer not given.
7	If a, b, and c are the roots of $x^3 - 3x^2 + 2x - 6$, what is the value of $\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c}$? A) $-\dfrac{1}{3}$ B) $\dfrac{1}{3}$ C) $\dfrac{2}{3}$ D) 3 E) Answer not given.
8	In a particular game, it is possible to make two different kinds of scores, one worth 7 points, the other worth 11 points. What is the largest integer total score that it is not possible to have? A) 47 B) 48 C) 52 D) 59 E) Answer not given.
9	Evaluate: $\displaystyle\sum_{n=1}^{\infty} \dfrac{n}{3^n}$ A) $\dfrac{3}{4}$ B) $\dfrac{7}{9}$ C) 1 D) $\dfrac{4}{3}$ E) Answer not given.
10	Let *MIC* be a three-digit number where each letter represents a different digit. If MIC = $(M + I + C)^2 + (M + I + C)$, what is the largest prime factor of MIC? A) 7 B) 11 C) 13 D) 19 E) Answer not given.

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9th & 10th Grade – October 19, 2011
Team Contest

1	Let: A = volume of a sphere with radius 6
	        B = volume of a cube with side length of 6
	        C = volume of a right circular cone with radius 6 and height 6
	Evaluate: BC/A

2	If $f(x) = \dfrac{(6x-7)^2}{4x-1}$ and $g(x) = f(f(f^{-1}(f^{-1}(f(x)))))$, find the value of $g(3)$.
3	I have five identical pieces of candy. In how many different ways can I distribute the candy to 3 distinct kids if all of the candy must be given out? There is no guarantee that each kid will receive any candy.
4	What is the remainder when 17^8 is divided by 11?
5	How many 4-digit numbers contain two or more 4's?
6	Freddie Krueger is chasing you through the streets of Gridlandia (map is shown below). You're trying to go to your friend's house across town. Unfortunately, you can only run along the lines and you can only go north or east. How many different paths can you take to your friend's house, where it is certain that you will be safe…ish?

7	Evaluate for positive x. $x = \cfrac{1}{1 - \cfrac{5}{8 + \cfrac{1}{1 - \cfrac{5}{8 + \cdots}}}}$
8	Find the area of the region enclosed by $x^2 - 12x + 9y^2 - 45 = 0$ and the x-axis.
9	A gold ring is to be made out of gold. The gold is in the shape of a torus with a circular cross-section with diameter of 4 millimeters with its center rotated about an axis 8 millimeters away. Find, in square millimeters, the surface area of the torus.
10	Trung and Stacey are trying to meet each other at a café. Unfortunately, they didn't set up a meeting time! Trung decides to randomly (uniformly) arrive at some time between 1:00 PM and 2:00 PM, stay for five minutes, and then leave. Stacey decides to randomly arrive at a time between 1:00 PM and 2:00 PM, stay for 10 minutes, and then leave. What is the probability that they will see each other at the cafe?

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9th & 10th Grade – October 19, 2011
Pressure Round Contest

1	A fair coin is flipped 9 times. What is the probability that the coin came up heads 4 times in a row during these 9 flips?
2	There are 8 bits in a byte, 1024 bytes in a kilobyte, and 2^{10} kilobytes in a megabyte. How many bits are there in a megabyte?
3	A squarefree integer is an integer that is not evenly divisible by any perfect square other than 1. If a and b are distinct positive squarefree integers less than 50 such that a+b is also squarefree, what is the largest possible value of ab?
4	$\log_w x = y, \log_x y = 2z, \log_y z = 3w, \log_z w = 4x$. Evaluate wxyz.
5	Let A be a ten-digit number $a_1 a_2 a_3 a_4 a_5 a_6 a_7 a_8 a_9 a_0$ in base 10, such that a_n is the number of digits of A that are equal to n. If a_1 cannot be 0, what is A?

COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	What is one-third of fifty percent of eighty four?	14
2	Mary's and John's current ages sum to twenty-four. Mary was six years old when John was born. How old, in years, will Mary be in five years?	20 [yrs old]
3	What is the number of faces plus the number of edges plus the number of vertices on a cube?	26
4	When six factorial is divided by five, what is the units digit?	4
5	What is the sum of the positive factors of 12?	28
6	Biff walks at four miles per hour and Eho walks at three miles per hour. If they live five miles apart and walk directly toward each other, how much farther has Biff walked than Eho, in miles, when they meet?	5/7 [miles]
7	What is measure of the angle, in degrees, between the two diagonals that can be drawn from a common vertex in a regular pentagon?	36 [°]
8	The first four elements of a sequence are three, five, two, and negative three. Each element is the difference between the two previous elements. What is the seventh element?	3
9	A triangle with side lengths: 6, 8 and 10 is inscribed in a circle. What is the radius of the circle?	5
10	A border surrounds an eight-foot by eight-foot square. The outer edge is exactly one foot from the closest point on the square. What is the area of the border?	32 plus pi [ft^2]

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COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	What is sixty-one times thirty-three plus thirty-six times sixty-one?	4209
2	The measures of the interior angles of a triangle are in the ratio of one to two to three. What is the measure of the angle supplementary to the smallest interior angle, in degrees?	150 [°]
3	The Lions won forty percent of their first twenty games. If they win fifty percent of their next thirty games, what will be the Lions overall winning percentage?	46 [%]
4	Express the square root of three hundred eighty-four as a simplified radical?	8 times the square root of 6
5	The sum of the third, fourth and fifth elements of an arithmetic sequence with common difference five, add to twenty-one. What is the first element?	-8
6	What is the total surface area of a right circular cylinder with a height of six inches and a base radius of two inches?	32 pi [in^2]
7	The ordered pair of integers, x comma y, is such that x-squared plus y-squared equals one hundred sixty-four. What is the sum of all possible values of x?	0
8	I repeatedly roll a fair six-sided die. What is the probability that a three is rolled before a four is rolled?	1/2
9	How many positive factors of seventy-two are multiples of three?	8
10	What is the smallest positive integer, n, so that one hundred eighty times n is a perfect cube?	150

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COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	What is the twenty-first element of an arithmetic sequence with first element negative eight and common difference five?	92
2	If I flip a fair coin four times, what is the probability that I get as many heads as I do tails?	3/8
3	What is the measure, in degrees, of each interior angle of a regular hexagon?	120 [°]
4	If the circumference of a circle is two, what is its area?	1 / pi [un^2]
5	Anna's favorite number is twelve less than the sum of three cubed and four squared. What is Anna's favorite number?	31
6	Represented in base ten, what is the largest four-digit number in base four?	255
7	Two fair six-sided dice are rolled. What is the probability that the sum of the numbers showing is greater than seven?	5/12
8	What is the largest two-digit number that has a remainder of one when divided by four and a remainder of four when divided by five?	89
9	What is the radius of the circle inscribed in a three-four-five right triangle?	1
10	If f of the quantity two "y" plus one equals y-squared plus six "y" plus one, what is f of three?	8

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COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	How many positive integers less than or equal to fifty [PAUSE] are multiples of two or three?	33
2	What is the sum of the arithmetic series: five plus ten plus fifteen and so on up to plus fifty?	275
3	A rhombus has a side length of five centimeters and a long diagonal of eight centimeters. What is its area in square centimeters?	24 [cm^2]
4	How many points with integer coordinates are exactly nine units from the origin?	4
5	In "x" comma "y" form, what is the "y" intercept of the graph if "y" equals six x-squared minus five "x" plus eight?	(0 , 8) or 0 comma 8
6	What is one hundred ninety-five times two hundred five?	39,975
7	What is the greatest common factor of seven hundred eight and six hundred seventy-two?	12
8	For what value of "m" does the equation, three x-squared minus two "x" plus "m" equal zero, have exactly one real solution?	1/3
9	Tom has two pennies, one nickel and three dimes in his pocket. If he randomly takes out two coins, what is the probability that they are worth at least fifteen cents?	2/5
10	A dartboard consists of three concentric circles of radii one, two and three. This inner circle is worth five points, the middle ring is worth three points and the outer ring is worth one point. Assuming, Joan hits the dartboard, what is her expected score?	19/9

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COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	Twin primes are prime numbers separated by two. What is the smallest twin prime pair greater than fifty?	59 and 61, both are needed either order.
2	Express the number thirty as the sum of three prime numbers?	2+5+23 or 2+11+17 [either one]
3	In an isosceles trapezoid, WXYZ, what is the sum of the measures of angles X and Z in degrees?	180 [°]
4	Alice the ant travels from a corner of a one centimeter sugar cube to the farthest corner staying on the surface of the cube. In centimeters, what is the shortest distance that she needs to travel?	Square root of 5 [cm]
5	An isosceles triangle has one angle of measure one hundred ten degrees, what is the measure of another angle, in degrees?	35 [°]
6	What is the tens digit of eleven raised to the eighth power?	8
7	When repeatedly flipping a fair coin, what is the probability of obtaining a "tail" before getting two "heads"?	3/4
8	What is two times four times six times eight and so on up to twenty, divided by ten factorial?	1024
9	What are the rectangular coordinates of a point if its polar coordinates are six comma sixty degrees?	3 comma 3 times square root of 3. $\left(3,3\sqrt{3}\right)$
10	What is the sum of the solutions to the equation: x-squared plus one over x-squared equals two?	0

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COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	Express as a decimal, the product nine point two times nine point eight.	90.16
2	The letters in the word school, S -C -H -O -O -L are interchanged so that the O's are at either end of the new word. In how many ways can this be done?	24 [ways]
3	What is eight choose three?	56
4	The first element of a sequence is one and the second is zero. After that each element is the mean average of the two previous elements. What is the sixth element of the sequence?	5/16
5	What is the total surface area, in square meters, of a hemisphere that has a radius of six meters?	108 pi [m^2]
6	What is the distance between the point negative two comma three and the point six comma negative twelve?	17
7	What is the remainder when thirteen to the power five is divided by three?	1
8	Bob can clean the house in two hours while Lynn takes three hours. In minutes, how long will it take them together?	72 [min]
9	What is the area of the triangle with vertices that have coordinates: negative two comma three [PAUSE] four comma negative two [PAUSE] and negative two comma negative four?	21 [un^2]
10	What is one-half plus two-fourths plus three eighths plus four sixteenths and so on?	2

COLLEGE KNOWLEDGE BOWL ROUND - EXTRA

#	Problem	Answer
1	What is the area of a rectangle, whose length is four times its width and whose perimeter is eighty?	256
2	Let the point X be two comma four and the point Y be eight comma one. What are the coordinates of the point that is on the segment XY and one-third of the way from X to Y?	(4 , 3)
3	In how many ways can four couples be seated in a row so that wives and husbands are seated next to each other?	384
4	What is the limit as x approaches negative infinity of the quantity twelve x minus ten divided by the quantity four x plus twenty?	3

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October 19, 2011
High School Mental Math

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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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" Championships -- 2011-12

School:_____ Room # _____ Team #_____

Name: _____ Proctor: _____

9th 10th 11th 12th 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	1024		
2	52		
3	120		
4	160 [degrees]		
5	4/3		
6	9		
7	34 [mph]		
8	IV or 4th		

Math is Cool" Championships – 2011-12
9th & 10th Grade – October 19, 2011

School Name_____Team #_____

Proctor Name_____Room #_____

STUDENT NAME_____

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	B		
2	C		
3	A		
4	E $[64\pi]$		
5	A		
6	B		
7	B		
8	D		
9	A		
10	C		

"Math is Cool" Championships – 2011-12
9th & 10th Grade – October 19, 2011

Final Score:

KEY

School Name_____Team #_____

Proctor Name_____Room #_____

First Score

(out of 10)

STUDENT NAME_____

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	54		
2	11		
3	21 [ways]		
4	4		
5	495		
6	32 [ways]		
7	2		
8	$\frac{27\pi}{2}$ [un^2]		
9	$64\pi^2$ [mm^2]		
10	67/288		

"Math is Cool" Championships – 2011-12
9th & 10th Grade – October 19, 2011

School Name_____Team #_____

Proctor Name_____Room #_____

STUDENT NAME_____

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	$\frac{111}{512}$
2	8,388,608 [bits]
3	2162
4	1/24
5	2,100,010,006