"Math is Cool" Championships-2002-03

Sponsored by: Western Polymer Corporation

6th Grade - February 28, 2003

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 5 + 8(5 + 1) + 2?
2	Find the sum of the next two numbers in the series: 1, 3, 5, 7, _, _
3	Evaluate: 3.569 + 2.1357 Express as a decimal.
4	What is the area of a circle with a diameter 8?
5	What is the sum of the first 5 odd positive numbers?
6	What is the remainder when you divide 1263 by 15?
7	Josh has a magic number. When you add Josh's number to half Josh's number, you get 6. What is Josh's magic number?
8	I have 7 quarters and enough nickels to make $3.00 in all. How many more nickels than quarters do I have?
9	Round 14,249 to the nearest hundred.
10	If distance = rate multiplied by time, and Lee has traveled 20 miles in 5 hours, what is Lee's rate of travel in mph?
11	In the state of Mathematica, there is a 10% sales tax. How much would Keisha have to spend, in dollars, after tax on a $25 item?
12	How many whole numbers are between 100 and 150 inclusively?
13	What is the area of a square with a perimeter of 20?
14	What is the sum of the digits that results from doubling 13?
15	What is the greatest common factor of 33 and 121?
16	Evaluate: 7^2-(1+4)(2)
17	Evaluate: 1/3 + 1/7 - 1/10
18	What is the circumference of a circle with radius 8?
19	What must the side length of a square be so that its perimeter and area are equal?
20	Abe is flipping a fair coin. He has flipped seven consecutive heads. What is the probability his next flip comes out heads?

21	What is the least common multiple of 16 and 30?
22	How many ways can 5 horses take 1st, 2nd, and 3rd place in a horse race?
23	If the time right now is 3 p.m., what time will it be 23989 hours from now?
24	Simplify: 8(x + 3)-5(2x + 2)
25	What is the probability of rolling a sum of 7 on two fair six-sided die?
26	Lee and his 10 friends all shake hands with each other exactly once. How many handshakes occur?
27	Evaluate: $\left(\frac{5}{6}\right)(6)+\left(\frac{6}{5}\right)(5)-\left(\frac{1}{2}\right)\left(\frac{1}{\frac{1}{2}}\right)$
28	Express .45 as a reduced fraction.
29	If today is a Friday, what day of the week will it be 48 days from now?
	Challenge Questions
30	How many integral values of n satisfy the inequality $0 \# n^2 < 60$
31	There is only one positive integer which is exactly three times the sum of its digits. What is this 2-digit number?
32	What percent of 25 is 15?
33	What is the smallest positive integer that leaves a remainder of 10 when divided into 80?
34	A j B= $\frac{B-A(B)}{B+A}$. What is 3 j (5^2)? Leave answer as an improper fraction.
35	Let P be the product of all positive primes less than 50. What is the units' digit of P?
36	The positive integer N has exactly eight different positive integral factors. Two of these factors are 21 and 33. What is the value of N?
37	What is the perimeter of the only rectangle whose diagonals each have a length of 13 and whose sides have integral lengths?
38	What is the simplified value of $(154)^2 - 2(154)(54) + (54)^2$?
39	Two identical jars are filled with equal numbers of marbles. The marbles are colored red or white. The ratio of red to white marbles is 6:1 in Jar 1 and 7:1 in Jar 2. If there are 120 white marbles all together, how many red marbles are there in Jar 2?
40	In Jar A there are 12 red marbles and 5 white marbles. In Jar B there are 8 red marbles and 35 white marbles. Keisha randomly takes one marble from Jar A and places it in Jar B. She then takes a random marble out of Jar B and places it into Jar A. Finally, she takes a final marble out of Jar A and places it in Jar B. She then randomly picks a jar and randomly draws one marble from it. What is the probability she picks a white marble?

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Team Multiple Choice Contest

Cid's Grocery Store is open from 10 a.m. to 8 p.m. daily. Cid did a survey at his store and found the average number of customers coming into the store at these time periods in one day and the average of what each individual customer spent on food. Customers leave during the same time period in which they arrive.

Time	Average Number of Customers		Type of Food	Average Amount Spent by Each Customer
10:00-12:00	66		Produce	$12.75
12:00-2:00	72		Meats	$15.00
2:00-4:00	89		Frozen Goods	$18.50
4:00-6:00	120		Dairy	$24.00
6:00-8:00	83		Breads	$4.00
8:00-10:00	34		Canned Goods	$5.75

Questions

1	On average how many customers does Cid have in his store between 2:00 and 4:00? A)430 customers B)398 customers C)356 customers D) 38.7 customers E)None of the above
2	On average, how many customers per minute go through the checkout counter from 4 until 6, assuming that all customers buy something? A)1 customers/min B)2 customers/min C)2.5 customers/min D)3 customers/min E)None of the above
3	What is the average number of customers per day? A)430 customers B)398 customers C)356 customers D) 38.7 customers E)None of the above
4	By what percentage did the average number of customers increase from the 12:00-2:00 time period to the 4:00-6:00 time period? A)166.7% B)30% C)60% D)70% E)None of the above
5	On average, how much does a person spend on the above items on one trip to Cid's Grocery Store? A)$74.25 B)$67.25 C)$95.00 D)$80.00 E)None of the above
6	What percentage of the total amount a person spends on the food above is from dairy? A)50% B)33% C)30% D)10% E)None of the above
7	How much does the store make from selling canned goods to customers from 6:00 until 8:00? A)$194.50 B)$477.25 C)$1058.25 D)$690.00 E)None of the above
8	What kind of relationship exists between the amount the store makes and the number of customers? A)Direct B)Inverse C)Linear D)Quadratic E)A and C
9	How much would the store make in 5 days from this data, assuming there are no costs in running the store? A)$289,840 B)$185,000 C)$172,000 D)$171,680 E)None of the above

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6th Grade - February 28, 2003

Team Contest

Leave answers in terms of π where applicable.
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Record all answers on the colored cover sheet.

1	Evaluate: 1+3+5+...+49
2	Biff can mow the lawn in 3 hours. Eho can mow the lawn in 2 hours and Merck can mow the lawn in 5 hours. How long, in hours, will it take them to mow the lawn together?
3	A calculator cost $100 in 2001 and decreases in value by 10% each year so that in 2002 it cost $90. What will the calculator cost in 2003?
4	What is 2+3x4-5+3(6+3)?
5	An empty 32 oz. water bottle weighs 1/2 pound and holds 2 pounds of water. Luke can only hold 30 lbs. on his back. How many full water bottles can he hold on his back?
6	What is the distance between the points (2,5) and (2,8)?
7	Elise's push-up routine consists of doing 20 push-ups in 1 minute and then taking a 5 minute break. Assuming she never gets tired, how many push-ups can she do in 1 hour?
8	Cheever is twice as old as Herrick and 25 years older than Proctor. Ten years ago Proctor was half the age of Herrick. Ten years from now, Proctor will be half the age of Cheever. How old, in years, is Proctor now?
9	What is the sum of the first 5 primes?
10	A penguin and a gopher are running a race. A gopher has an average speed of 2 mph and the penguin has an average speed of 5 mph. However, the penguin takes an hour break after every hour of running. At the end of the race the penguin finishes 3 hours ahead of the gopher. How long, in miles, was the race?

Practice relay

Person # 1

Simplify: $\frac{4+5}{3}$

Relay #1

Person # 1

Simplify: 2 times 3^3

Relay # 2

Person # 1

Connor can make 10 greeting cards in 15 minutes, Marianne can make 3 greeting cards in 3 minutes. Working together, how many greeting cards can they make in 30 minutes?

Practice relay

Person # 2

Find TNYWG + 5

Relay #1

Person # 2

TNYWG/9

Relay #2

Person # 2

Evaluate: TNYWG/100

Practice relay

Person # 3

Find TNYWG - 7

Relay #1

Person # 3

Solve for x: TNYWG = 2x+2

Relay #2

Person # 3

Evaluate: TNYWG + the product of all numbers between -2 and 2.

Practice relay

Person # 4

TNYWG times 18

Relay #1

Person # 4

Cube TNYWG

Relay #2

Person # 4

If the chance of Connor noticing Marianne on any day Monday through Friday is TNYWG, what is the probability of Connor noticing Marianne on every day Monday through Friday this week?

"Math is Cool" Championships-2002-03

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6th Grade - February 28, 2003

Mental Math Contest

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

Person #1		
1	What is the product of 9 and 7?	63
2	What is the perimeter of a square with side length 5?	20
3	What is 40% of 60?	24
4	What is 3 cubed?	27
Person #2		
1	What is the area of a circle with radius 3?	9π
2	What is 2/5 + 3/4? Leave in an improper fraction.	23/20
3	What is 7 x 5 ÷ 5?	7
4	What is 175 divided by 7?	25
Person #3		
1	What is the area of a rectangle with side lengths 6 and 8?	48
2	What is 25% of 80?	20
3	What is 6/7 times 4/5?	24/35
4	Evaluate: The square root of 81	9
Person #4		
1	What is the product of 10 and 12?	120
2	What is the circumference of a circle with radius 4?	8π
3	A farm has cows and chickens. If there are 11 heads and 34 legs, how many cows are there?	6
4	What is 1/4 the product of 8 and 3?	6

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College Knowledge Bowl Questions #1		
1	What term includes all shapes with exactly two sets of parallel sides?	parallelogram
2	What is the area of a triangle with base 7 and height 4?	14
3	Evaluate: 5!-3! (Read as: Evaluate 5 factorial minus 3 factorial.)	114
4	What is the measure in degrees of the angle complementary to a 34E angle?	56[E]
5	Aaron can eat 15 bananas in one hour and Lauren can eat 9 bananas in one hour. If they both start at noon, how many bananas can will be eaten by 3:40 p.m.?	88[bananas]
6	What is the radius of a circle with area 81π?	9
7	What is the first prime number larger than 150?	151
Number ***8*** is an extra question. Only use it if needed.		
8	What is the reciprocal of the reciprocal of the sum of 1/6 and 2/3?	5/6

"Math is Cool" Championships-2002-03

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College Knowledge Bowl Questions #2		
1	Annual means every year. If this (2003) is the 12th annual "Math is Cool" contest, in what year was the first "Math is Cool" contest held?	1992
2	What is the sum of the interior angles of a triangle.	180[E]
3	If Sanchez has 4 test scores of 94, 92, 88, and 87, what score does he need to get to have an average score of 92%?	99
4	What is the volume of a cube with side length three?	27
5	How many ways can you arrange the letters in the word ASSIST?	120
6	Aaron has 3 red, 6 blue, 5 green and 7 yellow pairs of sweat pants. It is a cold day and Aaron wants to wear 2 pairs of sweat pants to keep warm. How many pairs of sweat pants must Aaron must randomly draw to be sure he has two pairs of different colors?	8[pairs of sweat pants]
7	What is the volume of a rectangular solid with height 2, width 3, and height 7?	42
Number ***8*** is an extra question. Only use it if needed.		
8	What is 20% of 15?	3

"Math is Cool" Championships-2002-03

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College Knowledge Bowl Questions #3		
1	What is the median of the following data set: {2,3,4,4,2,5,9,7,3,3,2}?	3
2	What is 58% of 6450?	3741
3	If Joe flips a coin twice, what is the probability that he will get two heads?	1/4
4	The sum of 3 consecutive integers is 75. What is the largest integer?	26
5	What is the area of a trapezoid with bases of 3 and 5 and a height of4?	16
6	Two parrots yell at Lauren every 3 and 5 seconds, respectively. If they start by yelling at Lauren at the same time, how many second will elapse until they yell at Lauren at the same time again?	15[seconds]
7	Find the mean of the following set of data: {7, 3, 5, 9, 6}	6
Number ***8*** is an extra question. Only use it if needed.		
8	Eight horses are running in a race. How many ways can the first, second, and third place be awarded?	336[ways]

"Math is Cool" Championships-2002-03

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6th Grade - February 28, 2003

#3

"Math is Cool" Championships -- 2002-03

6th Grade - February 28, 2003

School Name_____Team #_____

Proctor Name_____Room #_____

Final Score:

Full Name:_____

1st Score

Out of 40

Individual Contest - Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer		
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

	Answer		
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			

"Math is Cool" Championships -- 2002-03

6th Grade - February 28, 2003

School Name_____Team #_____

Proctor Name_____Room #_____

Final Score:

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			
2			
3			
4			
5			
6			
7			
8			
9			

"Math is Cool" Championships -- 2002-03

6th Grade - February 28, 2003

School Name_____Team #_____

Proctor Name_____Room #_____

Final Score:

Team Contest-Score Sheet

1st Score

Out of 10

DO NOT WRITE IN SHADED REGIONS

	Answer		
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

"Math is Cool" Championships -- 2002-03

6th Grade - February 28, 2003

School Name_____Team #_____

Proctor Name_____Room #_____

Final Score:

Mental Math - Score Sheet

1		
2		
3		
4		
1		
2		
3		
4		
1		
2		
3		
4		
1		
2		
3		
4		

"Math is Cool" Championships -- 2002-03

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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	55		
2	20		
3	5.7047		
4	16π		
5	25		
6	3		
7	4		
8	18 [nickels]		
9	14,200		
10	4 [mph]		
11	[$] 27.50		
12	51 [numbers]		
13	25		
14	8		
15	11		
16	39		
17	79/210		
18	16π		
19	4		
20	$\frac{1}{2}$		

	Answer	1 or 0	1 or 0
21	240		
22	60 [ways]		
23	4 a.m.		
24	-2x+14		
25	1/6		
26	55 [handshakes]		
27	10		
28	9/20		
29	Thursday		
30	15		
31	27		
32	60[%]		
33	14		
34	-25/14		
35	0		
36	231		
37	34		
38	10,000		
39	392 [marbles]		
40	1/3		

"Math is Cool" Championships -- 2002-03

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

1. 89 customers
3. 464 customers
4. 66.7%
9. $185,600

"Math is Cool" Championships -- 2002-03

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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	625		
2	30/31[hours]		
3	[$]81		
4	36		
5	12[water bottles]		
6	3		
7	200[push-ups]		
8	15[years]		
9	28		
10	20[miles]		

"Math is Cool" Championships -- 2002-03

6th grade - February 28, 2003

School Name_____Team #_____

Proctor Name_____Room #_____

Key

Relay Contest - Score Sheet

Practice relay
3
8
1
18
Answer for relay #1
54
6
2
8
Answer for relay #2
50
.5 or $\frac{1}{2}$
.5 or $\frac{1}{2}$
1/32

Practice Relay

Answer for person #1	Answer for person #2	Answer for person #3	Answer for person #4
3	8	1	18
1 or 0	1 or 0	1 or 0	2 or 0

Relay #1 Contest

Answer for person #1	Answer for person #2	Answer for person #3	Answer for person #4
54	6	2	8
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
50	.5 or 1/2	.5 or 1/2	1/32
1 or 0	1 or 0	1 or 0	2 or 0