"Math is Cool" Championships – 2009-10

Sponsored by:

4th Grade – April 16, 2010

Individual Contest

GENERAL INSTRUCTIONS applying to all tests:

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

INDIVIDUAL TEST - *35 minutes*

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. Each problem is scored as a 1 or 0. Record your answers on the score sheet. No talking during the test. You will be given a 5 minute warning.

"Math is Cool" Championships – 2009-10

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4th Grade – April 16, 2010

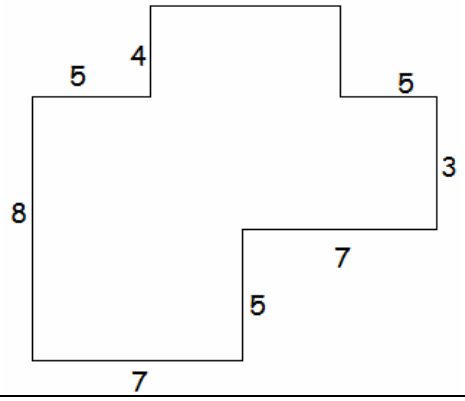
Individual Contest

Record all answers on the colored cover sheet.

1	What is the sum of 24 and 79?
2	Find the next number in this sequence: 4, 9, 14, 19, __
3	How many sides does a hexagon have?
4	What is the 5^{th} prime number? (A prime number is a number that only has two factors.)
5	I have a fair coin. What is the probability that I flip a head?
6	Find the mean (average) of this set of numbers: {3,6,6,9,11}
7	What is the area of a square, in square units, with a side length of 12 units?
8	Evaluate: $\frac{1}{2}+\frac{1}{3}$
9	What is the remainder when you divide 437 by 3?
10	True or false: $\frac{7}{8}>0.9$
11	What is the perimeter, in units, of a rectangle with a length of 5 units and width of 11 units?
12	Maddie has a favorite number. It is a two digit number that is a multiple of seven. It is also a perfect square. What is her favorite number?
13	Evaluate: $20-2\times6+4$
14	What is the range of the following set of data? 20, 11, 2, 5, 1, 21, 19
15	Kayleigh has a 4 foot by 6 foot garden full of rose bushes. If each rose bush covers 3 square feet of the garden, how many rose bushes are in her garden?
16	A bag contains 3 blue marbles, 4 red marbles, and 2 yellow marbles. As a fraction, what is the probability that a blue marble is drawn from the bag?

17	How many digits are used to number a 25 page book (numbering starts on page 1, count numbers such as 11 as 2 digits)?
18	Bertha has 3 dozen cupcakes. She organizes them into groups of 6. How many groups does she have?
19	What is the probability of drawing an ace of any suit from a standard deck of 52 cards?
20	Whenever Stacey eats jalapeños, she only takes a bite at a time. Stacey's bites are equivalent to 1/3 of a jalapeño. Each bite takes 40 seconds. How many seconds does it take for her to eat 7 jalapeños?
21	Express as a decimal: $\frac{19}{20}$
22	What is the greatest common factor of 6, 24, and 30?
23	Find, in square units, the area of a triangle with a height of 7 units and base of 8 units.
24	Eric has 5 shirts, 3 pairs of jeans, 2 pairs of socks, and 1 pair of shoes. If an outfit consists of 1 shirt, 1 pair of jeans, 1 pair of socks, and 1 pair of shoes, how many different outfits can he makes?
25	What is the least common multiple of 3, 5, and 7?
26	Mario and Luigi are fishing. Mario catches 3 times as many fish as Luigi. If they caught 16 fish altogether, how many fish did Mario catch?
27	Trung has some cookies. Stacey eats half of them, then Berta smashes a third of the remaining, then Eric gives Trung two more cookies. Trung now has 12 cookies. How many cookies did he start out with?
28	Convert 0.375 to a fraction.
29	How many days are there in 52 weeks?
30	How many factors does the number 84 have?

Challenge Questions

31	It takes Vishnu 7 minutes to play one full song on the saxophone. How many <u>full</u> songs can he play in 3 hours?
32	What is the area, in square units, of the largest four sided shape with a perimeter of 56?
33	My refrigerator is running. It runs at an average of 30 miles per hour. If my refrigerator started running at 10 AM, at what time would I catch it if I started running right when I noticed it was missing at 1 pm and I run at an average of 75 miles per hour?
34	Evaluate the area of the following figure (in square units): 
35	Dracula, Donatello, Dennis, Demetrius, and Rasputin are sitting in a line. Donatello is to the left of Demetrius, but to the right of Dennis. Dennis is to the right of Rasputin. Dracula is to the left of Demetrius. Donatello is sitting in the middle. Who is in the right most position?
36	Every time Sam drops a penny, Stacey screams two times. For every time Stacey screams, Jon hiccups three times. Every time Jon hiccups, William paints three inches. If William paints three feet, how many pennies did Sam drop?
37	Suhmiin wants to color an entire sheet of paper that has dimensions of 10 inches by 12 inches. If she colors at a rate of 6 square inches per minute, how many hours will it take her to color the entire sheet of paper? Express your answer as a fraction.
38	A tree has 100 leaves. On Tuesday, the tree begins losing its leaves at a rate of 6 leaves a day. On what day of the week will the tree have no leaves?
39	Amy, Brian and Charlie all compete in a Fall sport and a Spring sport. In the Fall, they randomly choose between swimming, football or volleyball. In the Spring they randomly choose between Track and Tennis. What is the probability that all three choose the same two sports?
40	On the first day of vacation, Mary gave me a lump of coal. On the second day of vacation, Mary gave me two lumps of coal. On the third day of vacation, she gave me four lumps of coal. On the fourth day of vacation, she gave me eight lumps of coal. If she keeps giving me coal at this rate, how many lumps of coal should I expect on the eighth day of vacation?

"Math is Cool" Championships – 2009-10

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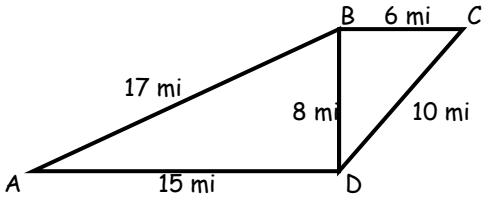
4th Grade – April 16, 2010

Team Multiple Choice Contest

Four bikers looking for the thrill of adventure decide to ride their bikes along the steep and difficult Mosquito Mountain paths (shown in the diagram below; "mi" stands for miles). The maximum (fastest) speed of each bike is shown in the table below; "mph" stands for miles per hour.
Because of the steepness of the path, bikers don't always travel at the maximum speed.

Bike Names	Bike Maximum Speeds
Seabiscuit	30 mph
Chariot of Fire	35 mph
Rocky	24 mph
Jaws	13 mph

Mosquito Mountain Paths



Angle ADB and Angle CBD are right angles.

1	How many bikes have a maximum speed that is a multiple of 3? A) 4 B) 3 C) 2 D) 1 E) Answer not given
2	What is the shortest distance, in miles, along the bike paths from point A to point C? A) 25 B) 23 C) 14 D) 10 E) Answer not given
3	What is the difference in area between the triangles ABD and BCD, in square miles? A) 20 B) 36 C) 56 D) 72 E) Answer not given
4	A biker is traveling from A to D to C. After 3/5 of the distance, he takes a break. How much further, in miles, does he have to travel? A) 9 B) 15 C) 10 D) 6 E) Answer not given
5	How many ways are there to park the bikes side by side in a bike rack that has four positions? A) 16 ways B) 20 ways C) 24 ways D) 36 ways E) Answer not given
6	Point D is 18 feet higher in altitude than point A. Point C is 14 feet higher than point D. Which is steeper: the path from A to D or the path from D to C? A) AD is steeper B) DC is steeper C) They are the same D) Not enough information E) Answer not given
7	Suppose that a biker is carrying a spare tire and wants to wear each tire evenly. He switches the tires around from time to time so that each of his tires is used the same number of miles during the trip from point A to point D. For how many total miles will each tire be used? A) 5 B) 7.5 C) 10 D) 12 E) Answer not given

Problem Restated: Four bikers looking for the thrill of adventure decide to ride their bikes along the steep and difficult Mosquito Mountain paths (shown in the diagram below; "mi" stands for miles). The maximum (fastest) speed of each bike is shown in the table below; "mph" stands for miles per hour. Because of the steepness of the path, bikers don't always travel at the maximum speed.

Bike Names	Bike Maximum Speeds
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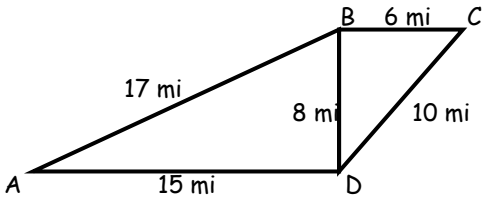
Mosquito Mountain Paths



Angle ADB and Angle CBD are right angles.

8	A bicycle is leaving Point A and wants to visit points B, C, and D but not necessarily in that order. What is the shortest distance that will have to ridden staying on the paths? A) 29 miles B) 31 miles C) 33 miles D) 35 miles E) Answer not given
9	Three bikers are traveling to point D. The biker riding Chariot of Fire leaves from point A, the biker riding Jaws leaves from point B, and the biker riding Rocky leaves from point C. All bikers leave at the same time and travel at their bike's maximum speed along the shortest path. Which bicycle gets to point D first? A) Chariot of Fire B) Jaws C) Rocky D) Two bikes get there at the same time E) Answer not given

"Math is Cool" Championships – 2009-10

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4th Grade – April 16, 2010

Team Contest

1	Adam read 3 books a day for six days a week during his summer vacation. His vacation lasted for 10 weeks. If he never read a book more than once, how many books did Adam read over his summer vacation?
2	What is the sum of the first 18 positive odd numbers?
3	Iris will make a rectangle so that the length is twice the width. She uses one yard of wire to make the rectangle. How wide is Iris's rectangle, in inches?
4	The average (mean) of my number and 7 is the same as the median of the following set of values: {9, 62, 14}. What is my number?
5	Jimmy's book has 7 chapters, each at least 14 pages and at most 27 pages long. Chapter 1 starts on page 1, and each chapter starts on a new page. What is the lowest page number that could be included in chapter 6?
6	How many of the following five values are greater than 1/2? 0.09 1/3 2 1.11 2/4
7	My 12-hour digital clock shows hours and minutes. For example, at 5 minutes after 3 o'clock in the afternoon, the display shows "3:05". For how many minutes in a 24-hour period are all the digits showing on my clock the same?
8	Vishnu made a fruit salad with twice as many raspberries as strawberries, and half as many blueberries as strawberries. If he used 12 blueberries, how many berries were in the salad?
9	From a list of the 1-digit and 2-digit counting numbers, Berta crossed out all multiples of 9, all the numbers she would say when counting by tens starting with 3 (3, 13, 23, and so on), and all numbers containing the digit 4. How many numbers were left on Berta's list?
10	Sarah enters a department store at the ground level (first floor) and steps in the elevator. She goes up 5 floors to the middle floor of the building. How many floors in all does this building have?

"Math is Cool" Championships – 2009-10

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4th Grade – April 16, 2010

Relay Contest

RELAYS - 5 minutes per relay

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

	Practice Relay	Answer
Person 1	What is 12 times 5?	60
Person 2	What is TNYWG plus 3?	63
Person 3	What is 195 minus TNYWG?	132
Person 4	What is TNYWG divided by 22?	6
	Relay #1	Answer
Person 1	What is the product of 3, 5, and 7?	105
Person 2	From TNYWG subtract the area of a square with side-length 8?	41
Person 3	What is TNYWG – (4 x 6 + 3)?	14
Person 4	What is the sum of TNYWG and two-thirds of 51?	48
	Relay #2	Answer
Person 1	8 friends are sharing 1,112 bottles of bug spray. How many bottles should each friend get so that the bottles are divided evenly?	139 [bottles]
Person 2	Find the area of a triangle with height 5 and base 8. What is the remainder when TNYWG is divided by this area?	19
Person 3	Find the product of the first 3 even counting numbers and add it to the sum of the digits of TNYWG. What is the resulting number?	58
Person 4	If the probability of drawing a blue marble from an urn is 3/7 and the urn contains 91 marbles total, find the number of blue marbles in the urn. What is the sum of this number and TNYWG?	97

"Math is Cool" Championships – 2009-10

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4th Grade – April 16, 2010

Final Score:

KEY

School Name_____Team #_____

Proctor Name_____Room #_____ Division: ____

Mental Math Contest

MENTAL MATH - 30 seconds per question

PERSON 1 NAME:		**1 or 0**
1.1	What is the sum of 32 and 15?	47
1.2	Which number is the largest? Point zero-zero-nine or point zero-two-five	.025
1.3	What is the perimeter of a rectangle, in units, with sides of length 7 and 9?	32 [un]
1.4	How many minutes are in 360 seconds?	6 [min]
PERSON 2 NAME:		
2.1	What is the largest possible remainder you can get when you divide a number by 8?	7
2.2	How many nickels are in three dollars and thirty-five cents?	67 [nickels]
2.3	What is the sum of the measures of the interior angles of a triangle, in degrees?	180 [deg]
2.4	What is the difference between 92 and 37?	55
PERSON 3 NAME:		
3.1	How many feet are in 12 yards?	36 [feet]
3.2	What is the product of 19 and 8?	152
3.3	Two consecutive counting numbers add to 19. What is the smaller of the two numbers?	9
3.4	If four people all shake hands with each other exactly once, how many handshakes occur?	6 [handshakes]
PERSON 4 NAME:		
4.1	What is the quotient of 42 and 7?	6
4.2	A bowl contains 3 red marbles and 4 green marbles. A blindfolded person chooses one marble from the bowl. As a fraction, what is the probability that the marble will be red?	3/7
4.3	How many cups are in a half-gallon?	8 [cups]
4.4	A drawer contains 2 red, 2 green and 2 purple socks. How many individual socks would need to be removed from the drawer without looking to make sure you get a matching pair?	4 [socks]

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4th Grade – April 16, 2010

Set A

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	What is three hundred twenty-five divided by thirteen?	25
2	Tony's rectangular front yard has an area of 200 square meters and one side of length 10 meters. How many meters is the perimeter of the yard?	60 [meters]
3	How many zeroes are in the number ten billion?	10
4	Our little zoo has 1 elephant, 3 camels, 4 ostriches and 5 snakes. How many total legs are there in the zoo?	24
5	When my favorite number is tripled and one is subtracted, I get fifty. What is my favorite number?	17
6	Two angles of a triangle measure 35 and 80 degrees. What is the measure of the third angle, in degrees?	65 [deg]
7	Pete visited his grandmother who lived 13 miles from his house. It took 20 minutes to get there. How many miles per hour did they average?	39 [mph]
	Extra Problem – Only if Needed	
8	What is the second largest two-digit prime number?	89

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4th Grade – April 16, 2010

Set A

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	My apartment is plagued by rats. Half of the rats are in my bathroom, two are in my refrigerator, and the rest are in my shoes. If there are a total of twenty rats in my apartment, how many rats are in my shoes?	8 [rats]
2	Starting with one, what is the sum of the first five perfect squares?	55
3	Michael has three baskets to fill with flowers. Each basket holds twenty five flowers. Each flower has six petals. How many petals does he have if all three baskets are filled with flowers?	450 [petals]
4	What is the area, in square units, of a square with sides measuring twenty-one units?	441 [un^2]
5	A picnic table supports eight people, and a school bus supports twenty-eight people. How many people can be supported by two picnic tables, and three buses?	100 [people]
6	What is one-half plus one-fourth plus one-fifth?	19/20
7	How many positive factors does the number sixty-eight have?	6
	Extra Problem – Only if Needed	
8	One cookie costs seventy five cents. How much do twelve cookies cost, in dollars?	[$] 9

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4th Grade – April 16, 2010

Set A

COLLEGE KNOWLEDGE BOWL ROUND #3

#	Problem	Answer
1	Trung has seven yards of rope. He cuts the rope into three-inch pieces. How many pieces of rope does he have now?	84 [pieces of rope]
2	What is one thousand twenty-four divided by one hundred twenty-eight?	8
3	If I roll two fair dice, what is the probability that the product of the top numbers is even?	3/4
4	What is the sum of the number of faces and the number of corners of a cube?	14
5	I have two quarters, six dimes, three nickels, and twenty pennies. What is the largest amount, in dollars, I can make using seven coins?	1 [dollar]
6	Which of these three numbers is largest: one-third, two-fifths, or three-eighths?	Two-fifths
7	A rectangle has a width of four and a length of eight. What is the sum of its area and perimeter?	56
	Extra Problem – Only if Needed	
8	What is the sum of the integers from negative five to eight, inclusive?	21

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4th Grade – April 16, 2010

Set B

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	What is twenty times twenty-five?	500
2	Mary walked around the edge of her rectangular backyard. If her yard is 35 feet in length and 50 feet wide, how many feet did she walk?	170 [ft]
3	How many zeroes are in the product of 2 times 2 times 2 times 5 times 5 times 5?	3
4	I have ten yards of licorice rope to be divided among my fifteen friends. How many inches does each one receive?	24 [in]
5	How many positive factors does the number 64 have?	7
6	What is the area of a triangle with base four and height four and one-half?	9
7	My house is 12 miles from school and I drive at 30 miles per hour. How many minutes does it take me to get to school?	24 [min]
	Extra Problem – Only if Needed	
8	What is the sum of the first 5 prime numbers?	28

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Set B

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	What is the average of the set of numbers: 4, 10, 5, 8 and 8?	7
2	A coin is flipped twice. What is the probability that I don't get a head?	1/4
3	What is twenty minus nineteen plus eighteen minus seventeen and so forth to: plus two minus one?	10
4	How many prime numbers are between forty and sixty?	5
5	An 8 by 10 inch picture is framed by a 2 inch rectangular border on all sides. How many square inches are in the frame?	88 [sq in]
6	What is the remainder when 413 is divided by 25?	13
7	How many sides does a decagon have?	10
	Extra Problem – Only if Needed	
8	What is the product of the first five primes?	2310

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Set B

COLLEGE KNOWLEDGE BOWL ROUND #3

#	Problem	Answer
1	What is the median of the set 12, 5, 3, 15, 8, and 17	10
2	Stacey drinks four bottles of water a day. Each bottle contains two cups of water. How many weeks does it take for Stacey to drink one hundred sixty-eight cups of water?	3 [weeks]
3	Start with the number of months in a year and add the number of days in April and divide by the number of days in a week. What number do you end up with?	6
4	What is the first multiple of 9 that has a remainder of 3 when divided by 7?	45
5	How many ways can I interchange the letters in the word C-O-O-L?	12
6	What is two times two times two times two times three?	48
7	My mom made 3 dozen cupcakes for my class. Every member of the class had one except Johnny, Bill and Tom who each had two. If there are 24 students in the class, how many cupcakes were left over?	9 [cupcakes]
	Extra Problem – Only if Needed	
8	What is the tenth smallest prime number?	29

"Math is Cool" Championships – 2009-10

4th Grade – April 16, 2010

Final Score:
KEY

First Score

School Name_____Team #_____

Proctor Name_____Room #_____

STUDENT NAME_____Division: _____

Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	103		
2	24		
3	6 [sides]		
4	11		
5	1/2 [or equiv]		
6	7		
7	144 [un^2]		
8	5/6 [or equiv]		
9	[r] 2		
10	False		
11	32 [units]		
12	49		
13	12		
14	20		
15	8 [rose bushes]		
16	1/3 [or equiv]		
17	41 [digits]		
18	6 [groups]		
19	1/13 or 4/52 [or equiv]		
20	840 [seconds]		

	Answer	1 or 0	1 or 0
21	0.95		
22	6		
23	28 [un^2]		
24	30 [outfits]		
25	105		
26	12 [fish]		
27	30 [cookies]		
28	3/8 or 375/1000 [or equiv]		
29	364		
30	12 [factors]		
31	25 [songs]		
32	196 [un^2]		
33	3 PM		
34	93 [un^2]		
35	Demetrius		
36	2 [pennies]		
37	1/3 [hours] [or equiv frac]		
38	Thursday		
39	1/36 [or equiv]		
40	128 [lumps of coal]		

"Math is Cool" Championships – 2009-10

4th Grade – April 16, 2010

School Name_____Team #_____

Proctor Name_____Room #_____Division: _____

Final Score:
KEY

First Score

(out of 18)

Team Multiple Choice Contest – Score Sheet

TEAM MULTIPLE CHOICE - 15 minutes

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

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

DO NOT WRITE IN SHADED REGIONS

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

"Math is Cool" Championships – 2009-10

4th Grade – April 16, 2010

Final Score:
KEY

First Score

(out of 20)

School Name_____Team #_____

Proctor Name_____Room #_____Div: _____

Team Contest – Score Sheet

TEAM TEST - 15 minutes

When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as a 2 or 0.

DO NOT WRITE IN SHADED REGIONS

	Answer	2 or 0	2 or 0
1	180 [books]		
2	324		
3	6 [in]		
4	21		
5	[page] 71		
6	2 [values]		
7	12 [min]		
8	84 [berries]		
9	63 [numbers]		
10	11 [floors]		

"Math is Cool" Championships -- 2009-10

KEY

4th Grade – April 16, 2010

School:_____Team #_____

Proctor: _____ Room #_____Div _____

PRACTICE RELAY

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
60	**63**	**132**	**6**
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
105	**41**	**14**	**48**
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 2

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
139 **[bottles]**	**19**	**58**	**97**
1 or 0	1 or 0	1 or 0	2 or 0