

# "Math is Cool" Masters-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

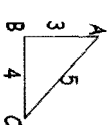
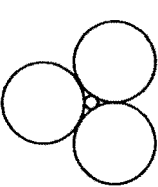
## Individual Contest

Express all answers as reduced fractions unless stated otherwise.  
Leave answers in terms of  $\pi$  where applicable.

Do not round any answers unless stated otherwise.

Record all answers on the colored cover sheet.

1	What is $1+2+3+\dots+11$ ?
2	If 1 Mathlete can eat 1 apple in 1 hour, how many Mathletes does it take to eat 2 apples in 2 hours?
3	What is the sum, in degrees, of the interior angles of a triangle?
4	Evaluate: 5!
5	What is the area of a triangle with a base length of 6 and a height of 9?
6	Evaluate: $1/3 + 2/5 + 1/6$
7	How many prime numbers are there between 1 and 20?
8	Write in scientific notation: 4,670,000,000
9	There are chickens and camels in a room. If there are 17 heads and 48 feet in the room, how many chickens are there?
10	Evaluate: $321 \times 515$
11	What is the diameter of a circle with area $36\pi$ ?
12	If Sue has 96 cups of orange juice, how many quarts does she have?
13	What is the probability that Gail will roll a sum of 7 on two six-sided dice?
14	If Charlie gets 92, 61, and 72 on his first three tests, what is his average score?
15	$A \cdot B = \frac{A \cdot B}{A^2 - B}$ Evaluate when $A = 5$ and $B = 3$ . Express answer in the form of $a/b$ .
16	How many multiples of 8 are there between 101 and 202?
17	Fill in the blank: $3 + 5 + 7 + 6 = (3 + 4) \times \underline{\hspace{1cm}}$
18	Evaluate: $3 \left( \frac{6}{13} + \frac{16}{52} \right)$
19	Evaluate: $[(23) \div 4(56) \cdot 7(89)]$
20	Andy's Dad wants to get the best value when he goes to the store. A 6 oz can of tuna from Brand A is \$ .78, a 15 oz can from Brand B is \$1.98 and an 8 oz can from Brand C is \$ .87. Which brand, A, B, or C should he buy?
21	Evaluate $ 1 + 2  + 3  + 4  + 5 $
22	Solve for $x$ : $5x + 3x + 11 = -29$ .
23	How many ways can the letters in the word "PROBLEM" be arranged?

24	If the ratio of brown-haired boys to blond-haired boys is 5:4, how many boys have blond hair if there are 27 boys total?
25	If the difference between two positive numbers is 18 and their product is 115, what is the larger of the two numbers?
26	Josh landed on an alien planet. On this planet there are two types of creatures, Tribles and Falcos. Tribles always tell the truth and Falcos always lie. Josh encounters 5 creatures, A, B, C, D and E. His sensors tell him that 3 are Tribles and 2 are Falcos. If A says "I am a Trible," B says "D is a Falco," C says "I am a Trible," D says "B is a Falco," and E says "A is a Falco," who does Josh know for certain is a Trible?
27	What is 30% of 45? Express your answer in decimal form.
28	True or False: A circle can be drawn to intersect any 3 points not in a straight line.
29	If a triangle has sides of length 4 and 9, what is the least whole number length the third side can be?
Challenge Questions	
30	Lee spends $1/4$ of his day at school, $1/3$ of his day on the internet, and 50% of the remaining time doing homework. Assuming he spends the remaining time sleeping, for how many hours each day does Lee sleep?
31	What is the sum of the first 20 positive odd integers?
32	I am thinking of a two-digit number. When I switch the digits I create a new number that is 9 less than my original number. My original number is divisible by 2, while my new number is prime. For the original number, how many two digit numbers fit this description?
33	Eight pounds of Green Apples cost \$4.50. If Eho wants to buy 15 tons of Green Apples, how much money, in dollars, does he need? (1 ton = 2,000 pounds)
34	Evaluate: $8(-7) + 6(-5) - 5$
35	Eric multiplied a number, $x$ , by a constant to get 56. When he multiplied 7 by the same constant he got 49. What is the number $x$ ?
36	What is the smallest positive integer greater than 1 that is a perfect square, cube and fourth power?
37	A point is chosen at random from the interior of triangle ABC. What is the probability that it is closer to vertex C than vertices A and B?
	
38	Consider points A, B, C, and D in that order on a line $\ell$ , where AC:BD = 3:7, and BC:AD = 1:4. Determine AB:CD.
39	A circle with radius $b$ is surrounded by 3 larger congruent circles, so that every circle touches all 3 other circles. What is the radius of the larger circles?
	
40	Two identical cones, labeled A and B, are filled $2/3$ full, cone A with red sand and cone B with green sand. Cone B is poured into cone A until it is full. Cone A is then poured into B until B is filled. Finally, B is poured back into A until A is full. Assume that the sand is mixed thoroughly after every transfer. What is the ratio of red sand to green sand in cone A after the final transfer?

# Math is Cool! Championships-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

## Team Multiple Choice Contest

Parabolic Peak has a ski and snowboard park constructed on it. It has 5 ski lifts and 22 different runs. Ski lifts run at different speeds. Amateurs use the ski lifts on runs of less difficulty. The ski lifts on these runs have a slower speed than the ski lifts that serve the more experienced skiers. The more experienced skiers like the more difficult runs. The following is data on the ski lifts:

Ski Lift Name	Speed	Total number of chairs on ski lift	Number of passengers per chair	How many passengers can ride per hour	Length of chair lift in one direction in feet
Powder Puff	4 mph	50	2	1056	1000 feet
The Denominator		80	4	2112	2000
Inferno	10 mph		6	4752	4000
Vertical Limit	12 mph	120		6336	3000
Vertex Locator	15 mph	75	1		2500

Questions:

- How many feet of cable are used in the Powder Puff Ski Lift?  
A) 2000 ft B) 3000 ft C) 4000 ft D) 5000 ft E) Answer not given
- How many feet apart are the chairs on the Powder Puff Ski Lift?  
A) 20 ft B) 30 ft C) 40 ft D) 50 ft E) Answer not given
- How many passengers can ride the Vertical Limit Ski Lift in 3.5 hours?  
A) 6336 B) 12000 C) 18842 D) 21700 E) Answer not given
- If the speed of the Powder Puff Ski lift was increased to 8 mph, how many passengers could ride the chair lift in 2 hours?  
A) 2000 B) 4123 C) 4244 D) 4512 E) Answer not given
- What is the total number of feet of cable on Parabolic Peak?  
A) 20000 B) 22000 C) 25000 D) 28000 E) Answer not given
- It costs \$100 per foot in one direction to build a ski lift. How much, in dollars, did it cost to build all 5 ski lifts on Parabolic Peak?  
A) \$832 B) \$729,000 C) \$455,000 D) \$124,000 E) Answer not given
- What is the speed of The Denominator Ski Lift?  
A) 4 mph B) 5 mph C) 6 mph D) 7 mph E) Answer not given
- What is the total number of chairs on the Inferno Ski Lift?  
A) 110 B) 120 C) 130 D) 140 E) Answer not given
- What is the number of passengers per chair on the Vertical Limit Ski Lift?  
A) 6 B) 7 C) 8 D) 9 E) Answer not given

# "Math is Cool" Masters-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

## Team Contest

Leave answers in terms of  $\pi$  where applicable.

Do not round any answers unless stated otherwise.

Record all answers on the colored cover sheet.

- What is the one's digit of  $9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$ ?
- Twenty seven people went to dinner at The Buffet Place. It costs children \$3.00 to eat, adults \$5.50 to eat, and every 4<sup>th</sup> child eats free. If the total cost of dinner was \$117.50, how many children ate at The Buffet Place?
- If  $A^8 = \frac{A^8 \cdot B^4}{3A^8}$  find  $243$ .
- Michael took a trip to Value Village. He found a coat that was \$32.50 after a 35% discount. What was the original price of the coat, in dollars?
- Bubba has 42 feet of fencing to make a fenced yard for his dog Fluffy. How many different rectangular fenced yards can he create with integral side lengths using all of the 42 feet of fencing he has?
- In physics, Work = Force times Distance. The Force applied to a system is tripled, and the Distance is halved. The new work performed is what percent of the original work?
- Evaluate:  $2 ( 3 ( 3 ( 5 + x ) + x ) + x )$ , when  $x = 5$ .
- What is the perimeter of a right triangle with legs of 9 and 12?
- A circle is inscribed in a square, with the square's edges tangent to the circle. If the circle has an area of  $64\pi$  in<sup>2</sup>, what is the area of the square in square inches?
- Silas drives at 10 mph, Sarah drives at 25 mph, and Sampson drives at 100 mph. What is their average speed, in mph, if each drives the same distance?

# "Math is Cool" Masters-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

## Mental Math Contest

Express all answers in terms of radicals and  $\pi$ , where applicable, unless otherwise instructed.

Relay 1 Person 1	What is the area of a square with perimeter 24?
Relay 1 Person 2	What is the sum of the factors of 15 and $TNYWG - 15$ ?
Relay 1 Person 3	Reduce $TNYWG/99$ , then find the sum of the reduced numerator and denominator?
Relay 1 Person 4	The ratio of boys to girls is 2:3. There are $TNYWG$ boys. How many girls are there?
Relay 2 Person 1	What is the sum of the next two terms in the sequence? 2, 4, 8, 16, 32, _____
Relay 2 Person 2	What is the smallest prime factor of $TNYWG$ ?
Relay 2 Person 3	If Libbey has $TNYWG$ shirts, 3 pairs of pants, and 4 pairs of shoes how many different outfits can she make?
Relay 2 Person 4	A pizza with a diameter of 12 inches costs \$20.00. How much would a pizza with a diameter of $TNYWG$ cost, in dollars, if it costs the same per square inch as the original pizza?

Person #1	
1	What is the product of 210 and 5? 1050
2	Jamie has 27 quarters. How much money, in dollars, does Jamie have? [\$] 6.75
3	Mary is 3 years older than six year old Jane. What will be the sum of their ages be in 5 years? 25 [years]
4	What is $3^4$ ? 81
Person #2	
1	What is the product of 11 and 12? 132
2	Josh had (6 times 3) apples, but then he ate (7 times 2) apples. How many apples does he have left? 4 [apples]
3	What is the sum of the thousands digit and the ones digit of 635,789? <i>Read as: 6 hundred thirty five thousand, seven hundred eighty nine. (Do not say "and")</i> 14
4	Convert 5 quarts into gallons. 1.25 or 1 1/4 or 5/4 [gallons]
Person #3	
1	What is $1/3$ plus $1/6$ ? 1/2
2	Abram sold all the integer numbers between 8 and 99 inclusive. How many integer numbers did he say? 92
3	Libby was supposed to arrive at Zero Hour at 7:00 a.m. but she arrived 77 minutes early. What time did she arrive? 5:43 a.m.
4	What is the sum, in degrees, of the interior angles of a square? 360 [°]
Person #4	
1	What is 10% of 210? 21
2	How many people can 24 cookies feed if each person gets one-third of a cookie? 72 [people]
3	If I have 30 dimes and Lee has the same amount of money in quarters, how many quarters does Lee have? 12 [quarters]
4	What is the sum of the first 6 positive whole numbers? 21

# "Math is Cool" Masters-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

<u>College Knowledge Bowl Questions #1</u>		
1	It takes Sampson's Water Purifier 30 pumps to fill 1 quart, and it takes Ring's Water Purifier 60 pumps to fill 1 quart. If they pump together, with each pumping at 60 pumps per minute, how many quarts will they fill in 1 minute?	3 [quarts]
2	5 bricks = 8 bracks and 3 bracks = 7 brocks. How many brocks are equal to 2 bricks? Express answer as an improper fraction.	112/15 [brocks]
3	Aaron loses the lid to his water bottle and 5 grams of water drips out every 20 minutes. If he has 33 grams of water in the bottle and he does not drink any of it, how many seconds will it take for the bottle to be empty?	7920 [seconds]
4	How many tiles 4 feet by 5 feet would be needed to cover a floor 120 feet by 75 feet?	450 [tiles]
5	What is the area of a right triangle with a leg of length 12 and a hypotenuse of length 13?	30
6	Mara is 6 years older than Maureen, who is 10. In how many years will the sum of their ages be 76?	25 [years]
7	What is the probability of drawing a diamond or a jack from a deck of cards?	4/13
Number <u>8</u> is an extra question. Only use it if needed.		
8	There are 25 students in Mrs. Smith's class. Seven received a final grade of "A." What percentage of students did not receive a final grade of "A"?	72[%]

# "Math is Cool" Masters-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

College Knowledge Bowl Questions #2		
1	Lisa is 3 times as old as Alex. In 6 years, Alex will be two-thirds as old as Lisa. How old is Lisa now, in years?	6 [years]
2	How many prime numbers are there in the following set of numbers: 1, 5, 9, 13, 17, 21, 25, 29, 33?	4 [numbers]
3	Rebecca always eats 6 chocolate candy bars on her way to a math competition. If she attends one competition each month, and each candy bar costs one dollar, how much money, in dollars, did she spend on candy bars in one year?	[\$] 72
4	Find the value of $x$ such that the line through $(-6,6)$ and $(x,14)$ has a slope of $4/3$ .	$x = 0$
5	If Anna rolls a die 60 times, how many times would she expect to roll a 3?	10 [times]
6	How many seconds are there in $3\frac{1}{2}$ hours?	12,600 [seconds]
7	Tom and Rohan were supposed to meet at 6:30 a.m. to bake cookies for the bake sale. Tom arrived on time, but Rohan arrived 1,320 seconds late. What time did Rohan arrive?	6:52 a.m.
Number 8 is an extra question. Only use it if needed.		
8	Colin, Abe, Keisha, and Libbey went to a baseball game. How many ways could they be seated in four seats, assuming Keisha and Libbey sat next to each other?	12 [ways]

# "Math is Cool" Masters-2003

5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

## College Knowledge Bowl Questions #3

1	Andy is helping Grandpa in the garden. They find that they planted 7 rows of corn, each with 12 plants. If each plant produces 7 ears of corn, how many ears will they harvest this summer?	588 [ears]
2	20 consecutive integers sum to 10. What is their product?	0
3	Sampson, Carl and Colin each flip a coin. What is the probability that Sampson's coin comes out heads, Colin's coin comes out tails and Carl's coin comes out heads? (Express as a fraction)	1/8
4	Jean went to the store to buy mascara and eyeliner. If the eyeliner cost \$.30 less than the mascara and together they cost \$2.02, how much did the eyeliner cost?	[\$] .86 or 86[¢]
5	What is the mode of the following set of numbers? 12, 61, 13, 2, 12, 15, 72	12
6	Evaluate: The opposite of 10 plus the opposite of 9 plus the opposite of 8 plus dot dot dot plus 10 plus 11.	11
7	A football field is 100 yards long and 50 yards wide. In addition, there are two end zones that are each 15 yards long and the width of the field. What is the area of the entire field, in square feet?	58,500 [ft <sup>2</sup> ]
Number <u>8</u> is an extra question. Only use it if needed.		
8	What is the mode minus the median of the following set of numbers? 26, 4, 1, 31, 13, 31, 40	5

School Name \_\_\_\_\_ Team # \_\_\_\_\_  
Pr-192 octor Name \_\_\_\_\_ Room # \_\_\_\_\_



Full Name: \_\_\_\_\_  
**Individual Contest - Score Sheet**  
DO NOT WRITE IN SHADED REGIONS

1<sup>st</sup> Score  
Out of 40

	Answer	1 or 0	1 or 0
1	66		
2	1		
3	180 [°]		
4	120		
5	27		
6	9/10		
7	8		
8	$4.67 \times 10^8$		
9	10 [chickens]		
10	165,315		
11	12		
12	24 [quarts]		
13	1/6		
14	75		
15	15/22		
16	13 [multiples]		
17	3		
18	30/13 or 2 4/13		
19	630		
20	[Brand] C		

	Answer	1 or 0	1 or 0
21	153		
22	$[x = ] -5$		
23	5040 [woys]		
24	12 [boys]		
25	23		
26	C		
27	13.5		
28	True		
29	6		
30	5 [hours]		
31	400		
32	3 [numbers]		
33	[\$]1687.50		
34	35,760		
35	8		
36	4096		
37	1/4		
38	1.5 or 1/5		
39	$12\sqrt{3} + 18$		
40	14:13 or 14/13		

School Name \_\_\_\_\_ Team # \_\_\_\_\_  
Pr-192 octor Name \_\_\_\_\_ Room # \_\_\_\_\_



**Team Multiple Choice Contest - Score Sheet**

Correct responses are worth 2 points, incorrect responses are worth -1 point and no response is 0 points.

1<sup>st</sup> Score  
Out of 18

**DO NOT WRITE IN SHADED REGIONS**

	Answer	-1, 0 or 2	-1, 0 or 2
1	A		
2	C		
3	E		
4	C		
5	C		
6	E		
7	B		
8	B		
9	E		

"Math is Cool" Masters -- 2003  
5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

School Name \_\_\_\_\_ Team # \_\_\_\_\_  
Pr 192 actor Name \_\_\_\_\_ Room # \_\_\_\_\_



1<sup>st</sup> Score

Out of 10

**Team Contest-Score Sheet**

**DO NOT WRITE IN SHADED REGIONS**

Answer	1 or 0	1 or 0
1 0		
2 10 [children]		
3 3		
4 [\$] 50		
5 10 [fenced yards]		
6 150 [%]		
7 220		
8 36		
9 256 [in <sup>2</sup> ]		
10 20 [mph]		

"Math is Cool" Masters -- 2003  
5<sup>th</sup> & 6<sup>th</sup> Grade - May 10, 2003

School Name \_\_\_\_\_ Team # \_\_\_\_\_  
Pr 192 actor Name \_\_\_\_\_ Room # \_\_\_\_\_



**Relay #1 Contest - Score Sheet**

Answer for person #1	Answer for person #2	Answer for person #3	Answer for person #4
36	45	16	24
1 or 0	1 or 0	1 or 0	2 or 0

**Relay #2 Contest - Score Sheet**

Answer for person #1	Answer for person #2	Answer for person #3	Answer for person #4
192	2	24	[\$]80.00
1 or 0	1 or 0	1 or 0	2 or 0