"Math is Cool" Masters – 2006-07

Sponsored by: Wenatchee Valley Clinic

4th Grade – May 19, 2007

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 19, 2007

Individual Contest

Record all answers on the colored cover sheet.

1	Evaluate: 305 – 184
2	What is the product of 18 and 12?
3	Evaluate as a decimal: 28.42 ÷ 0.4
4	What is 60% of 315?
5	How many years are equivalent to 276 months?
6	When two standard six-sided dice are rolled, what is the probability that the sum of the numbers shown is ten? [Give your answer as a reduced common fraction.]
7	Linnea drove 500 [kilometers] at 120 [kilometers per hour]. How many **minutes** did it take her?
8	A is 92 larger than B, and the sum of A and B is 234. What is the value of A?
9	When a coin is flipped three times, what is the probability that there are exactly two heads? [Give your answer as a reduced common fraction.]
10	Danielle has some cookies with four layers of frosting each and some cookies with only three layers of frosting each. If she has a total of 38 cookies with a total of 120 layers of frosting, how many cookies with four layers of frosting does she have?
11	What is the remainder when 182 is divided by 8?
12	What is the next term in the sequence 6, 12, 24, 48, ___ ?
13	What is the area, in square centimeters, of a circle with a diameter measuring 18 cm?
14	What is the perimeter, in centimeters, of a triangle with sides measuring 17, 41, and 46 cm?
15	What is the total surface area, in square centimeters, of a right circular cylinder with a base radius of 3 cm and a height of 12 cm?
16	What is the volume, in cubic centimeters, of a right circular cylinder with a base radius of 12 cm and a height of 4 cm?
17	When two cards are drawn from a standard 52-card deck [without replacing the first card], what is the probability that they are the same suit? [Give your answer as a reduced common fraction.]

18	What value(s) of g satisfy $2(4g - 3) - 3(g + 8) = -75$?
19	How many squares of any size are there in a four-by-four grid of unit squares?
20	When one card is drawn from a standard 52-card deck, what is the probability that it is a red card or a Jack?
21	When I double my age, in years, and then add 19 years, the result is 85 years. How old am I in years?
22	In how many ways can first, second, and third-place medals be awarded in a competition involving nine people, if no ties are allowed?
23	A rectangular picture measuring 13 cm by 18 cm is to be glued to a rectangular piece of paper measuring 19 cm by 24 cm so that 3 cm of paper shows on all sides of the picture. What is the area, in square centimeters, of the paper that is not covered by the picture?
24	How many diagonals can be drawn in a convex decagon (10-gon)?
25	In how many distinguishable ways can five people be seated at a round table?
26	How many distinguishable arrangements are there of the letters in the word "letters"?
27	How many positive three-digit numbers contain exactly two distinct digits (e.g. 343 or 772, but not 589 or 111)?
28	Pat can build a house in 6 weeks, while Tom can build one in 15 weeks. How many **days** would it take the two of them to build a house working together? [Assume that there are 7 work-days in a work-week.]
29	Two marbles are drawn without replacement from a bag of marbles containing 4 red, 6 green and 3 purple marbles. What is the probability both marbles are green.

Challenge Questions

30	Biff ran 4 times as fast as Eho. In fact, he ran 80 miles in 2 hours less than it took Eho to run 28 miles. How fast did Eho run?
31	Tickets on a bus were $4.00 and $6.00. A total of 45 tickets were sold and $230 earned. How many $4.00 tickets were sold?
32	A cow is tied to an external corner of a rectangular barn with sides measuring 15 and 25 m. If the cow's tether is 30 m long, what is the area, in square meters, of the region the cow can graze? [Give your answer as a reduced common fraction in terms of π.]
33	If eight "aarghs" are worth six "blahs", and ten "blahs" are worth three "crikeys", how many "crikeys" would 120 "aarghs" be worth?
34	Anne's Game Farm has only ten-point bucks and six-point bucks. If there are a total of 87 bucks with a total of 602 points between them, how many six-point bucks are there?
35	If P pizzas can be purchased for D dollars, how many **cents** would be necessary to purchase 3 pizzas?
36	When the digits of a positive two-digit number are reversed, the result is a positive two-digit number 18 greater than the original number. What is the smallest possible value of the original number?
37	If it takes two chickens three days to lay five eggs, how many eggs will nine chickens lay in fourteen days?
38	How many positive two-digit numbers contain at least one digit of 1 but not the digit2?
39	Circles A and B are concentric, and a chord of circle B that is tangent to circle A measures 14 m. What is the area, in square meters, of the region between the two circles?
40	Biff, Eho and Frank are tossing a coin to see who can gets the first head. As soon as a head appears (even if each has not had an equal number of tosses) the game is over. If Biff tosses first, then Eho, then Frank, with the order repeated (possibly indefinitely) until the first head appears, what is the probability that Frank will win? [Express your answer as a reduced common fraction.]

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4th Grade – May 19, 2007

Team Multiple Choice Contest

Four married couples (Kelly & Jacob, Mary & Nick, Carla & Danny, Brenda & Ted) visit the Lake de Puddle Resort for lunch and a day of boating. The lunch menu is shown in the table on the left, and the boat rental prices in the table on the right. For the lunch menu, on any given day only one kind of each item is available (for example, only one kind of sandwich or one kind of pie).

Main Dish	Cost		**Drinks**	Cost
Chef's Salad	$2.50		Milk	$1.50
Pizza	$4.00		Soda	$___
Sandwich	$5.50			
			Dessert	
Side Orders			Cake	$2.00
French Fries	$1.00		Pie	$2.50
Bacon	$0.75			

Type of boat	Cost
Rowboat	Flat fee of $30, plus $8 per hour
Canoe	$18 for the first hour, plus $6 for each additional half-hour
Motorboat	$45 per hour plus $1.50 per mile

1	How much do 3 glasses of milk cost? A) $3.00 B) $4.50 C) $5.00 D) $6.00 E) answer not given
2	A side order of bacon consists of one slice. Jacob ordered a chef's salad, 3 slices of bacon and a glass of milk. How much did he pay? A) $5.75 B) $6.00 C) $6.25 D) $7.00 E) answer not given
3	Jacob added a 15% tip to his lunch bill, rounding off the tip to the nearest nickel. He then paid for his lunch plus tip with a $10 bill. How much change did he get? A) $3.80 B) $1.95 C) $2.20 D) $2.80 E) answer not given
4	Mary ordered a chef's salad and Nick ordered 3 pieces of cake. They each had a soda. How much less did Mary's lunch cost than Nick's? A) $3.50 B) $3.65 C) $3.75 D) $4.00 E) answer not given
5	Carla and Danny together order one of everything on the lunch menu. If the average price of the 9 items they order is $2.40, what is the price of one soda? A) $1.50 B) $2.40 C) $2.00 D) $1.75 E) answer not given
6	Brenda definitely wants one main dish, one drink, and one dessert. She might have one side order, or she might not have any side order. If one possible drink is water (free), how many different lunches could Brenda order? A) 12 B) 54 C) 48 D) 18 E) answer not given
7	Kelly and Jacob plan a boat trip to Deer Glade, which is 12.5 miles away. If they rent a rowboat and travel at 5 miles per hour, how many minutes long will the one-way trip be? A) 120 B) 135 C) 150 D) 165 E) answer not given
8	Kelly and Jacob want to spend exactly an hour at Deer Glade before heading back. How much would it cost them to rent a rowboat for their trip to Deer Glade and back, assuming they row at a constant rate of 5 miles per hour? A) $54 B) $70 C) $38 D) $90 E) answer not given
9	Kelly and Jacob might rent a motorboat instead for their trip to Deer Glade and back (again spending exactly one hour at Deer Glade before returning). How much would it cost them if the motorboat's speed is a constant 25 miles per hour? A) $108.75 B) $82.50 C) $127.50 D) $90 E) answer not given

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4th Grade – May 19, 2007

Team Contest

1	Jeff adds 3 counting numbers (w + x + y) and correctly gets an even sum. Karen adds 2 of the same numbers as Jeff added, plus a different third number (w + x + z) and correctly gets an odd sum. Is the sum of y + z even or odd? If there is not enough information to be sure, answer "can't tell".
2	The faces of a cube are labeled 1, 2, 3, and so on. When three such cubes are rolled, the product of the numbers showing is 90. What is the sum of the numbers showing?
3	The display on my calculator scrambles the digits of the numbers I enter but it gives the correct sum of the original unscrambled numbers. I tried to add two 4-digit numbers, which the display shows as 5126 + 7831 = 3003. I remember that the hundreds digit of one of my numbers is a multiple of the hundreds digit of the other number. What were my two numbers?
4	My number is an even counting number with an even number of even digits and an odd number of odd digits. All its digits are different. What's the smallest my number could be if it has at least 5 digits?
5	List the following in order of increasing size (smallest first). (Your answer should consist of 4 letters in the correct order.) A = the number of hours in a month B = the number of days in a decade C = the number of milligrams in a gram D = the number of ounces in a ton
6	Stephen's number is 1/3 of Tyler's number and is 2 more than twice Joe's number. What is Tyler's number if Joe's number is 17?
7	Every time a straight line crosses either another line or a circle, an intersection point is created. What could be the largest number of intersection points created with one circle and 3 lines?
8	For lunch, Clair chooses 1 sandwich (ham, cheese, or turkey), 1 bag of chips (potato chips or vegetable chips), 1 piece of fruit (apple or banana), and 1 drink (milk or orange juice). However, Claire never chooses milk when she has a cheese sandwich. How many different lunches can Claire choose?
9	Three identical rectangles, each 5 inches long and *n* inches wide, are put together with their sides lined up to form a new, larger rectangle. The perimeter of this new rectangle is 34 inches. What is the sum, in inches, of the two possible values for *n*?
10	Fifty years ago, the oak tree in my yard was twice as old as the spruce tree. In 30 years, the spruce tree will be 100 years old. How many years old is the oak tree now?

"Math is Cool" Masters – 2006-07

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4th Grade – May 19, 2007

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	Joe walked 5 hours at 3 miles per hour. How many miles did Joe walk?	15 [miles]
Person 2	A field has chickens and cows in it. There are 28 cows and TNYWG chickens. How many feet are in the field?	142 [feet]
Person 3	What is the difference between the TNYWG and the product of 12 and 11?	10
Person 4	What is the probability of drawing a red marble from a bag that contains 7 green marbles, 4 purple marbles and TNYWG red marbles?	10/21
	Relay #2	Answer
Person 1	What is the mean of 5, 7, 9, 11, and 13?	9
Person 2	What is the next number in the sequence 1, TNYWG, 17, 25, ____?	33
Person 3	The ratio of dogs to cats was 1 to 2. There was a total of TNYWG dogs and cats. How many cats were there?	22 [cats]
Person 4	Keith traveled at 30 mph for 6 hours and then TNWG mph for 3 hours. How many miles did Keith travel?	246 [miles]

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4th Grade – May 19, 2007

Final Score:

KEY

School Name_____Team #_____

Proctor Name_____Room #_____ Division: ____

Mental Math Contest

PERSON 1 NAME:		**1 or 0**
1.1	What is the sum of two-thirds and one-sixth?	5/6
1.2	What is 11 times 12?	132
1.3	Charlie is taller than Dan, but is shorter than Jacob. Who is the shortest of the three?	Dan
1.4	The ratio of horses to cows in a field was 2 to 5. There were a total of 35 horses and cows in the field, how many were cows?	25 [cows]
PERSON 2 NAME:		
2.1	What is the sum of 67 and 48?	115
2.2	What is the product of 6 and 13?	78
2.3	Jim needs 1000 signatures to get a ballot passed. Jim has 654 signatures, how many more does he need?	346 [sig]
2.4	The number of boys in Triscia's class exceeded the number of girls by 7. If there were a total of 29 pupils in her class, how many were boys?	18 [boys]
PERSON 3 NAME:		
3.1	What is 9 squared?	81
3.2	What is the positive square root of 121?	11
3.3	How many minutes have passed between 11 o'clock am and 1:17pm?	137[min]
3.4	Joe made 60% more points at his basketball game this time than he did at his last basketball game. If he made 32 points this game, how many points did he make at the last game?	20 [pts]
PERSON 4 NAME:		
4.1	How many sides does a decagon have?	10
4.2	Jill made 8 dozen brownies. How many brownies did she make?	96 [brownies]
4.3	108 doughnuts are put into boxes with a dozen in each box. How many boxes are needed to hold the doughnuts?	9 [boxes]
4.4	The average of the first 7 numbers was 21. The average of the next 3 numbers was only 11. What was the over all average of the all the numbers?	18

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4th Grade - Division 1 & 2

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	What is 12 times 5 plus 10?	70
2	What is the perimeter of a square with a side of length 14?	56
3	How many feet are in a field if there are 4 elephants, 7 people and 13 chickens in the field?	56[feet]
4	What is 2997 rounded to the nearest 10?	3000
5	There are 10 fish in a pond. Every time a fish dies or is removed, it is replaced with two new fish. On Monday raccoons ate 3 fish. On Wednesday little Timmy added 4 more fish to the pond. How many fish are now in the pond?	17 [fish]
6	Joe is selling lemonade. He sells a cup of lemonade for 25 cents. Joe spent ten dollars on supplies to get started. In addition, the cost of the lemons for each cup is 5 cents. How many cups of lemonade does Joe need to sell to break even?	50 [cups]
7	Four consecutive even numbers add to 84. What is the largest of the four numbers?	24
	Extra Problem – Only if Needed	
8	The average of six, eight, and some number is five. What is that number?	1

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4th Grade - Division 1 & 2

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	What is the measure in degrees of the interior angle of a regular quadrilateral?	90 [°]
2	Jacob is building a 4-foot by 4-foot pen with posts at the corners and between every foot of fencing. How many posts are needed?	16 [posts]
3	If one crate can hold four and a half pounds, how many pounds can be held in sixteen crates?	72 [pounds]
4	How many sides does a dodecagon have?	12 [sides]
5	Two numbers sum to 84 and have a difference of 18. What is the larger of the two numbers?	51
6	What is the area, in square units, of a square with perimeter 24?	36 [square units]
7	A coloring book has 28 pages numbered 1, 2, 3 and so on through page 28. How many times does the digit 2 occur in the page numbers?	12 [2's]
	Extra Problem – Only if Needed	
8	If 7 clowns can hold 28 balloons, how many balloons can 4 clowns hold?	16 [balloons]

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May 19, 2007

4th Grade - Division 1 & 2

COLLEGE KNOWLEDGE BOWL ROUND #3

#	Problem	Answer
1	What is the least amount of money, in cents, I can have with four coins if all of them are different?	41 [cents]
2	Helly Hansen ordered three-dozen pairs of ski gloves for the upcoming winter. However, the store clerk lost two pairs. How many induvidual gloves are left in the order?	68 [gloves]
3	What time is it 35 minutes after 6:35 pm?	7:10 pm
4	If today is the 15th of June and Timmy's birthday is in 45 days, what is the date of Timmy's birthday?	July 30th
5	44 clowns can fit in a car. If there are 17 clowns currently in the car there is room for how many more?	27 [clowns]
6	The area of a triangle is 20 square inches. If the height of the triangle is 10 inches, what is the length of the base of the triangle in inches?	4 [units]
7	A 3-by-3-by-3 cube is painted blue and then cut into 27 unit cubes. How many cubes have only one painted face?	6 [cubes]
	Extra Problem – Only if Needed	
8	A flight of fifteen stairs raises ten feet. If all the steps are equally tall, how many inches high is each step?	8 [inches]

"Math is Cool" Masters – 2006-07

4th Grade – May 19, 2007

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	121		
2	216		
3	71.05		
4	189		
5	23 [yrs]		
6	1/12		
7	250 [min]		
8	[A =] 163		
9	3/8		
10	6 [cookies]		
11	6		
12	96		
13	81π [cm^2]		
14	104 [cm]		
15	90π [cm^2]		
16	576π [cm^3]		
17	4/17		
18	-9		
19	30 [Squares]		
20	7/13		

	Answer	1 or 0	1 or 0
21	33 [yrs]		
22	504 [ways]		
23	222 [cm^2]		
24	35 [diagonals]		
25	24 [ways]		
26	1260 [ways]		
27	243 [numbers]		
28	30 [days]		
29	5/26		
30	4 [mph]		
31	20 [tickets]		
32	$1475\pi/2$ [m^2]		
33	27 [crikeys]		
34	67 [6 pt bucks]		
35	300D/P		
36	13		
37	105 [eggs]		
38	16 [numbers]		
39	49π [m^2]		
40	1/7		

"Math is Cool" Masters – 2006-07

4th Grade – May 19, 2007

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	B		
2	C		
3	D		
4	A		
5	E [$1.85]		
6	B		
7	C		
8	D		
9	C		

"Math is Cool" Masters – 2006-07

4th Grade – May 19, 2007

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	odd		
2	14		
3	1625 & 1378 (either order)		
4	10,246		
5	ACBD		
6	108		
7	9 [points]		
8	20 [lunches]		
9	6 [inches]		
10	90 [years]		

"Math is Cool" Masters -- 2006-07

KEY

4th Grade – May 19, 2007

School:_____Team #_____

Proctor: _____ Room #_____Div _____

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
15 [miles]	**142 [feet]**	**10**	**10/21**
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
9	**33**	**22 [cats]**	**246 [miles]**
1 or 0	1 or 0	1 or 0	2 or 0