"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Sponsored by: x

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by <u>all</u> 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 — 2017-18

4th Grade — March 16, 2018

Final Score *(out of 8)*

Room #	School Name	Student Name	Team #

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

Error! Reference source not found.

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 — 2017-18

4th Grade — March 16, 2018

Proctor Copy

Mental Math Contest

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

Error! Reference source not found.

1	What is the sum of three, five, and seven?	
2	What is the length of the perimeter for a rectangle with side lengths of 9 and 5?	
3	An arithmetic sequence starts with 2, 5, and 8. What is the next number in the sequence?	
4	How many feet are in 9 yards?	
5	What is five sevenths of 28?	
6	What is the smallest prime number larger than 50?	
7	What is the average of the numbers 6, 8, and 16?	
8	If you have 3 quarters, 2 dimes, 4 nickels, and 6 pennies, how many cents do you have?	

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

Mental Math Contest – Answer Key

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

	Answer
1	15
2	28
3	11
4	27 [feet]
5	20
6	53
7	10
8	121 [cents]

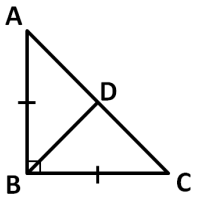
"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

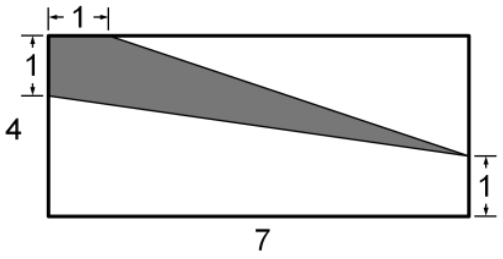
Individual Contest

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	What is the sum of 7 and 44?
2	Round 7128.1548 to the nearest thousand.
3	How many different (unique) letters are in the name BOONPONGMANEE?
4	Find the number that goes in the blank: __ + 17 = -3
5	Write the fraction 7/50 as a percentage.
6	Kai preheats the oven for 15 minutes, and then bakes his apple pie at 450 degrees for 10 minutes. Then he reduces the temperature to 350 degrees for 30 minutes. How many total minutes is the oven on in the process of Kai's cooking?
7	What is the average of 3, 20, and 25?
8	If I randomly pick one day out of a week, what is the probability, as a percentage, that the English name of the day ends in the letter 'Y'?
9	If a pack of gum costs $1 and contains 15 sticks of gum, how many dollars will 45 sticks of gum cost?
10	There are 5 giraffes in the "Biff and Eho Zoo." Each giraffe eats 75 pounds of leaves every day. How many total pounds of leaves do the giraffes eat in a week?
11	Kylo Ren, Captain Phasma, and three identical First Order Stormtroopers line up. If Kylo Ren insists on being first, how many different ways can the five of them line up?
12	Parker and Brendan go fishing. Brendan catches 3 fish for every 2 fish that Parker catches. If Parker caught 38 fish, how many did Brendan catch?
13	Evaluate: 11,111 × 11
14	Abe earns $6 per week by doing yard work. He has $5 saved, and wants to buy a game that costs $33, including tax. How many weeks will it take him to earn the money needed to buy the game?
15	To stay at a healthy weight, cats should eat 30 calories per day for each pound that they weigh. Using this guideline, how many calories per day should a 9-pound cat eat?
16	The hungry caterpillar takes one bite out of a leaf on Monday, two bites on Tuesday, three bites on Wednesday, and so on, until Sunday when he rests and doesn't eat anything. How many bites total does he eat in one week of eating like this?

17	Nikhil can decorate a Christmas tree at a rate of 3 ornaments per minute. Subha can decorate a Christmas tree at a rate of 6 ornaments per minute. A fully decorated Christmas tree has 36 ornaments. How many SECONDS will it take Nikhil and Subha to fully decorate their Christmas tree, if they work together?
18	What time will it be 566 minutes after 4:20 A.M.?
19	2.34×10^3 is written in scientific notation. Write this number as a whole number in standard notation.
20	In the right triangle shown, point D is the midpoint of the hypotenuse. If side BC = 10, find the area of triangle ADB. 
21	Two mice are racing around the edges of a 2-ft by 2-ft square, starting at the same corner (vertex) and both going in a clockwise direction. One mouse travels at a constant rate of 1 foot per second, and the 2nd mouse travels twice as fast. After 22 seconds, how far apart are the mice?
22	What is the median of the following data set: {12, 25, 21, 15, 13, 19}
23	Alana is always Snapchatting Jaden and has 11 filter options from which she randomly selects. As a common fraction, what is the probability that she chooses the dog filter or the flower crown filter?
24	How many prime numbers are between 66 and 88?
25	Abum takes a 5×5 grid of unit squares and draws two diagonals to connect opposite corners. Altogether, through how many unit squares do the two diagonals pass?
26	When the month, day, and two-digit year are written in the form m/d/yy (i.e., without extra zeros), some dates form palindromes, which read the same way forwards and backwards (ignoring the slashes). 8/14/18 is one example of a palindrome date. What is the total number of palindrome dates that will occur in 2018 (including the example listed)?
27	Biff and Eho go to the movies. They spend a total of $9.42 at the movies, paying together with a $10 bill, and they get their change in coins. Biff says, "Great! I got three coins from the change!" Eho replies, "I got three coins too, but they're all pennies." In cents, how much is the smallest value coin received by Biff worth?
28	Vincent is a fidget spinner master. While Edward can spin a gadget spinner 500 times per minute, Vincent can make it spin 25% faster than Edward. How many spins does Vincent get per minute?
29	If a tree sprout is 2 inches tall today, and the tree grows at an average rate of 1.3 inches per month, how many inches tall will the tree be five years from today?
30	Three different whole numbers (A, B, and C) make the equation $A \times B = C$ true. What is the smallest possible sum of $A + B + C$?

Continued on Next Page

Challenge Questions: 3 points each	
31	When two fair, six-sided dice are rolled, what is the probability that neither die shows a six? Answer as a common fraction.
32	I am thinking of a number N, such that the least common multiple of N and 7 is 91. What is the smallest possible value of N?
33	9 Doggos equal 12 Puppers, 4 Puppers equal 10 Leos and 8 Leos equal 7 Giras. How many Giras are equal to 24 Doggos?
34	If A@B is defined as $A@B = [(A + B)/(A - B)]^2$, then what is the value of 1@2 ?
35	The sum of two numbers is 109 and their difference is 43. What is the smaller of the two numbers?
36	Viknesh rides his bike from his house to school every day, taking him 15 minutes to get to school in the morning. When Callum gives him a ride home at the end of the day, the trip only takes 3 minutes. If Callum drives an average speed of 40 miles per hour (mph), how fast, in mph, does Viknesh bike to school?
37	Three distinct counting numbers have an average of 10. What is the largest possible value of the median for these three numbers? Recall that counting numbers don't include zero.
38	What is the area of the shaded region of the 4 by 7 rectangle at right? 
39	How many unique groupings of 3 students can a teacher make from her class of 21 students?
40	Evaluate: $\dfrac{1}{\dfrac{1}{\dfrac{1}{\frac{1}{4}+\frac{1}{4}}+\dfrac{1}{\frac{1}{4}+\frac{1}{4}}}+\dfrac{1}{\dfrac{1}{\frac{1}{4}+\frac{1}{4}}+\dfrac{1}{\frac{1}{4}+\frac{1}{4}}}}$

"Math Is Cool" Championships – 2017-18

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

March 16, 2018

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

"Math Is Cool" Championships – 2017-18

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	51
2	7000
3	8 [letters]
4	-20
5	14 [%]
6	55 [minutes]
7	16
8	100 [%]
9	[$] 3 [.00]
10	2625 [pounds]
11	4 [ways]
12	57 [fish]
13	122,221 (comma not required)
14	5 [weeks]
15	270 [calories]

	Answer
16	21 [bites]
17	240 [seconds]
18	1:46 PM
19	2340
20	25 [un^2]
21	2 [ft]
22	17
23	2/11
24	5 [prime numbers]
25	9 [unit squares]
26	11 [dates]
27	5 [cents]
28	625 [spins/min.]
29	80 [inches]
30	11

	Answer
31	25/36
32	13
33	70 [Giras]
34	9
35	33
36	8 [mph]
37	14
38	5 [un^2]
39	1330 [groupings]
40	2

4th Grade

March 16, 2018

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Team Multiple Choice Contest

Once all the visitors and Zookeepers have left for the night, the animals at the MathLand Zoo come out to play! Work together with your team to solve these problems about their nightly antics.

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

The table at right lists information about MathLand Zoo's Primates.

Name	Primate Type	Height	Weight (lbs)
Archimedes	Orangutan	4 ft, 0 in.	170
Babbage	Orangutan	4 ft, 3 in.	200
Copernicus	Chimpanzee	3 ft, 6 in.	?
Descartes	Chimpanzee	3 ft, 9 in.	130
Euclid	Chimpanzee	2 ft, 10 in.	75

1 What is the difference in height between the tallest primate and the shortest primate? Answer in inches.

A) 9 B) 14 C) 17 D) 21 E) Answer Not Given

2 The average weight of the primates is 150 lbs. How many pounds does Copernicus weigh?

A) 125 B) 140 C) 160 D) 175 E) Answer Not Given

3 The primates stand on each other's shoulders to escape their enclosure. If one of the orangutans must stand at the bottom of this "primate tower," in how many different arrangements could they stand?

A) 24 B) 48 C) 60 D) 120 E) Answer Not Given

4 Babbage had picked the zookeeper's pocket to steal the key ring with 100 different zoo keys. The primates take this key ring over to the ice cream shop, which has a single lock on its door. The primates take turns trying different keys in the lock. Archimedes tries the 1st key, Babbage tries the 2nd key, Copernicus tries the 3rd key, Descartes the 4th key, and Euclid the 5th. They keep taking turns in this same order, trying different keys in the lock. If the door unlocked with the 57th key, who unlocked it?

A) Archimedes B) Babbage C) Copernicus D) Descartes E) Euclid

Continued on Back Side

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #5 THROUGH #7.

Once the zoo is quiet for the evening, the sloths have a dance party. The table at right lists songs they like.

Songs by *Imagine Dragons*	Song Length
"Believer"	3 minutes, 21 seconds
"Radioactive"	3 minutes, 6 seconds
"On Top of the World"	3 minutes, 42 seconds

5 The sloths play their favorite Imagine Dragons songs over and over. If they play each of the three songs listed in the table 4 times, how many seconds will their dance party last?

A) 609 B) 1716 C) 2036 D) 2426 E) Answer Not Given

6 Sloths like to dance slow. How many seconds long would the song "Radioactive" last, if the sloths played it at one-third its normal speed?

A) 558 B) 603 C) 186 D) 62 E) Answer Not Given

7 The sloths take turns dancing with each other, dancing exactly one time with every other sloth in their group. If there are 15 sloths in their group, how many dances took place?

A) 14 B) 30 C) 60 D) 105 E) Answer Not Given

ANSWER QUESTIONS #8 THROUGH #10.

8 The reindeer are playing games. They all play tag, kickball, and/or video games. 8 reindeer like playing tag, 10 like playing kickball, and 5 like playing both tag and kickball. 6 reindeer only like to play video games, and nothing else. How many reindeer are there?

A) 14 B) 19 C) 24 D) 29 E) Answer Not Given

9 Lovelace the Lemur discovers that all 7 of the ring-tailed lemurs have a different number of rings on their tails, though every lemur has at least 1 tail ring. The average number of rings for the group is 6, and the median number of rings is 5. What is the greatest number of rings that one of the lemurs could have on its tail?

A) 35 B) 18 C) 14 D) 6 E) Answer Not Given

10 The penguins are cold, so they turn the enclosure temperature up to 90 degrees Fahrenheit. This causes their ice floe to melt! Their ice floe started as a rectangular prism that was 6 feet wide, 8 feet long, and 1 foot deep. The width, length, and depth of the ice floe are each now half their original size. How many cubic feet of ice have been lost from the ice floe?

A) 6 B) 12 C) 24 D) 42 E) Answer Not Given

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Final Score *(out of 20)*

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

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

Error! Reference source not found.

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 — 2017-18

4th Grade — March 16, 2018

Key

Team Multiple Choice Contest – Answer Key

Error! Reference source not found.

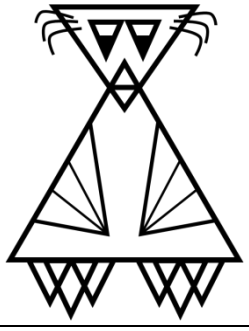
Correct responses are worth 2 points, incorrect responses are worth -1 point, and absence of a response is worth 0 points.

	Answer
1	C
2	D
3	B
4	B
5	E (2436)
6	A
7	D
8	B
9	B
10	D

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Team Contest

1	What digit is in the hundreds place of the number 123,450.7896?
2	Sydney has 45 cookies to share with her 9 friends. Sydney, Eddy, and Kiara take 4 cookies each. If the rest of the friends each get an equal number of cookies, what is the smallest number of cookies that could be left over?
3	10 squares, 12 rectangles, 16 parallelograms, and no other polygons are drawn on a page. What is the least number of polygons that could be on that page?
4	A 4×4×4 cube is built out of unit cubes and painted on all sides. The large cube is then broken into the unit cubes. How many of the unit cubes are not painted on any side?
5	Marlee is having a SpongeBob birthday party and wants to feed her guests SpongeBob macaroni. A box of SpongeBob-themed macaroni costs $3.50. If Marlee has $55 and each person eats half a box of macaroni, how many people can Marlee feed?
6	The numbers 21, 6, 16, 14, and 4 are separated into two groups such that the product of the numbers in the first group equals the product of the numbers in the second group. What is the product of the numbers in the first group?
7	Nicholas can eat a whole bag of N&Ns in 30 minutes. August can finish the same size bag of N&Ns in 20 minutes. If they eat from the same bag at the same time, how long does it take for them to finish a whole bag of N&Ns?
8	How many ways can Ella make change for $0.75 if she only has quarters, dimes, and nickels?
9	Biff and Eho are racing up a 25-foot wall. Biff climbs at 8 inches per minute and Eho climbs at 10 inches per minute. If Biff has a 5 minute head start, by how many SECONDS does the winner beat the other?
10	How many total triangles (of any size) are in this artistic sketch of Pythagoras the Penguin? 

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Final Score *(out of 10)*

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

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

Error! Reference source not found.

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 — 2017-18

4th Grade — March 16, 2018

Key

Team Contest – Answer Key

	Answer
1	4
2	5 [cookies]
3	16 [shapes]
4	8 [unit cubes]
5	30 [people]
6	336
7	12 [minutes]
8	18 [ways]
9	150 [seconds]
10	30 [triangles]

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

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 sum of 21 and 7 ?	28
Quest. 2	What is the remainder when TNYWG is divided by 5 ?	3
Quest. 3	How many minutes are in TNYWG hours?	180
Quest. 4	Subtract TNYWG from the number of degrees of the sum of the interior angles of a triangle. What number do you get?	0
Robert Dirks' Relay #1		**Answer**
Quest. 1	Find the next term in the arithmetic sequence: 3, 10, 17, 24, __	31
Quest. 2	What is TNYWG + (10 – 21) ?	20
Quest. 3	What is one-fourth of TNYWG ?	5
Quest. 4	What is TNYWG factorial, divided by 3 factorial ?	20
Robert Dirks' Relay #2		**Answer**
Quest. 1	Two sides of a triangle are 11 cm long and 14 cm long. What is the largest possible whole number value for the length of the third side?	24 [cm]
Quest. 2	Two congruent squares are placed side-by-side on the shop floor to make a rectangle that has an outside perimeter of TNYWG meters. What was the side length of the original squares?	4 [m]
Quest. 3	What is the TNYWGTH prime number?	7
Quest. 4	Six men working at the same rate can frame two houses in TNYWG days. How many days would it take for 9 men to frame 6 houses?	14 [days]

"Math Is Cool" Championships — 2017-18

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 — 2017-18

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 — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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 sum of 21 and 7 ?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay Practice – Person 1	
Question 1	What is the sum of 21 and 7 ?

Robert Dirks' Relay Practice – Person 2	
Question 1	What is the sum of 21 and 7 ?
Question 2	What is the remainder when TNYWG is divided by 5 ?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay Practice – Person 2	
Question 1	What is the sum of 21 and 7 ?
Question 2	What is the remainder when TNYWG is divided by 5 ?

Robert Dirks' Relay Practice – Person 3	
Question 2	What is the remainder when TNYWG is divided by 5 ?
Question 3	How many minutes are in TNYWG hours?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay Practice – Person 3	
Question 2	What is the remainder when TNYWG is divided by 5 ?
Question 3	How many minutes are in TNYWG hours?

Robert Dirks' Relay Practice – Person 4	
Question 3	How many minutes are in TNYWG hours?
Question 4	Subtract TNYWG from the number of degrees of the sum of the interior angles of a triangle. What number do you get?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay Practice – Person 4	
Question 3	How many minutes are in TNYWG hours?
Question 4	Subtract TNYWG from the number of degrees of the sum of the interior angles of a triangle. What number do you get?

Robert Dirks' Relay #1 – Person 1	
Question 1	Find the next term in the arithmetic sequence: 3, 10, 17, 24, __

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #1 – Person 1	
Question 1	Find the next term in the arithmetic sequence: 3, 10, 17, 24, __

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #1 – Person 2	
Question 1	Find the next term in the arithmetic sequence: 3, 10, 17, 24, __
Question 2	What is TNYWG + (10 – 21) ?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #1 – Person 2	
Question 1	Find the next term in the arithmetic sequence: 3, 10, 17, 24, __
Question 2	What is TNYWG + (10 – 21) ?

Robert Dirks' Relay #1 – Person 3	
Question 2	What is TNYWG + (10 – 21) ?
Question 3	What is one-fourth of TNYWG ?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #1 – Person 3	
Question 2	What is TNYWG + (10 – 21) ?
Question 3	What is one-fourth of TNYWG ?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #1 – Person 4	
Question 3	What is one-fourth of TNYWG ?
Question 4	What is TNYWG factorial, divided by 3 factorial ?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #1 – Person 4	
Question 3	What is one-fourth of TNYWG ?
Question 4	What is TNYWG factorial, divided by 3 factorial ?

Robert Dirks' Relay #2 – Person 1	
Question 1	Two sides of a triangle are 11 cm long and 14 cm long. What is the largest possible whole number value for the length of the third side?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #2 – Person 1	
Question 1	Two sides of a triangle are 11 cm long and 14 cm long. What is the largest possible whole number value for the length of the third side?

Robert Dirks' Relay #2 – Person 2	
Question 1	Two sides of a triangle are 11 cm long and 14 cm long. What is the largest possible whole number value for the length of the third side?
Question 2	Two congruent squares are placed side-by-side on the shop floor to make a rectangle that has an outside perimeter of TNYWG meters. What was the side length of the original squares?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #2 – Person 2	
Question 1	Two sides of a triangle are 11 cm long and 14 cm long. What is the largest possible whole number value for the length of the third side?
Question 2	Two congruent squares are placed side-by-side on the shop floor to make a rectangle that has an outside perimeter of TNYWG meters. What was the side length of the original squares?

Robert Dirks' Relay #2 – Person 3	
Question 2	Two congruent squares are placed side-by-side on the shop floor to make a rectangle that has an outside perimeter of TNYWG meters. What was the side length of the original squares?
Question 3	What is the TNYWGTH prime number?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #2 – Person 3	
Question 2	Two congruent squares are placed side-by-side on the shop floor to make a rectangle that has an outside perimeter of TNYWG meters. What was the side length of the original squares?
Question 3	What is the TNYWGTH prime number?

Robert Dirks' Relay #2 – Person 4	
Question 3	What is the TNYWGTH prime number?
Question 4	Six men working at the same rate can frame two houses in TNYWG days. How many days would it take for 9 men to frame 6 houses?

"Math Is Cool" Championships — 2017-18, 4th Grade — March 16, 2018

Robert Dirks' Relay #2 – Person 4	
Question 3	What is the TNYWGTH prime number?
Question 4	Six men working at the same rate can frame two houses in TNYWG days. How many days would it take for 9 men to frame 6 houses?

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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 — 2017-18

4th Grade — March 16, 2018

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
28	3	180	0

ROBERT DIRKS' RELAY #1

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
31	20	5	20

ROBERT DIRKS' RELAY #2

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
24 [cm]	4 [m]	7	14 [days]

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

College Knowledge Bowl Round #1

#	Problem	Answer
1	How many sides does the ever-popular heptagon have?	7 [sides]
2	What is the greatest common factor of the numbers 63 and 117?	9
3	What is the positive value of the difference between 3 and 60?	57
4	What is the sum of the first one hundred positive, counting numbers?	5050
5	Aisha's favorite number is seven more than six times four. What is Aisha's favorite number?	31
6	Sixteen soccer teams play a single elimination tournament, in which the loser of a game is out. How many games are played to determine first place?	15 [games]
7	Dan is selling ghost peppers for 55 cents each. How many peppers can Bryan buy with ten dollars?	18 [peppers]
8	The ratio of the sides of a triangle is two to six to seven, and the shortest leg has a length of 4 centimeters. What is the perimeter of the triangle?	30 [cm]
9	Which of the following elements of the same circle is the longest: the radius, the circumference, the diameter, or a chord?	circumference
10	What is the largest remainder possible when dividing a number by 32?	31

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

College Knowledge Bowl Round #2

#	Problem	Answer
1	What is the fifth positive, composite, counting number?	10
2	Zach has 200 people in his phone Contacts list. A computer virus destroys 30 percent of his Contacts before he can stop it. How many people are left on his Contacts list?	140 [people]
3	Multiply 7 times the sum of 8 and 4. What is the result?	84
4	Harry Kane scored 38 goals in a 25-game season. As a decimal number rounded to the nearest tenth, how many goals did he score per game?	1.5 [goals/game]
5	What is the difference between 84 and 46?	38
6	If Tim the Terrier can catch a squirrel every 5 days, how many squirrels can he catch in a non-leap year?	73 [squirrels]
7	What is the area of the triangle with vertices at the coordinates "zero comma zero", "zero comma five", and "twelve comma zero"?	30 [un.^{2}]
8	How many factors does 2018 have?	4 [factors]
9	There are 12 red pens in each box. A case has 9 boxes of pens. How many pens are in a case?	108 [pens]
10	Petunia Penguin went for a stroll. She saw 14 crows and 13 pigs. How many legs did she see?	80 [legs]

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

College Knowledge Bowl Round #3

#	Problem	Answer
1	What is the product of the first and sixth prime numbers?	26
2	Hershey can eat three hot dogs per hour. How many hot dogs can he eat in a week, if he eats for a total of seven hours every day?	147 [hot dogs]
3	What is the area of a right triangle with legs measuring three meters and four meters?	6 [m^2]
4	Minsuh reaches into a bag containing 7 red and 13 green marbles and draws out a marble without looking. What is the probability, as a percentage, that she selects a red marble?	35 [percent]
5	What is the whole number quotient of 78 and 3?	26
6	Kelton has a farm full of cows and chickens. As he flies his crop duster, he counts 14 heads and 44 legs. How many cows are on Kelton's farm?	8 [cows]
7	How many total sides are there on 24 individual triangles?	72 [sides]
8	If you have 1 boggle for every 2 globs, how many globs will you have if you have 24 boggles?	48 [globs]
9	If Kenneth has 13 apples and gives all but 4 away, how many does he have left?	4 [apples]
10	If Bobby has 21 pencils, and Billy has four-thirds as many pencils as Bobby, how many pencils does Billy have?	28 [pencils]

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

College Knowledge Bowl Round #4

#	Problem	Answer
1	What is twelve divided by the quantity "one-third" ?	36
2	If it is 9:32 AM, what time will it be 5 hours and 20 minutes from now?	2:52 PM
3	What is the sum of the number of faces, vertices, and edges of a triangular pyramid?	14
4	What is the quotient of two-thousand, eight-hundred forty-nine divided by seven?	407
5	How many cups are in 8 gallons?	128 [cups]
6	Four times 30 percent of my number is 12. What is my number?	10
7	In a business meeting with 6 people, they all shake hands with each other exactly once. How many handshakes took place?	15 [handshakes]
8	How many distinct ways are there to arrange the letters in the name Vlad, spelled V-L-A-D?	24 [ways]
9	When simplified, what is the units digit of "nine to the power of eight"?	1
10	Sonia has seven fewer marbles than Alex, who has ten marbles. How many marbles will Sonia have if Sonia gets four more marbles?	7 [marbles]

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

College Knowledge Bowl Round #5

#	Problem	Answer
1	If the legs of a right triangle both measure 12 feet, find the area of the triangle in square feet.	72 [ft^2]
2	Find the sum of the number of inches in a yard, the number of ounces in a pound, and the number of cups in a quart.	56
3	Ethan likes hats. He has 7 hats with baseball team logos, 5 hats with local company logos, and 3 hats with funny sayings. If he randomly selected a hat to wear today, what is the probability, as a percentage, that Ethan picked a hat with a funny saying?	20 [percent]
4	What is the product of 17 and 5?	85
5	Mary is running at a steady 10 miles per hour. How many minutes did it take her to run 12 miles?	72 [minutes]
6	What is 64 percent of 75?	48
7	An octahedron is a three-dimensional solid. How many faces does an octahedron have?	8 [faces]
8	Caleb walks 41 meters North, 14 meters West, 12 meters North, 8 meters East, 32 meters South, and 6 meters East. How far is he from his starting point?	21 [meters]
9	What is the remainder when 749 is divided by 6?	5
10	What is the square root of 16-squared?	16

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

College Knowledge Bowl Round #6

#	Problem	Answer
1	How many distinct prime factors does 25 have?	1 [factor]
2	The swim team celebrates their weekly practice with donuts on Thursdays. Of the 20 donuts in the box, 10 have sprinkles on them, 8 have chocolate on them, and 6 have neither chocolate nor sprinkles. How many donuts have both chocolate and sprinkles?	4 [donuts]
3	What is the most specific name for a polygon with 12 straight sides?	dodecagon
4	What is the volume of a rectangular prism with height 4, length 10, and width 4?	160 [units^2]
5	12 tennis players are in a single elimination tournament where the loser of a match is out. If everyone plays a match in the first round, how many players are out in the first round?	6 [players]
6	What is the sum of the odd whole numbers BETWEEN twenty and thirty?	125
7	What is the degree measure of the angle that is complementary to a 47 degree angle?	43 [degrees]
8	As a fraction, what is the probability of rolling an even prime number on a single roll of a fair 6-sided die?	1/6
9	In a class of 30 students, 60 percent of them are girls. How many girls are in the class?	18 [girls]
10	What is 4 squared, squared?	256

"Math Is Cool" Championships — 2017-18

4th Grade — March 16, 2018

Key

COLLEGE KNOWLEDGE BOWL ROUND — EXTRA Qs

#	Problem	Answer
1	What is 13 less than 217?	204
2	What even number between 110 and 130 is divisible by nine?	126
3	What is the square root of 225?	15
4	How many inches are in 4 feet?	48 [inches]
5	If a pen costs 60 cents, and a pencil costs 13 cents, how many cents do 3 pens and 6 pencils cost?	258 [cents]
6	How many zeroes are there at the end of two hundred forty thousand?	4 [zeros]

COLLEGE KNOWLEDGE BOWL ROUND — Alternate Questions

College Bowl has no impact on advancement to Masters. Thus, sites have flexibility to alter CB questions (but not questions in any of the other events!). Here are a set of potential alternate questions, if you would like to replace CB questions above.

#	Problem	Answer
1	Shaheer has 16 coins, half of which are dimes and half nickels. How much money in CENTS does Shaheer have?	120 [cents]
2	Each chipmunk in the tree has four legs and two ears. If the difference between the number of legs and ears is 26, how many chipmunks are in the tree?	13 [chipmunks]
3	What is one-half minus three-quarters?	$-\frac{1}{4}$ or "negative one-quarter"
4	Mom measured Zalan's height to be six feet, three inches tall. How many inches tall is Zalan?	75 [inches]
5	How many positive multiples of thirteen are less than one hundred?	7 [multiples]
6	How many individual digits did Kira write as she numbered the pages of her short story from 1 to 12?	15 [digits]
7	What is the smallest positive number divisible by 3, 5, and 6?	30
8	There are 28 days in February this year. If February 12 is a Monday, how many days in February are Mondays?	4 [days]
9	Wayne looking at his wagon wheel. There are 6 spaces between the spokes on the wheel. How many spokes radiate out from the center?	6 [spokes]
10	What is the product of eleven and sixteen?	176
11	How many cups are in a quart?	4 [cups]
12	What is the average of five, eight, and five?	6
13	Peter has one and one half dozen eggs. How many eggs does Peter have?	18 [eggs]
14	How many red cards are in a standard deck of fifty-two cards?	26 [red cards]
15	What is the sum of the number of letters in the English alphabet and the number of days in the week?	33
16	The product of two different whole numbers is nineteen. What is the sum of those two numbers?	20
17	Johnnie applied for fifteen jobs in the past two months. He got an interview call for two out of every five applications. How many job interview calls did Johnnie get?	6 [calls]
18	Justin is sixth from the front of the movie line and sixth from the back of the same line. How many people are in the movie line?	11 [people]
19	What is the sum of thirteen plus four plus eleven?	28
20	The ratio of boys to girls in Mrs. Madison class is 3 to 4. If there are 12 boys in the class, how many girls are in the class?	16 [girls]