"Math is Cool" Masters-2001-02

Sponsored by: Kimberly-Clark & Lukins & Annis, P.S.

5th & 6th Grade - May 11, 2002

Individual Contest

Express all answers as reduced fractions unless stated otherwise.
Leave answers in terms of π where applicable.
Do not round any answers unless stated otherwise.
Record all answers on the colored cover sheet.

1	What is the product of 356 and 366?
2	What is the remainder when 4100 is divided by 8?
3	The Jazz Band is going to a Jazz Festival 837 miles away. After traveling 123 miles, they realize that Mark forgot his saxophone and must go back to get it. How many total miles was their trip to the Jazz Festival?
4	What is the greatest common factor of 20 and 35?
5	How many 45° angles are on the interior of a square with both diagonals drawn?
6	Kyle has $900.00. Brasswind is having a sale for all trumpets. 4 trumpets cost $500.00. 3 trumpets cost $450.00. 2 trumpets cost $350.00. 1 trumpet costs $200.00. What is the maximum number of trumpets Kyle can buy?
7	An ohring is 5 glubicks, and a goring is 100 glubicks, how many ohrings are in a goring?
8	At the beginning of the month, Marlee has 37 goldfish and 3 die every month. At the beginning of the same month, her neighbor, Trip, has 12 goldfish and he buys 2 at the end of each month. How many months will it take until Marlee has the same number of goldfish as Trip?
9	How many factors does 432 have?
10	What is the product of the first six non-negative even numbers?
11	Sarah has 4 identical pairs of white shoes, 5 identical pairs of red shoes, and 7 identical pairs of flip-flops. How many shoes should she pick to be sure of getting a matching pair? Right and left shoes are important.
12	Evaluate: $5! / 3!$
13	What percent of 105 is 42?
14	What is the minimum of points needed to define a plane?

15	Si-rex, Powei, Sister Mampson, Ohring, and Junior Bird Man are standing in a line. Si-rex is not in the front. There are exactly two people in front of Sister Mampson. Powei is directly behind Si-rex. Who is 4^{th} in line?
16	What is the area, in units^2, of a trapezoid with bases of 5 and 13 and a height of 3?
17	The ratio of dogs to cats is 2:5. If there are 8 dogs, how many cats are present?
18	What letter must be in place of the "?" in order for this list of letters to be able to be arranged in exactly 5 unique ways? AAA?B
19	Each trumpet needs 3 valves, 1 bell, 3 valve slides, and 1 lead pipe. Wayne has 12 lead pipes, 11 bells, 39 valve slides, and 28 valves. How many trumpets can he build?
20	Simplify: $3\pi[(7\pi)2\pi]$
21	Express 0.82 as a fraction in reduced form.
22	Reduce $^{987}/_{789}$
23	Borris weighs 460 pounds and he wants to gain 75% more weight. He can gain 5 pounds per week. How many weeks will it take him to reach his ideal weight?
24	Six of Caitlin's candy bars have nuts in them and seven do not. How many more candy bars, with nuts, does she need to have to make the probability of drawing a candy bar without nuts 1/4?
25	Small Sarah eats 15 pretzels an hour. Little Carl eats 25 pretzels an hour. How many seconds would it take them to eat a total of 3 pretzels together?
26	The probability of Max's shoe coming untied in an hour is $^2/_7$. If he walks for 3 hours, what is the probability that his shoe will come untied?
27	What is the first prime number greater than 50 that has a remainder of n when divided by m where m + n = 7?
28	Tom Hanks is stranded on an island. He eats one fourth of his food supply on the first day. On the second day, he eats one fourth of the remaining food. On the third day, he eats one fourth of the remaining food. If he had $^3/_4$ of a pound left after the third day, how many pounds of food did he start with?
29	A ball is dropped 243 feet. Each time the ball hits the ground it bounces back up 2/3 the height it has fallen. Find the total distance, in feet, traveled when the ball hits the ground the 5^{th} time.
30	What is the sum of 12_5 and 2_4 in base 6?

Challenge Questions

31	A beetle sits on each square of a 9x9 checkerboard. Each beetle can crawl diagonally to a neighboring square, leaving some squares empty and others with multiple beetles. What is the smallest possible number of empty squares after each beetle has moved exactly once?
32	Rhonda wanted to determine the number of fish in a pond. Through sampling, she determined that the ratio of trout to salmon was 3 to 4. She then added 900 salmon and determined that the probability of catching a trout was 15/53.(Assume trout and salmon are equal in difficulty to catch.) How many total fish were initially in the pond if only trout and salmon were in the pond?
33	The sum of the perimeters of three squares is 48 units. What is the smallest possible sum of their areas?
34	A group of people is standing in a circle spaced evenly apart. Each person is assigned a number starting with 1 and increasing in order as they go around the circle by 1. Each person is assigned only one number. It is noted that the person assigned the number 53 is standing directly across from the person assigned the number 123. What is the number assigned to the person standing directly across from the person assigned the number 80?
35	Two regular 6-sided dice were rolled and it was determined that the probability of rolling a sum of x was 1/12. What is the sum of all possible values of x?
36	At the Annual Math Open held at Cow Pi Beach, the Mathletes outnumbered the Trimathletes 7:*x*. If a competitor was chosen at random, the probability that it was a Trimathlete was y/12. What is the product of x and y?
37	How many positive primes have a remainder of zero when divided by 2001?
38	The absent minded professor lost part of her data on the trip to and from her laboratory. This is the information she has: a) She traveled to and from the laboratory along the same route. b) The sum of the average speeds going and coming was 50mph. c) The average speed for the entire trip going and coming was 24 mph. d) The average speed going to the laboratory was faster than the average speed of the return trip. Help the professor find the average speed of the return trip.
39	Abe pushed a boulder up a 40 foot hill. He pushes it 12 feet each day, and each night it rolls down x feet, where x is an integral value . Abe reached the top of the hill with the boulder on the 7^{th} day. What is the sum of all the possible values of x?
40	Biff turned x years old in the year x^2 and Eho turned x + 1 years old in the year $(x+1)^2$ both of which occurred in the same century. The positive difference in the years they were born is 70 years. What is the sum of the years they were born in?

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5th & 6th Grade, May 11, 2002

Team Multiple Choice Contest

Julie's Farm Fresh Eggs

Julie owns a small fresh egg business. She has 50 laying hens, of which 96% produce one egg per day. The rest do not produce. Of the eggs collected each day, 1 egg is not fit for selling. These eggs will be considered defective. Julie sells her eggs for $1.50 per dozen and only sells a full dozen at a time.

For simplicity, assume months are 30 days long (one year is 360 days).

Costs			
Food		**Miscellaneous**	
Layena Crumbles	$9.00 per 50 lb bag	Electricity	$2.00 per month
Chicken Scratch	$7.00 per 70 lb bag	Egg cartons (holds 1 dozen eggs)	$0.25 each
Oyster Shell	$14.00 per 40 lb bag		

Daily Food Rations for all 50 chickens
Each day Julie feeds her chickens: 2 lbs of Layena Crumbles 3 lbs of Chicken Scratch $\frac{1}{2}$ lb of Oyster Shell

Using the given information, solve the following questions:

1	How many total eggs does Julie collect each day? A) 47 B) 48 C) 49 D) 50 E) Answer not given
2	How many pounds of food does Julie feed her chickens each month? A) 5.5 B) 60 C) 90 D) 15 E) Answer not given
3	Assuming the chickens eat equal amounts of food, how many pounds, does each chicken eat a day? A) .5 B) .11 C) .7 D) .9 E) Answer not given
4	If Julie were to sell one egg, how much would it cost to purchase? A)$1.25 B) $12.50 C) 1.25¢ D) 12.5¢ E) Answer not given
5	If Julie sells all of her non-defective eggs, how many cartons of eggs would Julie sell each month? A) 110 B) 117 C) 120 D) 127 E) Answer not given
6	How much does Julie spend each day to feed her chickens? A) $30 B) 83.5¢ C) 30¢ D) $83.5 E) Answer not given
7	How much does it cost to feed one chicken Oyster Shell per year? (Assume all chickens eat equal amounts.) A)$1.26 B) 63¢ C) $4.00 D) $2.32 E) Answer not given
8	What is the best estimate of how much Julie spends on food to produce one egg that is fit to sell? A) 5¢ B) 1¢ C) 50¢ D) 1.8¢
9	How much profit will Julie make each month? A) $120.10 B) $121.50 C) $119.20 D) $181.18 E) Answer not given

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5^{th} & 6^{th} Grade - May 11, 2002

Team Contest

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Record all answers on colored cover sheet.

1	There are six "Math is Cool" teams in a championship. Each team will compete twice against each of the other teams. What is the total number of match-ups?
2	Mr. Sampson made a tile patio that was 15 tiles long and 12 tiles wide. When he finished, there was a sudden earthquake and a crack passed directly from the upper left corner directly to the bottom right corner. How many tiles did the crack pass through?
3	What is the area of an equilateral triangle with side 5?
4	If $3x = 21$, what does $21x$ equal?
5	Out of 150 students, 54 are taking wood shop, 48 are taking arts and crafts, 12 are taking both wood shop and arts and crafts, 9 are taking both home economics and wood shop, 8 are taking both home economics and arts and crafts, 2 are taking all 3 classes, and 5 are not taking any. How many students are taking only home economics?
6	Find the smaller of two numbers whose sum is 10 and whose product is -24.
7	In quadrilateral ABCD, angle A = 56°, angle B = 101°, angle C = 90°. What is the measure of angle D in degrees?
8	Solve for x: $2^3 = (^1/_4)^x$
9	There are six purple marbles, nine yellow marbles, and three polka-dot marbles in a bowl. What is the probability of drawing two yellow marbles, if the first marble is put back in the bowl before the second marble is drawn?
10	***Definition: A sequence is arithmetic if the differences between the consecutive terms are the same.*** The following sequence is an arithmetic sequence. Find the sum of the missing terms. 5,__ ,__ ,__ ,__ ,__ ,9

Relay#1 Person#1 What is the difference between 17 and the number of sides an octagon has?
Relay#1 Person#2 Evaluate: $\sqrt{7^2}+TNYWG$
Relay#1 Person#3 Evaluate: TNYWG plus the quotient of 120 and 6
Relay#1 Person#4 Find the difference between the area of a square with side length 7 and TNYWG.
Relay#2 Person#1 What is the units digit of the product of 105 and 48?
Relay#2 Person#2 What is the product of TNYWG and the area of a square with side length 5?
Relay#2 Person#3 Evaluate: TNYWG + 1 + 2 + 3 + 4
Relay#2 Person#4 Find the perimeter of a rectangle with sides of length TNYWG and 7?

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5th & 6th Grade - May 11, 2002

Mental Math

Express all answers as reduced fractions in terms of radicals and π, where applicable, unless otherwise instructed.

Person 1		
1	What is the product of 9 and 8?	72
2	A regular pentagon has a perimeter of 25 inches. What is the total length of three of its sides?	15 [inches]
3	What is the greatest common factor of 45 and 63?	9
4	What is the product of the next two numbers in the sequence: 4, 6, 8, 10?	168
Person 2		
1	What is the quotient of 56 and 8?	7
2	Hank can eat 4 cookies in 2 minutes. How many cookies can he eat in 15 minutes?	30 [cookies]
3	What is the area of a circle with a radius 9?	81π
4	At a pet store, there are three times as many birds as there are miniature pigs. If there are 100 total animals, how many birds are there?	75 [birds]
Person 3		
1	What is the difference between 182 and 91?	91
2	Fabio told his girlfriend he would buy her the largest non-positive whole number of chocolates for her birthday. How many chocolates is he planning to buy her for her birthday?	0[chocolates]
3	Matt bought 11 bottles of valve oil. If he gave each of his 4 friends 2 bottles, how many bottles did he keep?	3 [bottles]
4	Not including 11 and 53, how many counting numbers are between 11 and 53?	41 [numbers]
Person 4		
1	What is the sum of 45 and 87?	132
2	Joe has $5.52. What is the maximum number of quarters he can have?	22 [quarters]
3	What is the sum of the distinct prime factors of 81?	3
4	In a recipe, the ratio of eggs to sugar is 2 eggs per 25 grams of sugar. How many eggs are needed for 175 grams of sugar?	14 [eggs]

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College Knowledge Bowl Questions #1

1	What is the probability of rolling an odd number in one roll of a 6-sided die?	$\frac{1}{2}$
2	A three-foot-high stone column weighs 2 tons. How many tons does a three yard high column of the same diameter and material weigh?	6 [tons]
3	Julie has 3 solid red scarves, 6 solid blue scarves, 11 polka-dotted scarves, 5 flowered scarves, and 9 striped scarves. If she thinks solid blue scarves will not coordinate well with her shirt, what is the probability of randomly drawing a scarf that will coordinate with her shirt?	14/17
4	The difference between two numbers is 16 and their sum is 1984. What is the larger number?	1000
5	What is the only prime number between 80 and 100 in which the units digit is larger than the tens?	89
6	What is the thousandths digit of the product of 6.52 and 0.097?	2
7	Max's extra-large packet of oatmeal uses 3/4 cup water, while Aaron's regular packet of oatmeal uses only $\frac{1}{2}$ cup water. If Max wants to make two extra-large packets and Aaron decides to make three regular packets, how many cups of water is needed for both of them to make their oatmeal?	3 [cups water]
	Extra Question: Only use it if needed	
8	How fast would you have to drive to get to a baseball game 20 miles away in exactly 40 minutes? Express your answer in mph.	30 [mph]

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College Knowledge Bowl Questions #2

1	A password is formed using 3 different positive digits, selected at random. How many possible combinations are there?	504[combinations]
2	With 10-10-2CALL, the cost of the first 20 minutes of a phone call is $0.95. After that, it costs $0.03 per minute. How long, in seconds, is a $1.10 call?	1,500 [seconds]
3	Evaluate: 762 multiplied by 3 factorial.	4572
4	What would the exponent on the ten be if four hundred fifty two billion were written in scientific notation?	11
5	If 4 tics = 6 tacs, and 3 tacs = 4 toes, then 6 toes equals how many tics?	3 [tics]
6	Charles drove 75 mph to Koshkonony, which is 525 miles away. How many hours did it take him to reach Koshkonony?	7[hours]
7	If the clock stopped running 435 minutes after 4:15 p.m., then it stopped running at what time?	11:30 p.m.
	Extra Question: Only use it if needed	
8	Lars removed all the spades, face cards, and 3's from a standard deck of cards. If Joe randomly drew a card from the remaining deck, what is the probability that it will be even?	5/9

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College Knowledge Bowl Questions #3

1	It takes Carl 3 hours to pick a bucket of blueberries. Aaron loves to eat blueberries so it takes him 6 hours to fill one bucket. How many hours would it take them to pick a bucket if they were working together?	2 [hrs]
2	If the math team's airplane must land in Chicago for a competition by 6:00 a.m. Central Time, and the flight from Spokane to Chicago takes 2 $\frac{1}{2}$ hours, at what time Pacific Time must their plane leave the airport? Remember, Chicago falls under the Central Time Zone, which is 2 hours ahead of the Pacific Time Zone.	1:30 a.m.
3	How many ways can you arrange the letters in the word "LITTLE"?	180[ways]
4	What is the sum of the reduced numerator and denominator of 36 / 75?	37
5	If today is Wednesday, what day of the week will be 17 days after the day before yesterday?	Thursday
6	How many even numbers are between 45 and 61?	8
7	What is the sum of all possible remainders when a number is divided by 6?	15
	Extra Question: Only use it if needed	
8	Lisa did 5 math assignments, each of which had 7 problems. Jina did 11 assignments, each of which had "n" problems. They did a total of 90 problems together. What is the value of "n"?	5

"Math is Cool" Masters -- 2001-02
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School Name_____Team #_____
Proctor Name_____Room #_____

Key

Team Multiple Choice Contest-Score Sheet

1* Score

Out of 18

*ect responses are worth 2 points, incorrect responses are
h -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	E		
3	B		
4	D		
5	B		
6	B		
7	A		
8	D		
9	C		

"Math is Cool" Masters -- 2001-02
5th & 6th grade - May 11, 2002

School Name_____Team #_____
Proctor Name_____Room #_____

Key

Full Name:_____

1* Score

Out of 40

Individual Contest - Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	130,296		
2	4		
3	1083 [miles]		
4	5		
5	8 [angles]		
6	6 [trumpets]		
7	20 [ohrings]		
8	5 [months]		
9	20 [factors]		
10	0		
11	17 [shoes]		
12	20		
13	40 [%]		
14	3 [points]		
15	Si-rex		
16	27 [units^2]		
17	20 [cats]		
18	A		
19	9 [trumpets]		
20	$42\pi^3$		

	Answer	1 or 0	1 or 0
21	41 / 50		
22	329/263		
23	69 [weeks]		
24	15 [candy bars]		
25	270 [seconds]		
26	218/343		
27	59		
28	16/9 [lbs]		
29	1023 [ft]		
30	$13_{(6)}$		
31	9 [squares]		
32	1750 [fish]		
33	48 [units^2]		
34	10		
35	14		
36	25		
37	0		
38	20 [mph]		
39	7		
40	2450		

"Math is Cool" Masters - 2001-02

5th & 6th Grade - May 11, 2002

Relay #1 Contest

Answer for person #1	Answer for person #2	Answer for person #3	Answer for person #4
9	16	36	13
1 or 0	1 or 0	1 or 0	2 or 0

Relay #2 Contest

Answer for person #1	Answer for person #2	Answer for person #3	Answer for person #4
0	0	10	34
1 or 0	1 or 0	1 or 0	2 or 0

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School Nome_____Team #_____
Proctor Name_____Room #_____

Key

1* Score

Out of 10

Team Contest-Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	30 [match-ups]		
2	24[tiles]		
3	$25\sqrt{3}/4$		
4	147		
5	55 [students]		
6	-2		
7	113[°]		
8	$-3/2$		
9	1/4		
10	35		