"Math is Cool" Championships – 2005-06

Sponsored by:

5th Grade – March 31, 2006

Individual Contest

GENERAL INSTRUCTIONS

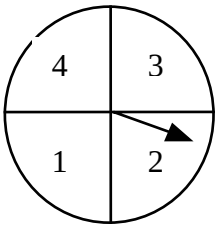
Good sportsmanship is expected throughout the competition by all involved. Bad sportsmanship may result in disqualification. Calculators or any other aids may not be used on any portion of this contest. On all tests, except multiple choice, express all rational, non-integer answers as reduced common fractions unless stated otherwise. For 5th and 6th 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 ***B*** *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*

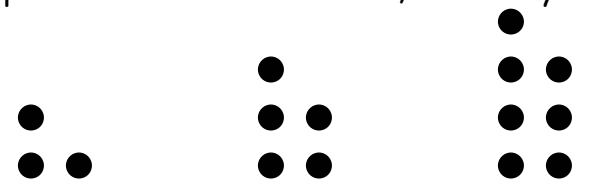
When you are prompted to begin, tear off the colored sheet and begin testing. Make sure your name and school are recorded on the answer sheet. Each problem is scored as a 1 or 0. Express all rational, non-integer answers as common fractions unless stated otherwise. For 5th & 6th grade, make sure all fractions and ratios are reduced. Units are not needed except on questions that deal with time and, in that case, a.m. or p.m. is needed. If you choose to use units, you must use them correctly. Record your answers on the score sheet. No talking during the test. You will be given a 5 minute warning.

Record all answers on the colored cover sheet.

1	What is the sum of the first seven prime numbers?
2	Find the sum: 8 + 9 + . . . + 20 + 21.
3	How many lines of symmetry does a regular hexagon have?
4	Reduce the fraction $\frac{120}{360}$ to lowest terms.
5	Find the remainder when 276 is divided by 11.
6	Evaluate 2.51 + 3.04. [Express as a decimal.]
7	What is 25% of 200?
8	What is the largest number of 90° angles that a parallelogram can have?
9	What is the greatest common factor of 20 & 36?
10	Find $1^2 + 2^2 + 3^2$.

11	What is the area of a triangle with a base of 9 and a height of 14?
12	The sum of two numbers is 9. Their product is 20. What is the smaller of the two numbers?
13	Bill bought some pens for his "Math is Cool" team. The pens cost $4.80 (with tax included). He paid with a ten dollar bill. How much change did Bill get back, in dollars? [Express as a decimal.]
14	How many quarters are needed to make $5.75?
15	John is three years older than Alfaro. Alfaro is five years younger than Jovon. If John is 12, how old is Jovon, in years?
16	Jose is stacking cans in a triangular arrangement. The top row has one can, the second row has two cans, the third row has three cans, and so on. If Jose stacks cans until he has completed 6 rows, how many cans will he need?
17	The length of a rectangle is twice the width of the rectangle. If the area of the rectangle is 32 cm^2, what is the perimeter of the rectangle, in cm?
18	A frog can eat 16 flies in one hour. At that rate, how many flies could the frog eat in 3 hours and 45 minutes?
19	Triscia can purchase 8 pencils for $10.00. How much money, in dollars, would she have to pay to purchase only 3 pencils? [Express answer as a decimal.]
20	What is the measure, in degrees, of each interior angle of a regular hexagon?
21	The sum of four consecutive integers is 86. What is the smallest of these four integers?
22	Find the next number in the pattern: 1, 6, 3, 8, 5, 10, ...
23	What percent of the integers, 1 through 20 inclusive, are prime?
24	What is the value of 2^{2^2} ?
25	What is the diameter of a circle whose area is 25π ?
26	What is the sum of the 5 smallest factors of the number 48?
27	You spin the spinner below one time. What is the probability of landing on a factor of 6? (All regions are equal area.) 
28	Two of the sides of an equilateral triangle have length 3x and 39. What is the value of x?
29	The perimeter of an equilateral triangle is 81 cm. What is the length of one of the sides of the triangle?

Challenge Questions

30	How many different four letter arrangements of the letters C, B, A, E, and W are possible? [Each letter can only be used once in an arrangement]
31	If $4x - 30 = 60$ then what is the value of x^2 ?
32	If W = 7 and Z = 5, evaluate 2W – Z.
33	Evaluate $\frac{3}{4} \div \frac{1}{2} \times \frac{5}{6}$.
34	Find $\frac{1}{2} + \frac{1}{3} + \frac{1}{4}$. Give your answer as a reduced common fraction.
35	What time is it 500 minutes after 11:45 AM ?
36	Peter rolls a die and flips a coin. What is the probability that the coin lands on heads and the die shows a prime number?
37	How many seconds are in 1 hour and 45 minutes?
38	The "Math is Cool" team has 9 members. If each one of the 9 members shake hands with every other member once, how many hand shakes will there be?
39	The surface area of a cube is 54 square centimeters. Find the volume of this cube in cubic centimeters.
40	If the pattern below is continued, how many dots will there be in step 10?  Step 1 Step 2 Step 3

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Team Multiple Choice Contest

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.

Caleb Archer took his stand up comedy on tour. The following is a list of cities he visited, the ticket price at the city, the seating capacity of the building Caleb visited, how many tickets were sold at each city, and how many people actually attended the performance.

City	Seating	Price	Sold	Attendance
Seattle	500	$90	413	398
Paris	900	$80	718	671
London	1100	$65	890	843
Boston	600	$70	511	510
Atlanta	700	$85	518	508

1	Which city's performance brought in the most money? A) Seattle B) Paris C) London D) Boston E) Atlanta
2	How much more money did the London performance bring in than the Paris performance? A) $410 B) $560 C) $380 D) $360 E) Answer not given
3	How many total tickets did Caleb Archer sell? A) 3112 B) 3028 C) 2060 D) 3080 E) Answer not given
4	How much are the seats that did not sell in Atlanta worth? A) $15204 B) $15288 C) $15470 D) $15385 E) Answer not given
5	Which city filled the highest percentage of its seats? A) Seattle B) Paris C) London D) Boston E) Atlanta
6	How many people who bought tickets did not attend? A) 120 B) 117 C) 119 D) 123 E) Answer not given
7	If only those who had attended had bought tickets, which city would have brought in the least money? A) Seattle B) Paris C) London D) Boston E) Atlanta
8	If all the seats were filled, which city would have brought in the most money? A) Seattle B) Paris C) London D) Boston E) Atlanta
9	Which city made the median amount of money? A) Seattle B) Paris C) London D) Boston E) Atlanta

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Team Contest

TEAM TEST - 15 minutes **(note change in point value!)**

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. Express all rational, non-integer answers as fractions unless stated otherwise. For 5th & 6th grade, make sure all fractions and ratios are reduced. Units are not needed except on questions that deal with time and, in that case, a.m. or p.m. is needed. If you choose to use units, you must use them correctly.

1	Kyle travels from Algeria to Zanzibar, leaving on Tuesday and reaching Zanzibar the following Saturday. The return trip takes exactly the same length of time. If Kyle reaches Algeria on Thursday, on what day did he leave Zanzibar?
2	Each side of a certain regular octagon is enlarged by 50%. By what percentage does the perimeter of the octagon increase?
3	I have 61 coins worth $11.80. How many of my coins are quarters, if I have only quarters and dimes?
4	When my number is divided by 8, the remainder is 3. When my number is divided by 7, the remainder is 2. If my number is as small as possible, what is the remainder when it is divided by 13?
5	List the following in order of increasing size. (Your answer should consist of 4 letters in the correct order.) A = the number of square feet in 2 square yards B = the product of $\frac{8}{9} \cdot \frac{45}{2} \cdot \frac{3}{4}$ C = the number of fluid ounces of water in a jar holding a half a quart plus half a cup minus half a pint of water D = the area of a circle of radius 2
6	Find the sum of all even multiples of 3 less than 100.
7	There are 110 frogs and toads altogether in the Dismal Swamp. The ratio of frogs to toads in the swamp is 3 to 2. How many toads would have to be added to the swamp to make the ratio 1 to 1 if the number of frogs doesn't change?
8	A 5 by 7 inch rectangular photograph was glued to a rectangular piece of colored paper, leaving a 1/4 inch wide strip of colored paper showing on all four sides. The paper was then glued to a larger rectangle of matboard, leaving a border of $1\frac{1}{2}$ inches all the way around. What was the perimeter, in inches, of the piece of matboard?
9	For a science fair project, a 17-year-old student stayed awake for 264 hours. For how many days did he stay awake?
10	Julia wants to tie a ribbon on each ear, paw, and tail of 11 cats. How many ribbons will she need?

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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 the remainder when 824 is divided by 5?	4
Person 2	What is the product of TNYWG and the amount of eggs in 2 dozen?	96
Person 3	Divide TNYWG by the difference of 72 and 69.	32
Person 4	What is the sum of TNYWG and the perimeter of a square with a side of length 3?	44
	Relay #1	
Person 1	What is the mean (average) of 30, 31, 32?	31
Person 2	What is the sum of TNYWG and the greatest common factor of 18 and 12?	37
Person 3	What is the product of TNYWG and the next number in the sequence 32, 16, 8, 4, ___?	74
Person 4	What is the sum of TNYWG and the area of a triangle with a base of 6 and height of 8?	98
	Relay #2	
Person 1	A spider has 8 legs. Pedro saw 7 spiders. How many legs did Pedro see?	56 [legs]
Person 2	What is the remainder when TNYWG is divided by the next number in the sequence 1, 2, 4, 7, ___?	1
Person 3	Multiply TNYWG by the least common multiple of 3 and 4.	12
Person 4	Add TNYWG and the number of feet in 36 inches.	15

"Math is Cool" Championships – 2005-06

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5th Grade – March 31, 2006

Final Score:

KEY

School Name_____Team #_____

Proctor Name_____Room #_____ Division: ____

Mental Math Contest

When it is time to begin, I 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 from 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 may answer only four questions, and then another member of your team will come up, until each team member has had a turn. If your team has fewer than 4 members, missing team members will receive a zero.*

PERSON 1 NAME:		**1 or 0**
1.1	What is 8 times 70?	560
1.2	How many sides does a dodecagon have?	12 [sides]
1.3	What is .75 as a reduced fraction?	3/4
1.4	The sum of three consecutive even whole numbers is 30. What is the largest of the three numbers?	12
PERSON 2 NAME:		
2.1	Find the sum of 83 and 39.	122
2.2	What is the area of a rectangle whose length is 8 and whose width is 4?	32 [un]
2.3	"Math is Cool" Championships starts at 3:30 pm. If you were 12 minutes early, when did you arrive?	3:18 pm
2.4	Max's recreation store makes bicycles and tricycles. If Max has 53 wheels, what is the largest number of tricycles he can make?	17
PERSON 3 NAME:		
3.1	What is the difference between 72 and 38?	34
3.2	Find the perimeter of a square with a side of length 8.5.	34
3.3	Evaluate 9 times 9 plus 9.	90
3.4	If each of the 26 letters of the alphabet is assigned a number, starting with A=1, B=2, and so on until Z=26, what would be the sum of the letters in the word baby?	30
PERSON 4 NAME:		
4.1	What is the quotient of 75 and 3?	25
4.2	What is one half plus one fifth?	7/10
4.3	How many inches are there in three and a half feet?	42 [in]
4.4	35 is 50% of what number?	70

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Division 1

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	What is the product of 32 and 16?	512
2	What is the length of one side of a regular hexagon with a perimeter of 24?	4 [units]
3	Evaluate $\frac{1}{2}A + 2B$ if $A = 4$ and $B = 1$.	4
4	How many prime numbers are there between 10 & 20?	4 [primes]
5	For a certain game, the odds of winning are 1 to 3. What is the probability of winning?	1/4
6	Alex, Bob, Cassi and Dimitri are seated in 4 chairs in a row. How many different ways can they be seated?	24 [ways]
7	Maria has a square dart board that is painted red and blue. One third of the board is painted red. If the area of the dart board is 9 square inches, what is the area of the region painted blue, in square inches?	6 [in^2]
	Extra Problem – Only if needed	
8	What is the next number in the sequence 1, 4, 9, 16, __?	25

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Division 1

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	When rolling a pair of 6 sided dice, what is the probability that the sum of the two numbers will be even?	1/2
2	The sum of two whole numbers is 10. If these two numbers are multiplied, what is the largest possible product?	25
3	45 dimes is the same amount of money as how many quarters?	18 [quarters]
4	Delmar can buy 350 worms for $7.00. How many worms could he buy for $8.00?	400 [worms]
5	Mrs. Chey is 5 feet 4 inches tall. How many inches is that?	64 [in]
6	John has 2 gallons of Gatorade. He drinks 1 quart plus two pints. How many cups of Gatorade are left?	24 [cups]
7	How many factors of 48 are odd?	2 [factors]
	Extra Problem – Only if Needed	
8	How many lines of symmetry does a regular pentagon have?	5 [lines]

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Division 1

COLLEGE KNOWLEDGE BOWL ROUND #3

#	Problem	Answer
1	On planet Lars, each alien has 4 hands with three fingers on each hand. In a group of 5 aliens from planet Lars, how many fingers will there be?	60 [fingers]
2	A palindrome is a number that reads the same both forwards and backwards. How many 3 digit palindromes begin and end with the number 5?	10 [palindromes]
3	The perimeter of an equilateral triangle is 81. What is the length of one of the sides of the triangle?	27 [units]
4	How many multiples of 6 lie between the numbers 20 and 57?	6 [multiples]
5	When the tens digit of 3,141 is added to the hundreds digit of 2,718, what is the result?	11
6	There are twice as many girls as boys on the "Math is Cool" team. There are a total of 33 members on the team. How many girls are on the team?	22 [girls]
7	The difference of two numbers is 12. If the larger of the numbers is 34, what is the other number?	22
	Extra Problem – Only if Needed	
8	What is the sum, in degrees, of the interior angles of a square?	360 [°]

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Division 2

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	What is the area of a circle whose radius is 8?	64π [un^2]
2	The area of a square is 36. If both the length and the width of the square are increased by 1, what is the area of the resulting square?	49 [un^2]
3	How many prime factors of the number 60 are less than 6?	3 [factors]
4	A palindrome is a number that reads the same both forwards and backwards. What is the largest possible 3-digit palindrome that begins and ends with an even number?	898
5	Kim bought 2 movie tickets for $13.70. If she pays with a $20 dollar bill, how much money will she get back, in dollars? [Express answer as a decimal.]	[$]6.30
6	How many numbers less than 40 are multiples of 6?	6
7	If you count 200 legs in a herd of cows, how many cows are in the herd?	50 [cows]
	Extra Problem – Only if Needed	
8	If the perimeter of a square is 16, what is the area of the square?	16 [un^2]

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Division 2

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	What is one-fifth of twenty?	4
2	How many prime numbers are there between 20 and 30?	2 [primes]
3	The sum of Demi and Ashton's ages is 75. What will the sum of their ages be in 30 years?	135
4	Marco had the following scores on three exams: 80%, 82%, and 90%. What is the average (or mean) percent of Marco's test scores?	84 [%]
5	How many lines of symmetry does an isosceles right triangle have?	1 [line]
6	What is the next number in the sequence below: 256, 128, 64, 32, ?	16
7	Mark has 4 shirts, 6 pairs of pants, 2 hats, and 1 pair of shoes. If he must wear one shirt, one pair of pants, one hat, and one shoe, how many different outfits can Mark wear?	48 [outfits]
	Extra Problem – Only if Needed	
8	In terms of π, what is the area of a semicircle of diameter 16?	32π [un^2]

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Division 2

COLLEGE KNOWLEDGE BOWL ROUND #3

#	Problem	Answer
1	If two angles are supplementary, what is their sum, in degrees?	180 [°]
2	What is 25 times 11?	275
3	Jerry has 3 freckles on Monday. Each day after Monday, the number of his freckles doubles. On what day of the week will Jerry have 48 freckles?	Friday
4	What is 1/2 of 1/3?	1/6
5	If the perimeter of an isosceles triangle is 19, what is the largest whole number that could be the length of one of the legs of the triangle?	9
6	How many different ways can 5 people be seated into 3 chairs?	60 [ways]
7	If n = 3, find the value of n squared plus five.	14
	Extra Problem – Only if Needed	
8	Solve for x: $2x + 6 = 20$	7

"Math is Cool" Championships – 2005-06

5th Grade – March 31, 2006

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	58		
2	203		
3	6 [lines]		
4	1/3		
5	1		
6	5.55		
7	50		
8	4 [angles]		
9	4		
10	14		
11	63 [un^2]		
12	4		
13	[$] 5.20		
14	23 [quarters]		
15	14 [years]		
16	21 [cans]		
17	24 [cm]		
18	60 [flies]		
19	[$] 3.75		
20	120 [°]		

	Answer	1 or 0	1 or 0
21	20		
22	7		
23	40 [%]		
24	16		
25	10 [units]		
26	16		
27	$\frac{3}{4}$		
28	13 [units]		
29	27 [units]		
30	120 [arr]		
31	2025/4		
32	9		
33	5/4		
34	13/12		
35	8:05 PM		
36	$\frac{1}{4}$		
37	6300 [seconds]		
38	36 [handshakes]		
39	27 [cm^3]		
40	21 [dots]		

"Math is Cool" Championships – 2005-06

5th Grade – March 31, 2006

School Name_____Team #_____

Proctor Name_____Room #_____

Division: _____

Final Score:
KEY

First Score

(out of 18)

Team Multiple Choice Contest – Score 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	A		
3	E		
4	C		
5	D		
6	A		
7	D		
8	B		
9	E		

"Math is Cool" Championships – 2005-06

5th Grade – March 31, 2006

Final Score:
KEY

First Score

(out of 10)

School Name_____Team #_____

Proctor Name_____Room #_____

Div: _____

Team Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	2 or 0	2 or 0
1	Sunday		
2	50[%]		
3	38 [quarters]		
4	12		
5	CDBA [in that order!]		
6	816		
7	22 [toads]		
8	38 [inches]		
9	11 [days]		
10	77 [ribbons]		