"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Sponsored by: x

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by all involved (competitors and observers). Display of poor sportsmanship may result in disqualification.*
- *Calculators or any other aids may not be used on any portion of this contest.*
- *Unless stated otherwise:*
  - *Express all rational, non-integer answers as common fractions, except in problems dealing with money.*
  - *For problems dealing with money, give the answer as a decimal rounded to the nearest cent.*
  - *For fifth and sixth grade, all fractions and ratios must be reduced to simplest form.*
  - *Do not round or approximate answers.*
  - *Leave answers in terms of π or other irrational quantities (e.g., √2), where applicable.*
- *Units are not necessary as part of your answer unless it is a problem that deals with time, in which case, a.m. or p.m. is required. However, if you choose to use units, they must be correct.*
- *Record all answers on the colored cover sheets in the answer column only.*
- ***Be sure that the name, team number, etc. at the top of every answer sheet has been filled out.***
- *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 be scored as a 0.*

FINAL SCORES AND AWARDS

Individual awards are determined by both the Mental Math and Individual Test scores. Individual ties are broken based on the following, in this order: total scaled individual points, total number of correct answers on the Individual Test, Mental Math raw score, number of correct answers from Individual Test #31-40, number of correct answers from Individual Test #16-30, highest numbered question answered correctly on the Individual Test working backwards from #40.

Team (School) awards are based on the highest score from amongst each of the school's teams-of-4 students in each event and is calculated as 2·(Sum of highest 3 Mental Math scores) + 2·(Multiple Choice) + 6·(Team) + 3·(Relay) + 1·(College Bowl), for approximate weights of 25%, 20%, 30%, 15% and 10% respectively. Team ties are broken based on highest event score in order of the events, starting with Mental Math.

MENTAL MATH TEST - 30 sec./quest., 8 problems, ~8%/25% of individ./team scores

The proctor will read each question twice. You may not do any writing or talking while arriving at a solution. Record only your answer on your answer sheet. You may not change, cross out, erase, or write over an answer once you have written it down. The maximum wait time is 30 seconds after completion of the second reading of the question. Correct answers receive 1 point.

INDIVIDUAL TEST - 35 minutes, 40 problems, ~92% of individual score

When you are prompted to begin, tear off the colored answer sheet and begin testing. No talking during this individual test. You will be given a 5 minute time warning. Correct answers receive 2 points for problems 1-30 and 3 points for 31-40 (in the scaled score).

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 8)*

Room # _____ **School Name** _____ **Student Name** _____ **Team #** _____

Mental Math – ~25% of team score & ~8% of individual score

All students in the room will concurrently be asked the same eight questions in this individual test. When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. ***You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.*** *Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his or her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before the next question is read. You may continue to work on a problem (in your head) while the next question is being read. The raw score is 1 point per correct answer.*

STUDENT: DO NOT WRITE IN SHADED REGIONS (or anywhere else, other than the answer box)

	Answer	Scorer 2 0 or 1	Scorer 1 0 or 1
1			
2			
3			
4			
5			
6			
7			
8			
	TOTAL:		

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Proctor Copy

Mental Math Contest

MENTAL MATH – 30 seconds per question – ~25% of team score & ~8% of individual score

All students in the room will concurrently be asked the same eight questions in this individual test. When it is time to begin, the proctor will read the first question twice. You may not do any writing or talking while arriving at a solution. Once you have a solution, record it on the sheet in front of you. ***You may not change or cross out answers once you have written an answer down. If there are eraser marks, write-overs, or crossed-out answers, they will be marked wrong.*** *Once all students have laid their pencils on the desk, another question will be asked. If a student doesn't lay his or her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before the next question is read. You may continue to work on a problem (in your head) while the next question is being read. The raw score is 1 point per correct answer.*

1	What is the product of 4 and 7?	
2	How many decades are in three centuries?	
3	Anna draws a parallelogram with sides of length 11 centimeters and 6 centimeters. What is the length of the perimeter of this figure?	
4	What is the seventh prime number?	
5	What is the sum of three, plus six, plus eight, plus two, plus one?	
6	What time will it be 80 minutes after 10:39 AM?	
7	The sum of two consecutive odd numbers is 80. What is the smaller of the two numbers?	
8	What is 35 percent of one hundred forty ?	

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

Mental Math Contest – Answer Key

SCORERS — Write-overs, Cross-outs, and Erasures Must be Marked Incorrect (0)

	Answer
1	28
2	30 [decades]
3	34 [cm]
4	17
5	20
6	11:59 AM
7	39
8	49

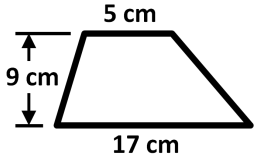
"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Individual Contest

Record all answers on the colored cover sheet. 35 minutes, 40 problems, ~92% of individual score.
No talking during this individual test. A 5-minute time warning will be given.

	Questions 1-30: 2 points each
1	Evaluate: 103 + 482
2	Pizzas come with 8 slices each. How many pizzas must be ordered so that all 12 math club students get the same whole number of slices?
3	Write the letters of the following values in order from smallest to largest (i.e., your answer should be three letters, like: A, B, C) $A = \frac{3}{18}$, $B = \frac{1}{5}$, $C = 0.14$
4	The base of a triangle is 12 units and its height is 7 units. What is the area of the triangle?
5	Puffy the penguin eats 7 fish in 40 seconds. How many fish will Puffy eat in 4 minutes?
6	Maddy buys a lollypop for $1.38 and a box of lemon drops for $2.45. How much change does she receive if she pays with a five-dollar bill? Answer in dollars.
7	Kim bought four packages of jacks. Each package contains 13 jacks. How many jacks does Kim have in all?
8	Solve for the blank value: $4 + 3 \times \underline{\ ?\ } = 19$
9	Dan is writing college admission essays and he has 10 days left to write 30 essays. How many essays does Dan need to write per day?
10	Zalan has 57 gummy worms to share equally between five friends and him. How many gummy worms are left over?
11	What is two-thirds of 3/4 ?
12	What is $4 \times 2 - 3 + 5 \times 8 - 7 + 6$?
13	What is the sum of the number of vertices in a square pyramid and the number of vertices in a pentagonal prism?
14	If today is Tuesday, what day of the week will it be 67 days from today?
15	Evaluate: $2^5 - 5^2$

16	Counting from the front, Kiara is 31st in line for the new Parry Hotter movie. And she is the 42nd person in the line when counting from the back of the line. How many people are in the line?
17	What is the least common multiple of 6 and 14?
18	What is the median of the following set of numbers: {12, 72, 21, 41, -7, 53, 109, 156} ?
19	What is the probability of getting exactly two heads when three fair coins are flipped?
20	Kailyn has 4 different blouses, 3 pair of different-colored ripped jeans, and 5 different pairs of fancy shoes. If an outfit consists of a blouse, a pair of jeans, and a pair of shoes, how many outfits can Kailyn make?
21	How many feet are in 13 yards?
22	What is the 23rd term of the arithmetic sequence that starts: 5, 11, 17, 23, …
23	Eddie and Melinda are volunteering at the Fixer-upper Hospital. Eddie can check in 1 patient every 10 minutes, whereas Melinda can check in 1 patient every 15 minutes. Working together, how many patients do they check in over their 4-hour shift?
24	Fill in the blank with the largest possible positive number such that the following inequality is still true: $\_\_ \times 7 < 32$.
25	Ethan is cutting a metal rod into 23 pieces. If it takes 4 minutes to make 1 cut, how many minutes will it take to make all of the cuts?
26	The ratio of boys to girls at a school is 3 to 5. If there are a total of 96 children, how many girls are there at the school?
27	If 14 osh equal 6 gosh, 18 gosh equals 7 bosh, and 5 bosh equals 2 posh, then how many osh equal 5 posh?
28	Fourteen of the math team members like squares, while twelve members like circles, and six members like both shapes. If everyone likes at least one shape, how many math team members are there?
29	Evaluate: $\frac{5}{13} \times \frac{3}{20}$
30	What is the area of the trapezoid shown in the figure? 

Continued on Next Page

Challenge Questions: 3 points each	
31	Connar was adding the numbers 61 through 80, inclusive. He made a mistake and got an answer of 1300. What is the positive difference between the correct answer and Connar's answer?
32	Meghan is 14 years old. Her mom is 3 times her age. Ten years from now, what is the ratio of Meghan's age to her mom's age? Write your answer as a reduced fraction.
33	How many ways can you arrange the letters in the name 'ANGELA' ?
34	Given that $a \varphi b = a^2 - 3 \times b$, what is the value of $12 \varphi 7$?
35	Annalisa went to the store and spent twice as much money buying pencils as she spent on erasers. Pencils cost $2.50 each. If Annalisa spent a total of $30.00, how many pencils did she buy?
36	A cube is painted with a different color on each face. The cube is then cut into 64 smaller cubes, each the same size. How many of the smaller cubes have more than one color of paint on them?
37	Rose has a very thick, fair coin which is like a regular coin, but it lands on its edge 1/5 of the time. If Rose flips this coin twice, what is the probability that she gets 2 heads?
38	Nine workers can build a house in 18 days. How many days does it take twelve workers to build two houses?
39	If it takes John 24 minutes to build a model train, and it takes Titus 40 minutes to build the same model train, how many minutes would it take them if they worked together?
40	If the average of 5 different positive whole numbers is 100, and the largest of the numbers is 113, what is the least possible value that the smallest of the other 4 numbers could take?

"Math Is Cool" Championships – 2016-17

Total Correct (all columns)

Room # _____ SCHOOL NAME _____ STUDENT NAME _____ Team # _____

Individual Contest – Score Sheet

STUDENTS: DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
31-40 TOTAL:			

4th Grade

April 21, 2017

Scorers: Just score as 0 or 1 and add up those values (i.e., just work with number correct).

"Math Is Cool" Championships – 2016-17

KEY

Individual Contest – Answer Key

SCORERS: Just score as 0 or 1 and add up those values to reflect total correct. First Scorer use the right-hand columns.

	Answer
1	585
2	3 [pizzas]
3	C, A, B (in that order)
4	42 [units^2]
5	42 [fish]
6	[$] 1.17
7	52 [jacks]
8	5
9	3 [essays]
10	3 [gummy worms]
11	1/2
12	44
13	15 [vertices]
14	Saturday
15	7

	Answer
16	72 [people]
17	42
18	47
19	3/8
20	60 [outfits]
21	39 [feet]
22	137
23	40 [patients]
24	4
25	88 [minutes]
26	60 [girls]
27	75 [osh]
28	20 [members]
29	15/260 or 3/52
30	99 [cm^2]

	Answer
31	110
32	6/13
33	360 [ways]
34	123
35	8 [pencils]
36	32 [cubes]
37	4/25
38	27 [days]
39	15 [minutes]
40	54

4th Grade

April 21, 2017

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Team Multiple Choice Contest

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #1 THROUGH #4.

The Wong family is taking a road trip from Seattle to Los Angeles and the family makes stops overnight in Portland and San Francisco. Information about the trip is shown in the table.

Day of week	**Cities**	**Departure time**	**Arrival time**	**Distance** (miles)	**Average Speed** (mph)
Saturday	Seattle to Portland	8:45 AM	12:15 PM	175	
Sunday	Portland to San Francisco	9:30 AM	7:00 PM		66
Monday	San Francisco to Los Angeles	9:05 AM		357	59.5

1. What is the distance, in miles, between Portland and San Francisco?

   A) 597 B) 613 C) 627 D) 634 E) Answer Not Given

2. What time in the afternoon (PM) did the family arrive in Los Angeles?

   A) 3:00 B) 3:05 C) 3:10 D) 3:15 E) Answer Not Given

3. What was the average speed, in mph, from Seattle to Los Angeles?

   A) 61 B) 62 C) 63 D) 64 E) Answer Not Given

4. The Wong family car gets a fuel economy of 30.5 miles per gallon of gasoline. How many gallons of gasoline will does it take for the Wong family car to make the entire trip from Seattle to Los Angeles?

   A) 32 B) 34 C) 36 D) 37 E) 38

Continued on Back Side

ANSWER QUESTIONS #5 THROUGH #7.

5 How many days are BETWEEN (i.e., not including) Election Day on November 8th of 2016 and Inauguration Day on January 20th of 2017?

A) 62 B) 69 C) 71 D) 73 E) Answer Not Given

6 What is the measure of one of the interior angles of a regular pentagon?

A) 72° B) 108° C) 120° D) 135° E) Answer Not Given

7 If P and Q are digits such that PQ + QP = 99, then what is the maximum possible value of P×Q?

A) 8 B) 12 C) 18 D) 20 E) 22

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #8 THROUGH #10.

Tofu comes in a rectangular block measuring 7 inches by 5 inches by 3 inches. Additional information for one serving is listed in the table below.

Attribute	Amount per Serving	% Daily Value*	Attribute	Amount per Serving	% Daily Value*
Fat	4 g	6 %	Sodium	10 mg	
Saturated Fat	0.5 g		Potassium	125 mg	4%
Trans Fat	0 g		Carbohydrates	2 g	
Polyunsaturated Fat	2.5 g		Fiber	1 g	5%
Monounsaturated Fat	1 g		Sugar	0 g	
Cholesterol	0 mg		Protein	7 g	14%

* Percentage of typical daily dietary intake.

8 What fraction of the total fat in one serving is polyunsaturated fat?

A) 1/4 B) 1/8 C) 2/3 D) 5/8 E) Answer Not Given

9 How many grams (g) of protein would a person consume daily in a typical diet?

A) 98 B) 50 C) 49 D) 21 E) Answer Not Given

10 The nutrition information states that one serving is a "1-inch slice." Which of the following is NOT a possible volume of a 1-inch slice cut from the block of tofu with a single cut?

A) 15 B) 21 C) 27 D) 35 E) Answer Not Given

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 20)*

Room # _____ **School Name** _____ **Team #** _____

Team Multiple Choice Contest – 15 minutes – ~20% of team score

This test is the only test where you will be penalized for incorrect responses. You will receive two points for a correct letter response, zero points for leaving it blank and minus one point for an incorrect response. When you are prompted to begin, tear off the colored answer 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 this answer sheet.***

Correct responses are worth 2 points, incorrect responses are worth -1 point, and absence of a response is worth 0 points.

STUDENTS: DO NOT WRITE IN SHADED REGIONS

	Answer	Scorer 2 -1, 0, or 2	Scorer 1 -1, 0, or 2
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	TOTAL:		

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

Team Multiple Choice Contest – Answer Key

This test is the only test where you will be penalized for incorrect responses. You will receive two points for a correct letter response, zero points for leaving it blank and minus one point for an incorrect response. When you are prompted to begin, tear off the colored answer 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 this answer sheet.***

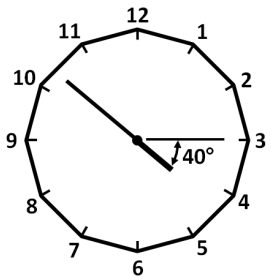
Correct responses are worth 2 points, incorrect responses are worth -1 point, and absence of a response is worth 0 points.

	Answer
1	C
2	B
3	A
4	E
5	E (72 [days])
6	B
7	D
8	D
9	B
10	C

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Team Contest

1	Mr. Henderson is hiking up Mt. Mathazooma, which is 25,000 feet tall. If Mr. Henderson climbs at a steady rate of 3,000 feet every hour, what percent of the mountain will he have climbed in five hours?
2	I bought an amazing Math is Cool T-Shirt from the concession stand here at Math Is Cool, and I bought one for you too! They cost $10 apiece before the 8% sales tax. If you give me a $10 bill, how much more, in dollars, will you owe me?
3	What is the greatest quantity of composite numbers between two consecutive 2-digit primes?
4	What is the remainder when 75,697 is divided by 4?
5	Michelle loves money, so she opens a brand new bank account on January 1, 2017 and she puts $5 in her bank account every day. On December 31, 2017 at midnight, the bank gives her an additional 10% on her balance. How many dollars are in her account on January 1 just after midnight?
6	Write 0.189189189189… as a simplified common fraction.
7	The teacher asked Christopher a mental math problem: take a certain number, subtract 4, and then divide by 7. However, Chris got confused and subtracted 7 then divided by 4 to get a result of 15. If he had worked the problem correctly, what would have been his answer?
8	One endpoint of a particular line segment is at point (-2, 1) on a coordinate grid and the midpoint is at point (8, 1). As an ordered pair, (x, y), what are the coordinates of the other endpoint?
9	Gabe and Maya are throwing water balloons at a target. If Gabe has a 30% chance of hitting the target, and Maya has a 50% chance of hitting the target, what is the probability that they both hit the target? Answer as a percent.
10	Biff has a wonky watch. While playing racquetball with Eho, Biff's watch took a hit that bumped the minute hand cogs out of alignment. Now his watch reads the wrong minutes, but the hour hand is correct. What is the correct time in the afternoon when Biff's hour hand is 40 degrees clockwise away from horizontal, as shown in the figure? 

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 10)*

Room # _____ **School Name** _____ **Team #** _____

Team Contest – 15 minutes – ~30% of team score

When you are prompted to begin, tear off the colored answer sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as a 1 or 0. Record all answers on this colored answer sheet.

STUDENTS: DO NOT WRITE IN SHADED REGIONS

	Answer	Scorer 2 0 or 1	Scorer 1 0 or 1
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

Team Contest – Answer Key

	Answer
1	60 [percent]
2	[$] 0.80
3	7
4	1
5	[$] 2007.50
6	7/37
7	9
8	(18, 1)
9	15 [percent]
10	4:20 PM

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Robert Dirks' Relay Contest – Questions & Key

RELAYS - 2 relays, 5 minutes per relay, 4 problems per relay, ~15% of team score

There is no talking during this event and you must always be facing forward. The proctor will hand out a strip of paper to each person containing problem(s). These need to remain 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, but first make sure you have the right person number. Person #1 receives a full problem to solve. Questions 2-4 will be missing a number and will show the acronym "TNYWG" (meaning "the number you will get") as a placeholder in the problem statement. The answer for the previous question (i.e., received from the teammate in front of you) should be inserted into the problem statement in place of "TNYWG." Person #1 will have problem #1 on his/her paper. Person #2 will have problems #1 and #2 printed on his/her paper. Person #3 will have problems #2 and #3 on his/her paper and Person #4 will have problems #3 and #4 on his/her paper. You may write on the strip of paper to come up with answers to the problems on your strip of paper. However, when person #1 figures out his/her problem, he/she will record ONLY his/her final answer on the answer sheet and pass only the answer sheet back (without turning around) to the person #2. Person #2 has the option of changing Person #1's answer if he/she wants, by crossing it out and putting a new answer. Once Person #2 records at least an answer for problem #2 on the answer sheet, he/she passes only the answer sheet behind to Person #3. Repeat these steps until person #4 puts an answer on the answer sheet and gives it to the proctor. Teams with only three members can position themselves in positions 2-4 and thus provide answers for all four problems. The raw score will be 1 point for correct answers to problems 1-3 and 2 points for question 4. Any non-answer text (i.e., scratch work or notes) on the answer sheet will result in a score of 0 for the entire relay.

Robert Dirks' Relay Practice		**Answer**
Quest. 1	What is the quotient when 21 is divided by 7?	3
Quest. 2	What is two to the TNYWG power ?	8
Quest. 3	What number is TNYWG more than 15?	23
Quest. 4	What is TNYWG minus 25?	-2
Robert Dirks' Relay #1		**Answer**
Quest. 1	Evaluate: 960 / 60 / 2	8
Quest. 2	Adam is making a triangle with two sides of length TNYWG inches and 3 inches. What is the largest whole number length possible for the third side?	10 [inches]
Quest. 3	Big Vince can write 30 problems in 15 minutes. Jun can write 20 problems in TNYWG minutes. If they write questions at a constant rate and are paid $3 per problem, how much money will they make together in one hour?	[$] 720
Quest. 4	What is TNYWG divided by the number of quarters needed to make $11.25?	16
Robert Dirks' Relay #2		**Answer**
Quest. 1	Evaluate: 8 × 12/16 + 11 × 2	28
Quest. 2	How many positive factors does TNYWG have?	6 [factors]
Quest. 3	What is the arithmetic mean (average) of the following set of numbers: {4, 9, 13, 16, 36, TNYWG}?	14
Quest. 4	Lilly is making an outline in gold filament for a right triangle with whole number side lengths. The gold filament costs TNYWG dollars per inch length of filament. Lilly has completed the 12-inch side and the 15-inch side. How much will it cost to complete the third side?	[$] 126

"Math Is Cool" Championships — 2016-17

Robert Dirks' RELAY INSTRUCTIONS – 5 min. per relay – ~15% of team score

Tear off this sheet and fill out the top portion of all the answer sheets in this packet.

There is no talking during this event and you must always be facing forward. The proctor will hand out a strip of paper to each person containing problem(s). These need to remain 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, but first make sure you have the right person number. Person #1 receives a full problem to solve. Questions 2-4 will be missing a number and will show the acronym "TNYWG" (meaning "the number you will get") as a placeholder in the problem statement. The answer for the previous question (i.e., received from the teammate in front of you) should be inserted into the problem statement in place of "TNYWG." Person #1 will have problem #1 on his/her paper. Person #2 will have problems #1 and #2 printed on his/her paper. Person #3 will have problems #2 and #3 on his/her paper and Person #4 will have problems #3 and #4 on his/her paper. You may write on the strip of paper to come up with answers to the problems on your strip of paper. However, when person #1 figures out his/her problem, he/she will record ONLY his/her final answer on the answer sheet and pass only the answer sheet back (without turning around) to the person #2. Person #2 has the option of changing Person #1's answer if he/she wants, by crossing it out and putting a new answer. Once Person #2 records at least an answer for problem #2 on the answer sheet, he/she passes only the answer sheet behind to Person #3. Repeat these steps until person #4 puts an answer on the answer sheet and gives it to the proctor. Teams with only three members can position themselves in positions 2-4 and thus provide answers for all four problems. The raw score will be 1 point for correct answers to problems 1-3 and 2 points for question 4. Any non-answer text (i.e., scratch work or notes) on the answer sheet will result in a score of 0 for the entire relay.

"Math Is Cool" Championships — 2016-17

Robert Dirks' RELAY INSTRUCTIONS – 5 min. per relay – ~15% of team score

Tear off this sheet and fill out the top portion of all the answer sheets in this packet.

There is no talking during this event and you must always be facing forward. The proctor will hand out a strip of paper to each person containing problem(s). These need to remain 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, but first make sure you have the right person number. Person #1 receives a full problem to solve. Questions 2-4 will be missing a number and will show the acronym "TNYWG" (meaning "the number you will get") as a placeholder in the problem statement. The answer for the previous question (i.e., received from the teammate in front of you) should be inserted into the problem statement in place of "TNYWG." Person #1 will have problem #1 on his/her paper. Person #2 will have problems #1 and #2 printed on his/her paper. Person #3 will have problems #2 and #3 on his/her paper and Person #4 will have problems #3 and #4 on his/her paper. You may write on the strip of paper to come up with answers to the problems on your strip of paper. However, when person #1 figures out his/her problem, he/she will record ONLY his/her final answer on the answer sheet and pass only the answer sheet back (without turning around) to the person #2. Person #2 has the option of changing Person #1's answer if he/she wants, by crossing it out and putting a new answer. Once Person #2 records at least an answer for problem #2 on the answer sheet, he/she passes only the answer sheet behind to Person #3. Repeat these steps until person #4 puts an answer on the answer sheet and gives it to the proctor. Teams with only three members can position themselves in positions 2-4 and thus provide answers for all four problems. The raw score will be 1 point for correct answers to problems 1-3 and 2 points for question 4. Any non-answer text (i.e., scratch work or notes) on the answer sheet will result in a score of 0 for the entire relay.

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 5)*

Room # _____ **School Name** _____ **Team #** _____

ROBERT DIRKS' RELAY — PRACTICE ROUND

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
0 or 1	0 or 1	0 or 1	0 or 2
Proctor — (circle value)	Proctor — (circle value)	Proctor — (circle value)	Proctor — (circle value)

Fill in your answer and pass this sheet back to the next person without turning around.
No scratch work is allowed on this answer sheet.

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 5)*

Room # _____ **School Name** _____ **Team #** _____

ROBERT DIRKS' RELAY — PRACTICE ROUND

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
0 or 1	0 or 1	0 or 1	0 or 2
Proctor — (circle value)	Proctor — (circle value)	Proctor — (circle value)	Proctor — (circle value)

Fill in your answer and pass this sheet back to the next person without turning around.
No scratch work is allowed on this answer sheet.

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 5)*

Room # _____ **School Name** _____ **Team #** _____

ROBERT DIRKS' RELAY #1

Answer for question # 1		Answer for question # 2		Answer for question # 3		Answer for question # 4	
0 or 1		0 or 1		0 or 1		0 or 2	
Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)

Fill in your answer and pass this sheet back to the next person without turning around.
No scratch work is allowed on this answer sheet.

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 5)*

Room # _____ **School Name** _____ **Team #** _____

ROBERT DIRKS' RELAY #1

Answer for question # 1		Answer for question # 2		Answer for question # 3		Answer for question # 4	
0 or 1		0 or 1		0 or 1		0 or 2	
Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)

Fill in your answer and pass this sheet back to the next person without turning around.
No scratch work is allowed on this answer sheet.

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 5)*

Room # **School Name** **Team #**

ROBERT DIRKS' RELAY #2

Answer for question # 1		Answer for question # 2		Answer for question # 3		Answer for question # 4	
0 or 1		0 or 1		0 or 1		0 or 2	
Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)

Fill in your answer and pass this sheet back to the next person without turning around.
No scratch work is allowed on this answer sheet.

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Final Score *(out of 5)*

Room # **School Name** **Team #**

ROBERT DIRKS' RELAY #2

Answer for question # 1		Answer for question # 2		Answer for question # 3		Answer for question # 4	
0 or 1		0 or 1		0 or 1		0 or 2	
Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)	Scorer 1 (circle value)	Scorer 2 (checkmark)

Fill in your answer and pass this sheet back to the next person without turning around.
No scratch work is allowed on this answer sheet.

Robert Dirks' Relay Practice – Person 1	
Question 1	What is the quotient when 21 is divided by 7?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay Practice – Person 1	
Question 1	What is the quotient when 21 is divided by 7?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay Practice – Person 2	
Question 1	What is the quotient when 21 is divided by 7?
Question 2	What is two to the TNYWG power ?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay Practice – Person 2	
Question 1	What is the quotient when 21 is divided by 7?
Question 2	What is two to the TNYWG power ?

Robert Dirks' Relay Practice – Person 3	
Question 2	What is two to the TNYWG power ?
Question 3	What number is TNYWG more than 15?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay Practice – Person 3	
Question 2	What is two to the TNYWG power ?
Question 3	What number is TNYWG more than 15?

Robert Dirks' Relay Practice – Person 4	
Question 3	What number is TNYWG more than 15?
Question 4	What is TNYWG minus 25?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay Practice – Person 4	
Question 3	What number is TNYWG more than 15?
Question 4	What is TNYWG minus 25?

Robert Dirks' Relay #1 – Person 1	
Question 1	Evaluate: 960 / 60 / 2

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #1 – Person 1	
Question 1	Evaluate: 960 / 60 / 2

Robert Dirks' Relay #1 – Person 2	
Question 1	Evaluate: 960 / 60 / 2
Question 2	Adam is making a triangle with two sides of length TNYWG inches and 3 inches. What is the largest whole number length possible for the third side?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #1 – Person 2	
Question 1	Evaluate: 960 / 60 / 2
Question 2	Adam is making a triangle with two sides of length TNYWG inches and 3 inches. What is the largest whole number length possible for the third side?

Robert Dirks' Relay #1 – Person 3	
Question 2	Adam is making a triangle with two sides of length TNYWG inches and 3 inches. What is the largest whole number length possible for the third side?
Question 3	Big Vince can write 30 problems in 15 minutes. Jun can write 20 problems in TNYWG minutes. If they write questions at a constant rate and are paid $3 per problem, how much money will they make together in one hour?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #1 – Person 3	
Question 2	Adam is making a triangle with two sides of length TNYWG inches and 3 inches. What is the largest whole number length possible for the third side?
Question 3	Big Vince can write 30 problems in 15 minutes. Jun can write 20 problems in TNYWG minutes. If they write questions at a constant rate and are paid $3 per problem, how much money will they make together in one hour?

Robert Dirks' Relay #1 – Person 4	
Question 3	Big Vince can write 30 problems in 15 minutes. Jun can write 20 problems in TNYWG minutes. If they write questions at a constant rate and are paid $3 per problem, how much money will they make together in one hour?
Question 4	What is TNYWG divided by the number of quarters needed to make $11.25?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #1 – Person 4	
Question 3	Big Vince can write 30 problems in 15 minutes. Jun can write 20 problems in TNYWG minutes. If they write questions at a constant rate and are paid $3 per problem, how much money will they make together in one hour?
Question 4	What is TNYWG divided by the number of quarters needed to make $11.25?

Robert Dirks' Relay #2 – Person 1	
Question 1	Evaluate: 8 × 12/16 + 11 × 2

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #2 – Person 1	
Question 1	Evaluate: 8 × 12/16 + 11 × 2

Robert Dirks' Relay #2 – Person 2	
Question 1	Evaluate: $8 \times 12/16 + 11 \times 2$
Question 2	How many positive factors does TNYWG have?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #2 – Person 2	
Question 1	Evaluate: $8 \times 12/16 + 11 \times 2$
Question 2	How many positive factors does TNYWG have?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #2 – Person 3	
Question 2	How many positive factors does TNYWG have?
Question 3	What is the arithmetic mean (average) of the following set of numbers: {4, 9, 13, 16, 36, TNYWG}?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #2 – Person 3	
Question 2	How many positive factors does TNYWG have?
Question 3	What is the arithmetic mean (average) of the following set of numbers: {4, 9, 13, 16, 36, TNYWG}?

Robert Dirks' Relay #2 – Person 4	
Question 3	What is the arithmetic mean (average) of the following set of numbers: {4, 9, 13, 16, 36, TNYWG}?
Question 4	Lilly is making an outline in gold filament for a right triangle with whole number side lengths. The gold filament costs TNYWG dollars per inch length of filament. Lilly has completed the 12-inch side and the 15-inch side. How much will it cost to complete the third side?

"Math Is Cool" Championships — 2016-17, 4th Grade — April 21, 2017

Robert Dirks' Relay #2 – Person 4	
Question 3	What is the arithmetic mean (average) of the following set of numbers: {4, 9, 13, 16, 36, TNYWG}?
Question 4	Lilly is making an outline in gold filament for a right triangle with whole number side lengths. The gold filament costs TNYWG dollars per inch length of filament. Lilly has completed the 12-inch side and the 15-inch side. How much will it cost to complete the third side?

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Room #	School Name	Team #

Total Score for Each Round

College Bowl #1 (10 Possible)	College Bowl #2 (10 Possible)	College Bowl #3 (10 Possible)

DO NOT USE TALLY MARKS

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Room #	School Name	Team #

Total Score for Each Round

College Bowl #1 (10 Possible)	College Bowl #2 (10 Possible)	College Bowl #3 (10 Possible)

DO NOT USE TALLY MARKS

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

Robert Dirks' Relay Contest – Answer Key

(Proctor — Hide this Key from View of Competitors)

ROBERT DIRKS' RELAY — PRACTICE ROUND

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
3	8	23	-2

ROBERT DIRKS' RELAY #1

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
8	10 [inches]	[$] 720	16

ROBERT DIRKS' RELAY #2

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
28	6 [factors]	14	[$] 126

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round #1

#	Problem	Answer
1	Five penguins live on an iceberg. Each penguin hugs each other penguin exactly one time. How many hugs take place?	10 [hugs]
2	What is the probability of getting 2 heads when you flip 2 coins?	1/4
3	What is the largest remainder possible when you divide a number by 6?	5
4	The first four terms of an arithmetic sequence are 3, 10, 17, and 24. What is the next number in the sequence?	31
5	What is the degree measure of the exterior angle of a hexagon?	60 [degrees]
6	How many seconds are in 1.4 minutes?	84 [seconds]
7	What is the least number of factors that a composite number can have?	3
8	Lee has nickels and dimes in his pocket. If he has 40 cents altogether and a total of 5 coins, how many nickels does he have?	2 [nickels]
9	What is the area of a right triangle with legs of 8 and 25?	100
10	How many numbers between 20 and 30 are prime?	2 [numbers]

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round #2

#	Problem	Answer
1	What is the product of the number of sides of a hexagon and the number of faces on a cube?	36
2	What is the quotient when eight is divided by one-fourth?	32
3	If three angles of a quadrilateral are 28, 102, and 95 degrees, what is the degree measure of the fourth angle?	135 [degrees]
4	If there are cows and chickens in a field, and Eho counts 36 legs and 15 heads, how many cows are there for Biff to milk?	3 [cows]
5	What is the range of the following set of numbers: 13, 1, 17, 5, 21, and 9 ?	20
6	What is the greatest common factor of 14 and 56?	14
7	In a class of 30 students, 60% are boys. How many girls are in the class?	12 [girls]
8	What is the square root of the number of lives that a cat is said to have?	3
9	What is the remainder when you divide 173 by 17?	3
10	What is the smallest distinct factor of two-hundred forty?	1

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round #3

#	Problem	Answer
1	What is the product of the greatest one-digit prime number and the smallest two-digit prime number?	77
2	For a math quiz, Manasi numbered the lines of her paper from 1 through 15. How many digits did Manasi write?	21 [digits]
3	What common fraction is 50% less than 5/8 ?	5/16
4	A dozen jars of taco sauce fit in a shipping box. A factory has an order for 420 jars of taco sauce. How many boxes will they need for this order?	35 [boxes]
5	How many cubes 3 centimeters on each edge will it take to fill a rectangular box that is 9 centimeters by 6 centimeters by 6 centimeters?	12 [cubes]
6	If Eho counts backwards from 100 by 7's, what is the last positive number that he says?	2
7	The slow train from New York to Chicago covers the eight hundred miles at a steady sixteen miles per hour. How many hours does the trip take?	50 [hours]
8	A recipe calls for two and one-third cups of flour, two eggs, and one and one-half cups of milk to make a batch of 11 pancakes. How many cups of flour will it take to make 33 pancakes?	7 [cups]
9	If you have 3 dollars, and pencils cost 38 cents each, how many pencils can you buy?	7 [pencils]
10	How many nickels are in one dollar and twenty-five cents?	25 [nickels]

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round #4

#	Problem	Answer
1	How many feet are in two yards?	6 [feet]
2	Find the sum of the positive integer factors of 12.	28
3	What is 14% of 150?	21
4	The product of two consecutive whole numbers is 56. What is the sum of these two consecutive numbers?	15
5	If 7 people shake hands with each other once, how many handshakes occur?	21 [handshakes]
6	How many lines of symmetry does a regular hexagon have?	6 [lines]
7	What is the difference between 29 and 18?	11
8	What number do you get when you start with 13, triple it, add 7, and add 1971?	2017
9	When rolling two fair, six-sided dice, what is the probability of rolling a sum of seven?	1/6
10	What is the ones digit of the product of the first twenty prime numbers?	0

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round #5

#	Problem	Answer
1	There are an equal number of chickens, ducks, and pigs in Farmer McCoy's barn. If a total of 104 legs are counted, how many pigs are in the barn?	13 [pigs]
2	Twelve people entered a room. Three more than two-thirds of these people then left. How many people remain in the room?	1 [person]
3	What is the sum of: positive twelve, negative thirty-three, positive twenty, and negative five?	-6
4	What would be your cost if you were offered a 20% discount on a 600-dollar diamond?	480 [dollars]
5	Lucy has 2 fair, six-sided dice. What is the probability that she rolls a sum of 8?	5/36
6	The length of one side of a regular hexagon is 30 cm. What is the perimeter of the hexagon?	180 [cm]
7	What is the result when you multiply twelve times twelve and then divide that by six?	24
8	How many ways can you arrange the letters in the word "PIZZA"?	60 [ways]
9	David is four times as old as Anna, who is one-third as old as Elizabeth. If Elizabeth is 18, how old is David?	24 [years old]
10	What is the sum of the number of faces, edges, and vertices of a triangular pyramid?	14

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round #6

#	Problem	Answer
1	What is the sum of the number of days in August, April, and October?	92 [days]
2	How many sides does a heptagon have?	7 [sides]
3	What is the arithmetic average of the set {5, 6, 8, 9, 9, 11}?	8
4	If Mary rides her moped at a constant 24 miles per hour, how many **minutes** will it take her to travel 102 miles?	255 [minutes]
5	What is the maximum number of points of intersection between a circle and a triangle?	6 [intersections]
6	The sum of two numbers is 45 and their difference is 17. What is the smaller of the two numbers?	14
7	Given the number seven thousand one hundred twenty-three point four five six, what is the digit in the hundredths place?	5
8	An isosceles triangle has two sides of equal length that meet to form a vertex angle of 96 degrees. What is the degree measure of one of the other angles in the triangle?	42 [degrees]
9	What is the number of minutes between 2:37 pm and 3:23 pm on the same day?	46 [minutes]
10	The ratio of boys to girls in the Math Knowdown contest is 7:11. If there are 72 participants, how many girls are participating?	44 [girls]

"Math Is Cool" Championships — 2016-17

4th Grade — April 21, 2017

Key

College Knowledge Bowl Round — EXTRA Qs

#	Problem	Answer
1	What is the remainder when two-hundred ninety-seven is divided by seven?	3
2	What is the sum of the positive, even, whole numbers less than twenty?	90
3	How many seconds are in one day?	86400 [s]
4	How many faces does a tetrahedron have?	4 [faces]
5	What is thirteen less than one-thousand seven?	994
6	If there are eight pencils in each box, how many pencils are in eighty boxes?	640 [pencils]