"Math is Cool" Masters-2004

Sponsored by: Automated Accounts

5th Grade - May 15, 2004

Individual Contest

Express all answers as 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 1/10 + 3/5 + 7/6? Write your answer as a reduced mixed fraction.
2	True or False: 3/5 < 4/6?
3	If a triangle has side lengths 7 and 13, what is the largest integer side length the third side could be?
4	If Kai jogs 1/6 of the football field, sprints 2/3 of the field, then jogs the rest of the way, what fraction of the field did he jog?
5	Homer's Doughnut Shop has 200 doughnuts to be put in boxes that hold a dozen doughnuts at a time. How many boxes are needed?
6	What is 1/3 of 1/2 of 2/3?
7	What is the area of a circle with radius 5?
8	What is the area of a right triangle with leg lengths of 8 and 16?
9	What is the remainder when 51806 is divided by 9?
10	Whitney says he will help Keisha write "Math is Cool" tests, but he never does. If Keisha expects Whitney to write 1/5 of the 40 questions, and finds out he didn't write them 1/5 of an hour before the deadline, how many questions must she write per minute to finish by the deadline? Express as a fraction.
11	Fill in the blank: $2 \times 7 \times 5y + 14 \times 3 = 2 (35y + \_\_)$
12	What is the area of a square with a perimeter of 60?
13	Out of 91 people, 65 are boys. What fraction of the people are girls?
14	Josh builds a fence that has the shape that of a regular hexagon. He has 24 feet of fence. How much area does the fence enclose, in square feet?
15	If Peter has 24 cookies and eats half, gives Teddy half of the remaining, then gives Kai half of the remaining, and then Peter eats the rest, how many cookies did he eat?

16	Kai is 2 years older than Teddy. The sum of their ages is 34. What is the difference of their ages in 17 years?
17	There are lanky ostriches and mooing cows in a field. If Farmer Sampson counts 30 heads and 86 legs, how many cows are there?
18	Find the next number in the sequence: (2, 2/3 , 2/9 , 2/27 , ...)
19	What is the fifth non-prime after zero?
20	How many prime numbers less than 100,000 are perfect squares?
21	What is the sum of the first 5 terms of the Fibonacci sequence?
22	If a triangle has 2 congruent angle measures and the third angle has a measure of 68E, what is the measure, in degrees, of one of the congruent interior angles?
23	Libbey and Keisha take belly dance lessons on Thursdays. Keisha pays $8 weekly while Libbey takes advantage of a deal of buying four weeks of lessons for $25. After 16 weeks of lessons, how much money does Libbey save, in dollars?
24	Colin finished a math test at 1:45 pm and Keisha took the same test starting at the same time and finished at 2:17 pm. How many seconds separated Colin's time from Keisha's?
25	The sum of two numbers is 143. Their positive difference is 27. What is the smaller number?
26	If there are 3 Luz in 7 Ers and 9 Ers in 6 Pells, how many Luz are in 28 Pells?
27	Luke tries to play tennis but can only hit the ball 20% of the time. If 60 balls are hit to Luke, how many balls can you expect him to hit?
28	Keisha fills her water bottle each morning. Keisha drinks 1/3 of her water before lunch, one half of the remaining water at lunch, two cups after lunch and then has two cups remaining. How many cups of water did Keisha have at the beginning of the day?
29	Ingrid's phone rings in two classes each day. After three, 5-day school weeks containing no days off, how many times will her phone ring in class?

Challenge Questions

30	Biff is pushing a rock up a 72-foot hill. He pushes it up 7 feet every day, and Eho, at night, pushes it down 2 feet. How many days will it take Biff to push the rock to the top of the hill?
31	A right triangle is drawn inside a circle. If the hypotenuse has a length of 25 and a leg has a length of 7, what is the other leg length?
32	I'm thinking of a 2-digit number. When I switch the digits, the new number is 27 less than the original, and the sum of the two numbers is 99. What is my original number?
33	A group of math students stands in a circle. Each is assigned one number starting at 1 and increasing in order around the circle by 1. Person 57 is across from Person 163. Who's number is across from Person 33?
34	If the circumference of a circle inscribed inside a square is 6π, then what is the area of the square?
35	Two standard 6-sided dice are rolled. The probability of rolling a sum of x is 1/12. Find the product of all possible integers of x.
36	On a plane, two men together had 135 kilograms of luggage. The first paid $1.35 for his excess luggage and the second paid $2.70 for his excess luggage. Had all the luggage belonged to one person, the excess luggage charge would have been $8.10. At most how many kilograms of luggage is each person permitted to bring on the plane free of additional charge?
37	[In this problem, use the facts that 1 ton = 2000 lbs and 1 mile = 5280 feet.] An elephant weighing 2.64 tons and a rabbit weighing 1 lb. Are balanced on a very long, perfectly rigid teeterboard (seesaw). If the elephant starts sliding toward the fulcrum at the uniform rate of 1 foot per minute, how many miles per hour must the rabbit run in order to maintain balance?
38	The squash season is nearing its end, and the current individual standings are shown in the chart. Each of the 8 players must still play 28 games, 4 with each of the other players. How many players still have a theoretical chance to at least tie for the championship? Player: A B C D E F G H Games Won: 92 91 90 71 67 66 44 39 Games Lost: 48 49 50 69 73 74 96 101
39	Some workers were asked to mow two fields, one twice as big as the other. They all mowed the larger field for half of a day; then they split in half. One group finished the larger field at the end of the day. The others mowed the smaller field; but at the end of the day, there remained a part to do. This part was finished by one worker in a single day. How many workers were there?
40	A fuel tank receives a continuous, steady flow of 2000 liters per hour. The tank experiences a steady rate of fuel usage within each of the 6 consecutive 4-hour periods every day. Every day, usage during these periods is, respectively, 6000, 13500, 7300, 10000, 8000 and 3200 liters. What is the capacity, in liters, of the smallest tank which could ensure there would always be at least 200 liters of fuel in the tank?

"Math is Cool" Championships-2004

Sponsored by: Automated Accounts

5th Grade - May 15, 2004

Team Multiple Choice Contest

Mr. Willoughby's English class has the following summer reading list. Each student of his must read at least one book from the list. As they cannot do math very well, help Mr. Willoughby's English students with their calculations about their summer reading.

Title	Author	Price ($)	Pages	Weight (ounces)
"Tom Sawyer"	Mark Twain	5.95	298	18
"Treasure Island"	Robert Louis Stevenson	3.95	224	16
"20,000 Leagues Under The Sea"	Jules Verne	3.99	320	19
"The Time Machine"	H. G. Wells	3.99	144	10
"Robinson Crusoe"	Daniel Defoe	2.50	288	17
"Gulliver's Travels"	Jonathan Swift	4.95	311	20

Questions

1	Bill is reading "Treasure Island." Assuming that only the pages have weight, how many pages of the book weigh one ounce? A) 12 B) 13 C) 14 D) 15 E) 16
2	If Emily reads "Robinson Crusoe" in four hours, how many pages does she read per hour? A) 72 B) 144 C) 216 D) 288 E) 1152
3	Jeff is planning to buy all six books from his friend. How much will it cost Jeff? A) $21.32 B) $25.00 C) $25.33 D) $26.74 E) answer not shown
4	Carl wants to read all six books in five days. How many pages must he read per day? A) 5 B) 25 C) $25.33 D) 317 E) 1585
5	The Book Shipping Company charges 20 cents per ounce plus a 4 dollar flat rate to ship books. How much will it cost to ship all six books? A) $16 B) $20 C) $24 D) $26 E) $104
6	The Text Transport Company charges 4 dollars and 50 cents per book plus 2 dollars to ship books. How much will they charge to ship all six books? A) $24.00 B) $24.25 C) $24.50 D) $24.75 E) $29.00
7	Kyle is buying all six books from a bookstore. The bookstore charges 8% tax on all sales. How much must Kyle pay rounded to the nearest cent? A) $27.36 B) $28.00 C) $25.33 D) $2.03 E) answer not given

8	Anthony starts to write the letter series: A, C, E... If he wants to read a book by the author whose first name begins with the 7th letter in the series, what book does he read? A) "Tom Sawyer" B) "Treasure Island" C) "20,000 Leagues Under The Sea" D) "The Time Machine" E) answer not shown
9	What is the average price per ounce of "Gulliver's Travels" rounded to the nearest cent? A) $0.20 B) $0.25 C) $99 D) $0.30 E) $0.24

"Math is Cool" Masters-2004

Sponsored by: Automated Accounts

5th Grade - May 15, 2004

Team Contest

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 smallest positive integer that leaves a remainder of 10 when divided into 90?
2	At the bank, Al exchanged a $10 bill for an equal number of nickels, dimes, and quarters. How many of each type of coin did Al receive?
3	Matt's hair grows 2 inches per month. If he cuts his hair once every three months and only cuts off half an inch, how long will his hair be after one year? (Assuming that he shaves his head at the beginning of every year)
4	If 94 students and 21 adults are going to Mexico to build houses, how many houses can be built if at least 10 students and exactly 2 adults must work on each house the entire time? Each group of people can build one house in the time they're in Mexico.
5	Find the sum of the following sequence: 3 + 9 + 15 + ...+ 105 + 111
6	Will has a door that is two and a half feet wide and 8 feet tall. He removes the door and cuts it into two congruent rectangles. He then takes one of the halves and cuts it into two congruent triangles. What is the area of one of the triangles?
7	12 boys and 12 girls attend prom at Columbia High School. If each of the boys dances once with each of the girls, how many dances occur total?
8	Shaun is three times as old as Kayla and four times as old as Rayann. If Rayann will be 4/5 of Kayla's age in two years, how many years old will Shaun be in 5 years?
9	Aaron fills out college applications at a rate of one application every 77 minutes. Keisha fills out two applications simultaneously every 54 minutes. If Libbey takes 8/7 as long as Aaron to fill out an application, how many more complete applications can Keisha fill out in a 24 hour day than Libbey?
10	The probability Lee dresses as a clown on any given day is 1/9. The probability Colin dresses as a clown is 9/1000000 on any given day. According to these probabilities, Colin and Lee should independently dress as a clown on the same day once every how many years? Answer as a decimal rounded to the nearest hundredth and assumes all years have 365 days.

5th grade

	Relay 1 (5th)	
1	Evaluate: 3 × 7 + 5 × 5	46
2	Evaluate: TNYWG minus the number of dots on two standard dice.	4
3	Find the sum of the number of prime numbers between 0 and 10 and TNYWG.	8
4	Evaluate: 5% of 20 minus TNYWG	-7

	Relay 2 (5th)	
1	What is the number of socks in 12 dozen pairs of socks?	288
2	Evaluate: TNYWG times the number of sides in a square.	1152
3	Find TNYWG divided by the number of feet in six yards.	64
4	Evaluate: TNYWG minus the sum of the next two terms in the series: 1, 5, 9, 13, 17, __, __.	18

"Math is Cool" Masters-2004

Sponsored by: Automated Accounts

5th Grade - May 15, 2004

Mental Math Contest

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

Person #1		
1	What is the area of a right triangle with leg lengths of 6 and 8?	24
2	What is the number of inches in 1 yard divided by 12?	3
3	How many quarts are in 2 gallons?	8
4	If Biff pushes a rock 5 feet up a 25-foot hill every day and every night Eho pushes it back 1 foot, how many days will it take Biff to get the rock to the top of the hill?	6
Person #2		
1	If x equals 3 what is 3x plus 5?	14
2	What is one- half plus one-fourth?	3/4
3	What is the mean of the following set of data? (3,4,5,6,7,8,9)	6
4	Kai has $3.50 in dimes. How many dimes does he have?	35
Person #3		
1	What is the area of a circle with a diameter of 8 inches?	16π
2	Solve for x: 2x + 7 = 19	6
3	How many interior degrees are in a pentagon?	540 [E]
4	What is the angle measure between the hour hand and the minute on an analog clock when it is 10:00 am?	60 [E]
Person #4		
1	What is the product of 9 and 8 divided by 3?	24
2	What is the difference between 291 and 152	139
3	What is the sum of the first 7 positive whole numbers?	28
4	What is 20% of 400?	80

"Math is Cool" Masters-2004

Sponsored by: Automated Accounts

5th Grade - May 14, 2004

College Knowledge Bowl Questions #1		
1	Googgy has 12 pink jelly beans and 12 yellow jelly beans. If Jon eats 3/4 of her pink jelly beans and 2/3 of her yellow jelly beans, what fraction of her remaining jelly beans are yellow?	4/7
2	If Max goes to a pool party three times a week, how many times does he go to pool parties per year?	156 [times]
3	Katherine who prefers skiing and Luke who prefers snowboarding are arguing about whether skiing or snowboarding is better. If Aaron, Max, and Keisha are on Katherine's side, and Colin is on Luke's side, what fraction of the group prefers skiing?	2/3
4	If Lucas takes 16 minutes and 30 seconds to run 3 miles and he wants to run it in 15 minutes and 15 seconds, how many seconds faster will he have to run each mile?	25 [seconds]
5	If John has 7 red socks, 3 blue socks, 5 green socks, and 2 black socks in a drawer, what is the probability that he randomly picks a green sock out of the drawer?	5/17
6	Terrence runs 4.25 miles and takes 2000 steps per mile. How many steps does he take?	8500 [steps]
7	Lee shoots exactly 99.9% from the free throw line. If he shoots 1,000,000 shots how many does he miss?	1000
Number ***8*** is an extra question. Only use it if needed.		
8	Evaluate: $9 \times 16 \div 4 + 6 \div 2$	39

"Math is Cool" Masters-2004

Sponsored by: Automated Accounts

5th Grade - May 14, 2004

College Knowledge Bowl Questions #2		
1	What is the sum of the interior angles of a triangle?	180
2	What is 5 x 4 - 2 + 3 x 6 / 18	19
3	If I drive 3 miles in five minutes, what is my speed in miles per hour?	36 [mph]
4	How many pints are in 3 1/4 gallons	26 [pints]
5	If I pay $1.50 for half a gallon of milk and $2.25 for one gallon of milk, how much do I save by buying a gallon rather than two half gallons?	$.75
6	Solve for x: 20=4x+4	4
7	What is 1/4 of 1/8 of 1/2 of 4?	1/16
Number ***8*** is an extra question. Only use it if needed.		
8	What is the fourth prime number after 30?	43

"Math is Cool" Masters-2004

Sponsored by: Automated Accounts

5th Grade - May 14, 2004

College Knowledge Bowl Questions #3		
1	Matt rolls two regular, 6-sided dice. What is the probability that the sum of the numbers showing is 5?	1/9
2	If Katherine bakes 12 cookies per night for one week, how many cookies did she bake that week?	84 [cookies]
3	If my destination is 56 miles away, and I'm driving at a speed of 8 mph, how many hours will it take for me to get there?	7 [hours]
4	Jasmine can jump a distance of 4 feet, and Simone can jump a distance of 6 and 1/3 feet. How many inches farther can Simone jump than Jasmine?	28 [inches]
5	Elise has weird dreams twice every month. How many weird dreams will she have in a year?	24 [dreams]
6	Googgy puts one quarter in her piggy bank every day. If she begins with $6.75, how much money will she have after 64 days?	$22.75
7	If Libbey belly dances four times a week, how many times does she belly dance in a year?	208 [times]
Number ***8*** is an extra question. Only use it if needed.		
8	If Julie can write one question every 3 minutes, how long does it take her to write 13 questions?	39 [minutes]

"Math is Cool" Masters -- 2004

5th grade - May 14, 2004

School Name_____Team #_____

Proctor Name_____Room #_____

Key

Full Name:_____

1st Score

Out of 40

Individual Contest - Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	1 13/15		
2	True		
3	19		
4	1/3[of the field]		
5	17[boxes]		
6	1/9		
7	25π[units squared]		
8	64 [units squared]		
9	2		
10	2/3 [questions per minute]		
11	21		
12	225 [units squared]		
13	2/7		
14	$24\sqrt{3}$ [square feet]		
15	15[cookies]		
16	2[years]		
17	13 [cows]		
18	2/81		
19	9		
20	0		

	Answer	1 or 0	1 or 0
21	12		
22	56[E]		
23	[$] 28		
24	1920 [seconds]		
25	58		
26	18[Luz]		
27	12 [balls]		
28	12 [cups]		
29	30 [times]		
30	14[days]		
31	24		
32	63		
33	139 [person]		
34	36 [units squared]		
35	40		
36	45 [kilograms of luggage]		
37	60 mph		
38	5 [players]		
39	8 [workers]		
40	7000[L]		

"Math is Cool" Masters -- 2004

5th grade - May 14, 2004

School Name_____Team #_____

Proctor Name_____Room #_____

Key

Team Multiple Choice Contest-Score Sheet

1st Score

Out of 18

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	C		
4	D		
5	C		
6	E		
7	A		
8	A		
9	B		

"Math is Cool" Masters -- 2004

5th grade - May 14, 2004

School Name_____Team #_____

Proctor Name_____Room #_____

Key

1st Score

Out of 10

Team Contest-Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	16		
2	25 [coins]		
3	22 [inches]		
4	9 [houses]		
5	1083		
6	5 [square feet]		
7	144[dances]		
8	29[years old]		
9	36[applications]		
10	2739.73 [years]		

"Math is Cool" Masters -- 2004

5th grade - May 14, 2004

School Name_____Team #_____

Proctor Name_____Room #_____

Key

Relay Contest - Score Sheet

Answer for relay #1
46
4
8
-7
Answer for relay #2
288
1152
64
18