"Math is Cool" Masters – 2007-08

Sponsored by:

4th Grade – May 17, 2008

Individual Contest

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by all 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.*
- *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.

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4th Grade – May 17, 2008

Individual Contest

Record all answers on the colored cover sheet.

1	Find the area in square units of a rectangle with sides of length 5 and 7.
2	Find the missing number: 5 + 3 – 2 + 8 + ? = 30
3	Find the sum of the thousands digit and the tens digit of 7,832,154.
4	Joe has $72 in his savings account. He is saving money to buy a calculator for $110. He saves $2 a week. How many weeks will it take before he has $110?
5	What is the probability of spinning an even number in one spin of a spinner with equal sections numbered 1 through 7?
6	Find the positive difference between 5.32 and 10.09, and give your answer as a decimal.
7	Colin is buying bananas. Bananas cost 50 cents each, or 2 for 75 cents, or 3 for 90 cents. (You must buy groups of 2 or 3 to get the lower prices.) He has $7.83. What is the largest number of bananas he can buy?
8	Two angles in a triangle are 37 degrees and 55 degrees. What is the degree measure of the other angle?
9	If all piano players are poor, and Biff is poor, does it follow logically (necessarily) that Biff is a piano player? Answer "yes" or "no".
10	Fred went 210 miles in 5 hours. What was his average speed in miles per hour?
11	How many yards are in 180 inches?
12	What is the number of units in the perimeter of a pentagon with 3 sides of length 8 units each, and 2 sides whose lengths average to 6 units?
13	What is the 73rd letter in the pattern MATHISCOOLMATHISCOOLMA…
14	How many sets of parallel lines does a parallelogram have?
15	What is the seventh term in the following sequence: 3, 4, 6, 9, 13, and so on?
16	Find the average of the following values: 3, 5, 7, 8, and 2.
17	Dan Marino threw for 2,290 yards over 11 games. What was his average passing yards per game, to the nearest yard?
18	Eho's school has 15 steps between each floor, but no steps are required to enter the building on the first floor. Eho's 1st period class is on the first floor, his 2nd

	period class is on the 4th floor, and his 3rd period class is on the 2nd floor. After 3rd period Monday, he left for a dentist appointment and stayed home the rest of the day. How many steps at school did Eho go up or down on Monday?
19	Shane is headed to Seattle from Spokane, which is 280 miles away. He was scheduled to stop at Moses Lake in order to pick up supplies. However, he didn't remember until he was 35 miles past Moses Lake. He traveled back and got his supplies. What is the total number of miles he drove before he arrived in Seattle?
20	What is the hundreds digit of the quotient of 76,842 divided by 3?
21	Tom has 7 green socks, 3 purple socks, and 5 red socks in a drawer. What is the minimum number of socks he would need to take out of the drawer without looking to guarantee a matching pair of purple socks?
22	This year at state track Kai finished 4th place in the mile race. He was also 4th place from last. If there were no ties, how many runners were in the race?
23	A square number is the product of a counting number times itself. What is the difference between the smallest 3-digit square number and the largest 2-digit square number?
24	From a list of the first ten counting numbers, Lynn selects 3 different numbers and adds them. If the sum she gets is the largest even sum possible, what is it?
25	What is the smallest counting number I could add to forty-five to get a number that can be divided by eight with no remainder?
26	A large group of mathletes stood equally spaced in a circle. They counted off and Biff said the number seven. He noticed Eho, number nineteen, was directly across from him. How many mathletes are in the circle?
27	A telephone call has a charge of 30 cents for the first five minutes and 4 cents for each minute after five minutes. Colin spent 62 cents on this phone call. How many minutes long was the phone call?
28	Find the largest possible odd remainder when a counting number is divided by 23.
29	If it takes one-fourth ounce of peanut butter to cover one cracker, how many crackers could I cover with half a pound of peanut butter?
30	Linda opened a book and noticed that the product of the two page numbers where she had the book open was 5256. What is the smaller of the two page numbers?

Challenge Questions

31	A line is drawn down the middle of a square, from the midpoint of one side to the midpoint of the opposite side, creating two equal rectangles. If the perimeter of the original square was 48 centimeters, what is the number of centimeters in the perimeter of one of these two equal rectangles?
32	A dog has three different toys, but plays with its favorite toy exactly twice as often as either of the other two. If the dog is currently playing with a toy, what is the likelihood that it is playing with its favorite toy? Give your answer as a fraction.
33	What are the odds in favor of an event occurring if the probability that the event will occur is 5/7?
34	Write .2222… as a reduced fraction.
35	I left my calculator out in the rain, and now it gives me weird answers to division problems. When I enter "175 ÷ 4", it shows the answer 433. When I enter "88 ÷ 3", it shows the answer 291. When I enter "315 ÷ 2", it shows the answer 1571. When I try to divide a certain number n by 5, it shows the answer 933. What is n?
36	After four boys moved away, exactly half of the students on the math team were boys. Before they moved, the proportion of boys was 21 boys out of every 40 math team members. How many girls are on the math team?
37	A snail tries to get out of a well. Each day it climbs up the side of the well 4 feet and each night it slides down the well 2 feet and 6 inches. If the snail starts 40 feet down inside in the morning, how many days will the snail take to get out of the well?
38	ABCD is a rectangle with area 36 units^2. Tony makes the following 5 statements about this rectangle: (1) AB = DA; (2) AB = AC; (3) CD = BC > AB; (4) AD < DC < BD; (5) DB = CA. Let x = the number of Tony's statements that cannot ever be true; y = the number of Tony's statements that might be true or might not be true; and z = the number of Tony's statements that must always be true. Give the ratio x : y : z.
39	The ratio of the side lengths of two similar triangles is 2:3. What is the ratio of their areas?
40	Colin, Kai, and Sampson are playing a dice game. Colin goes first, Kai second, and Sampson third. The first person to roll a three wins and the game is over. The dice are continuously passed in the above order until someone wins. What is the probability that Sampson wins?

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4th Grade – May 17, 2008

Team Multiple Choice Contest

When the Jay family went on safari in East Africa, they kept track of the numbers of big animals they saw per day. Below is their record for one day, in addition to some facts about these animals. All questions about the numbers of animals seen refer to the day for which the record is shown, unless you are told otherwise. Lions and cheetahs are predators, and have paws. Gazelles and zebras are prey, and have hooves.

Notes: The abbreviation "mph" stands for miles per hour. One ton is 2000 pounds.

Animal	Top speed	Average adult weight	Number of animals seen
Cheetah	70 mph	125 pounds	10
Lion	50 mph	500 pounds	15
Gazelle	35 mph	25 pounds	40
Zebra	40 mph	600 pounds	30

1	All the cheetahs seen were young adult males (brothers) living together in family groups. If there are always 3 to 5 males per family group, what is the largest number of cheetah family groups the Jay family could have seen? A) 10 B) 5 C) 4 D) 3 E) 2
2	How many animals of these four types did the Jay family see in all? A) 95 B) 85 C) 80 D) 75 E) answer not given
3	How many more hooves than paws did the Jay family see? A) 15 B) 45 C) 90 D) 35 E) answer not given
4	Assume each animal seen is of average adult weight. What is the total weight in pounds of all the animals seen by the Jay family? A) 6,150 B) 1,250 C) 2,775 D) 11,550 E) 27,750
5	A newborn lion cub weighs 40 ounces. By what factor will its weight increase if it reaches the average weight for an adult lion? A) 560 B) 12.5 C) 200 D) 15 E) 20
6	If a lion's average speed when chasing prey is 10 miles per hour slower than its top speed, how fast does a lion run, on average, when chasing prey? A) 70 mph B) 60 mph C) 50 mph D) 40 mph E) 30 mph

RESTATED:

When the Jay family went on safari in East Africa, they kept track of the numbers of big animals they saw per day. Below is their record for one day, in addition to some facts about these animals. All questions about the numbers of animals seen refer to the day for which the record is shown, unless you are told otherwise. Lions and cheetahs are predators, and have paws. Gazelles and zebras are prey, and have hooves.

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Cheetah	70 mph	125 pounds	10
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Zebra	40 mph	600 pounds	30

7	A gazelle and a zebra are five miles apart and are running toward each other at their top speeds. How many minutes does it take them to meet? A) 15 B) 24 C) 4 D) 3 E) 7.5
8	On a different day, the only animals the Jay family saw were five cheetahs and two gazelles. What was the average speed in mph of the animals they saw on this day? A) 50 B) 60 C) 70 D) 52.5 E) 48.75
9	Park rangers need to move some of the animals to another part of the park due to over-crowding. They have a truck that will carry as much weight as two elephants averaging 5 tons each. If the rangers put the largest possible number of zebras of average weight in the truck, then fill up the truck with gazelles of average weight, how many animals will be in the truck? A) 41 B) 32 C) 16 D) 33 E) 49

"Math is Cool" Masters – 2007-08

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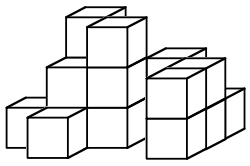
4th Grade – May 17, 2008

Team Contest

1	Vowels are a, e, i, o, and u. Consider all the other letters to be consonants. What fraction of the letters in this problem are vowels?
2	In the stack of identical cubes at right, each cube that is not resting on the table must be resting on another cube. What is the <u>smallest</u> number of cubes there could be in the stack? 
3	Put the following five values in order from smallest to largest. Your answer should consist of 5 letters in the correct order. $A = 8 \times 8$ $B = 88$ $C = 8 - 8$ $D = 8 + 8$ $E = 8 \div 8$
4	An experimental robotic vehicle moves at constant speed in half-hour time blocks. At the end of any half-hour block it may change its speed (which then remains the same for the next half-hour). In one test, the vehicle moved 220 kilometers in 4 hours. If its fastest speed is 60 kilometers per hour, what is the least possible distance in kilometers the vehicle could have moved during any half-hour block of this test trip?
5	Sarah and Millie are collecting shells at the beach. Sarah has 47 shells and Millie has 40 shells. After Sarah gives some of her shells to Millie, Sarah is left with 34 shells. How many shells does Millie now have?
6	Toad has a number line painted on the floor of the exercise room of Toad Hall. One day, Toad starts on the number 14, jumps x units forward, then 5 units backward, then 7 units forward. He ends on the number 37. What is x?
7	Find the value of (6 x 5) + (2 x 2 x 2) – (4 x 3) + (15 ÷ 3).
8	Harriet spent a total of 85¢ on a mixture of gumballs and jawbreakers, each costing a whole number of cents. A gumball costs 25¢, and a jawbreaker is more expensive than a gumball. If Harriet got an even number of jawbreakers, what is the price in cents of each jawbreaker?
9	Marty takes 5 steps for every 6 steps that Jon takes. Each of Jon's steps is 3 feet, and each of Marty's steps is 2 feet. In the time it takes Jon to walk 630 feet, how many feet does Marty walk?
10	My favorite number is a 2-digit counting number. One of its digits is in 12,450 and one of its digits is in 2,793. The sum of its digits is odd, and the difference between its digits is 3. Find the sum of all possible numbers that could be my favorite number.

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4th Grade – May 17, 2008

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!*

	Relay #1	**Answer**
Person 1	What is the product of the number of sides a triangle has and the number of sides a square has?	12
Person 2	Evaluate: TNYWG – (47-39)	4
Person 3	To square a number means to multiply the number by itself. Square 11, and then multiply that product by TNYWG.	484
Person 4	Add TNYWG to the number of different 3-digit counting numbers that can be formed from the digits 2, 4, and 7, if each digit is used exactly once in each 3-digit number.	490
	Relay #2	**Answer**
Person 1	Evaluate: $2 \times 7 + 8 - 6$	16
Person 2	A spider has 8 legs and a cricket has 6 legs. If I keep my (TNYWG – 12) vegetarian spiders and my 8 crickets in a cage together, how many legs in all are there in the cage?	80 [legs]
Person 3	Colin drove 60 miles per hour for 4 hours, and then drove TNYWG miles per hour for 0.5 hours. How many miles did Colin drive in all?	280 [miles]
Person 4	What is the remainder when TNYWG is divided by the sum of (3 + 0) plus (3 + 1) plus (3 + 2)?	4

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4th Grade – May 17, 2008

Final Score:

KEY

Mental Math Contest

PERSON 1 NAME:		**1 or 0**
1.1	Find the value of fifty-one plus eleven.	62
1.2	What is the side length in centimeters of a square with area eighty-one square centimeters?	9 [cm]
1.3	Joel falls into the lake. He sinks at a rate of three feet per second. The lake is twenty-four feet deep. How many seconds does it take Joel to reach the bottom?	8 [seconds]
1.4	What is the next number in this sequence: seventeen, fourteen, eleven, eight, and so on?	5
PERSON 2 NAME:		
2.1	What is one-half of twenty-one? Express your answer as a decimal.	10.5
2.2	What is the remainder when the product of 18 and 7 is divided by 2?	0
2.3	Three days ago it was Monday. What day of the week will it be tomorrow?	Friday
2.4	I gave my bunny six carrots, but one-third of the carrots were moldy. How many carrots can the bunny eat if he cannot eat moldy ones?	4 [carrots]
PERSON 3 NAME:		
3.1	Evaluate: three times six plus seven.	25
3.2	When I draw one card from a standard deck, what is the probability that the card will be a queen, but not the queen of hearts? Give your answer as a fraction.	3/52
3.3	When the following three measurements are listed in order of size, which one will be in the middle? one meter, one inch, one foot	1 foot [or just "foot"]
3.4	If three cogs equal one dog, and one dog equals one slog, then one slog is equal to how many cogs?	3 [cogs]
PERSON 4 NAME:		
4.1	If three plus my number is equal to five plus two, what is my number?	4
4.2	What is the digit in the ones place of the product that you get when you multiply 17 by itself?	9
4.3	If the area of a square is sixteen square yards, what is the number of yards in the perimeter of the square?	16 [yards]
4.4	How many whole flowers can you buy with eighty-five cents, if each flower costs ten cents?	8 [flowers]

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May 17, 2008

4th Grade - Division 1 & 2

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	Cathy had 19 balloons, and Dan had twice as many balloons as Cathy. How many balloons did they have altogether?	57 [balloons]
2	How many positive even counting numbers are less than 44?	21 [numbers]
3	Arnold is watching a Spongebob Squarepants video, which started at 8:15 PM and will last for 55 minutes. If he watches it all, what is the largest number of minutes he can read after the video and still get to bed by 9:30 PM, given that he does not read in bed?	20 [min]
4	If three dozen cookies are put into 4 boxes with an equal number of cookies in each box, how many cookies will be in each box?	9 [cookies]
5	What is the difference between one-half of 200 and one-fourth of 100?	75
6	If the letter A is worth one dollar, B is worth two dollars, C is worth three dollars, and so on, then what is the value in dollars of the phrase "BAD CAT", spelled B-A-D C-A-T?	31 [dollars]
7	What is the product of the digits of two thousand eight?	0
	Extra Problem – Only if Needed	
8	The radius of a circle is two-thirds of an inch. What is the diameter of the circle, as a mixed number of inches?	$1\frac{1}{3}$ [inches]

"Math is Cool" Masters – 2007-08

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4th Grade - Division 1 & 2

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	When Karen rolls three dice, the numbers showing on the top faces are all different. What is the largest possible sum of the numbers on the top faces?	15
2	What is the probability of drawing either a black card or a diamond in a single random draw from a standard deck of cards?	$\frac{39}{52}$ or $\frac{3}{4}$
3	When you reverse the digits of my friend's 7-digit telephone number, you get the number three million forty-two thousand eight hundred ninety-seven. In the correct order, what digits should I dial to telephone my friend?	7982403
4	How many days total are in the years 2007 and 2008, given that 2008 is a Leap Year?	731 [days]
5	What is the name of the flat, straight-sided geometric shape that has twice as many sides as a rectangle?	octagon
6	If the average of my number and 17 is 23, what is my number?	29
7	In a Quidditch match, Gryffindor has seventy points, while Slytherin has eighty-three points. If Slytherin does not score again, how many more points does Gryffindor need to score in order to win?	14 [points]
	Extra Problem – Only if Needed	
8	Multiply ninety-eight times fifty-five.	5390

"Math is Cool" Masters – 2007-08

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May 17, 2008

4th Grade - Division 1 & 2

COLLEGE KNOWLEDGE BOWL ROUND #3

#	Problem	Answer
1	Find the mode of the following set of data: 5, 3, 7, 3, 8, 7, 5, 3, and 4.	3
2	April Fool's Day is the first day of April, and May Day is the first day of May. If April Fool's Day is on a Thursday in a certain year, on what day of the week will May Day fall that year?	Saturday
3	A string is eighty-nine inches long. How many pieces of length one foot can be cut from this string?	7 [pieces]
4	How many dimes will it take to equal the same amount of money as 100 quarters?	250 [dimes]
5	What time would it be 80 minutes before 12:18 PM?	10:58 AM [or 2 minutes before 11:00 A.M.]
6	I have 97 candy bars. What is the largest whole number of candy bars I can eat and still leave at least 20 candy bars for each of my two sisters?	57 [candy bars]
7	Find the value of A plus B plus A plus B minus A, if A equals seven and B equals eleven.	29
	Extra Problem – Only if Needed	
8	Subtract nineteen from fifty, and then multiply that result by two.	62

"Math is Cool" Masters – 2007-08

4th Grade – May 17, 2008

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	35 [sq units]		
2	16		
3	7		
4	19 [weeks]		
5	3/7		
6	4.77		
7	25 [bananas]		
8	88 [degrees]		
9	no		
10	42 [mph]		
11	5 [yards]		
12	36 [units]		
13	T		
14	2 [sets]		
15	24		
16	5		
17	208 [yards]		
18	90 [steps]		
19	350 [miles]		
20	6		

	Answer	1 or 0	1 or 0
21	14 [socks]		
22	7 [runners]		
23	19		
24	26		
25	3		
26	24 [mathletes]		
27	13 [minutes]		
28	21		
29	32 [crackers]		
30	[page] 72		
31	36 [cm]		
32	1/2		
33	5:2 or 5/2 or 5 to 2		
34	2/9		
35	[n =] 468		
36	38 [girls]		
37	25 [days]		
38	2: 2: 1		
39	4:9 or 4/9		
40	25/91		

"Math is Cool" Masters – 2007-08

4th Grade – May 17, 2008

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	D		
2	A		
3	E [180]		
4	E		
5	C		
6	D		
7	C		
8	B		
9	A		

"Math is Cool" Masters – 2007-08

4th Grade – May 17, 2008

School Name_____Team #_____

Proctor Name_____Room #_____Div: _____

Final Score:
KEY

First Score

(out of 20)

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	$\frac{40}{103}$		
2	17 [cubes]		
3	CEDAB [in order]		
4	10 [km]		
5	53 [shells]		
6	21 [units]		
7	31		
8	30 [cents]		
9	350 [ft]		
10	228		

"Math is Cool" Masters -- 2007-08

KEY

4th Grade – May 17, 2008

School:_____Team #_____

Proctor: _____ Room #_____Div _____

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
12	**4**	**484**	**490**
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
16	**80 [legs]**	**280 [miles]**	**4**
1 or 0	1 or 0	1 or 0	2 or 0