"Math Is Cool" Masters — 2018-19

5th Grade — May 18, 2019

Sponsored by: The UPS Store

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by all involved (competitors and observers). Display of poor sportsmanship will result in disqualification.*
- *Competitors may not use calculators or any other aids on any portion of this contest.*
- *Unless stated otherwise:*
  - *Express all rational, non-integer answers as common fractions, except in problems dealing with money, where you should give the answer as a decimal rounded to the nearest cent.*
  - *For 5th grade and up, all fractions and ratios must be reduced to simplest form, all radicals must be simplified, and all denominators must be rationalized.*
  - *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, AM or PM 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 student name, school, team number, etc. has been filled out at the top of each answer sheet.***
- *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" Masters — 2018-19

5th Grade — May 18, 2019

Sponsored by: The UPS Store

Final Score *(out of 8)*

Room #	School Name	Student Name	Team #

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

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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			
5th Grade	**TOTAL:**		

"Math Is Cool" Masters — 2018-19

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Key

Mental Math Contest – Answer Key

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

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

5th Grade

	Answer	
1	7	What is the positive difference between 35 and 28?
2	36	What is six squared?
3	46	What is two point three times twenty?
4	13 [cents]	Emily goes to the farmer's market and buys seven cucumbers for a total of ninety-one cents. How many cents does one cucumber cost?
5	Sunday	If yesterday was Tuesday, what day of the week will it be three days before two weeks from now?
6	20 [degrees]	Angle A is complementary to angle B, and angle B is complementary to angle C. If angle B is eighty (eight-zero) degrees, what is the sum of the measures of angle A and angle C?
7	120 [ways]	A spelling bee is down to six finalists. From these six finalists, how many ways are there to award first, second, and third places, assuming no ties?
8	1/6	You roll a standard six-sided die two times in a row. As a reduced fraction, what is the probability that you will roll a prime number first, followed by a composite number?

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Individual Contest

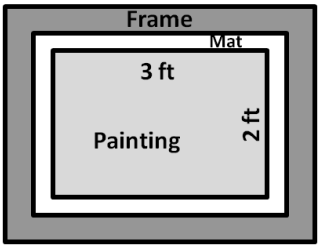
Record all answers on the colored cover sheet. 35 minutes, 40 problems, ~92% of individual score.
No talking during this individual test. A 5-minute time warning will be given.

	Questions 1-30: 2 points each
1	Calculate: 777 – 333 + 444
2	I drove for 3 hours at 60 miles per hour. How many miles did I drive?
3	What time is it at "a quarter past 5 in the afternoon" ?
4	Anson has 21 dimes. Antonio has 57 cents. How much more money, in dollars, does Anson have than Antonio?
5	What is the largest factor of 1040?
6	The sum of two numbers is 14. If one of the numbers is 17 less than 21, then what is the second number?
7	What is $7 + 3 \times 6 - 9$?
8	Round 43789.8329 to the nearest hundred.
9	Write 0.65 as a reduced common fraction.
10	A rainforest sloth spends 40 out of every 50 hours asleep. What percent of a sloth's life is spent awake?
11	Andrew downloads 12 songs on Monday. If each day afterward he downloads 3 more songs than the day before, how many total songs will Andrew have downloaded at the end of Wednesday, assuming he starts with no songs?
12	Ignoring units, what is the positive difference between the value of the area and the value of the perimeter of a square with a side length of 5?
13	Pygmy sloths have 3 toes on each of their two feet and 3 fingers on each of their two hands. Hoffman's sloths have 3 toes on each of their two feet and only 2 fingers on each of their two hands. How many total sloth toes and fingers would there be in a wildlife preserve containing a colony of 25 Hoffman's sloths and 7 pygmy sloths?
14	What is the perimeter of a square with a side length of $\frac{11}{2}$ units?
15	In the book Hatchet, Brian spends 54 days alone in the wilderness after his plane crashes. If he is rescued on a Wednesday, on what day of the week did his plane crash?
16	At Battle School, there are 12 armies made up entirely of students. Each army has one student-commander plus four platoons. Each platoon has 10 soldiers. How many students are in Battle School?

17	One mile is equal to 5,280 feet. How many feet are in 5/16 of a mile?
18	Rainwing dragons (which have 2 wings each) love to keep sloths as pets. In a particular gathering of Rainwing dragons and their pet sloths, you count 56 wings and 40 heads. How many sloths are present?
19	Jane works sorting apples after school. Apples come on a conveyor belt and she picks out the rotten apples as they go past. One of every four apples is rotten. Jane has seen 13 good apples go past. What is the fewest number of apples (good + rotten) that could have gone past?
20	Abby has 454 LEGO pieces. Charlie has 782 LEGO pieces. How many LEGO pieces does Charlie need to give Abby, so that they have the same number of pieces?
21	My favorite number is the largest number possible that satisfies the following requirements: • It has three different digits. • Each digit is a prime number. • The product of the first and last digits is 6. What is my favorite number?
22	What is the sum of the digits in the largest prime factor of 2019?
23	An acute isosceles triangle has an angle of 30°. What is the largest angle measure in this triangle?
24	Rolando has 12 shirts, 4 pairs of pants, 3 pairs of shoes, and 2 hats to choose from when getting dressed today. If he wears one shirt, one pair of pants, one pair of shoes, and one hat, how many different outfits can Rolando choose from?
25	What is the sum of the first 20 even counting numbers?
26	Calculate the value of the following expression, answering as a reduced common fraction: $\frac{3}{7} \div \frac{8}{9} \times \frac{4}{15}$
27	Sleepy Steve snoozes through 30% of each of his 50-minute-long classes. How many HOURS of sleep does Steve get during class, if he has 12 classes?
28	A rectangle is twice as long as it is wide and it has an area of 32 mm^2. What is the perimeter of the rectangle?
29	Students acquire AR points depending on how many books they read and how long the books are. Eho has twice as many AR points as Colin. Colin has 2 more AR points than Biff. Biff has 1/10 the number of AR points that Dafne has. Dafne has 1240 AR points. How many AR points does Eho have?
30	There is a $^2/_3$ chance that the advertisement (ad) you see on YouTube is unskippable. Independently, 60% of ads are 15 seconds long, 30% are 30 seconds long, and 10% are 60 seconds long. As a reduced common fraction, what is the probability that the next ad you see is an unskippable, 30-second ad?

Continued on Next Page

Challenge Questions: 3 points each

31	The circles in the picture at right touch at exactly one point. The radius of the larger circle is 11 cm. The radius of the smaller circle is 4 cm. In terms of pi, what is the area of the shaded portion of the picture? 
32	When you get your braces on, your orthodontist tells you that you will need to wear them for 400 days. If you get the braces on March 28th of a leap year, what will be the date (month and day) when you get your braces off?
33	The @ operator is defined such that $a@b = \frac{(b-a)^2 + b}{a}$. What is the simplified value of 2@9?
34	My favorite number is two digits. When you add the two digits together and multiply them by 5, you get my number. What is my favorite number?
35	Gary gave his mother a framed painting as a Mothers' Day gift. The visible portion of the rectangular painting is 3 feet wide by 2 feet tall. The painting will be surrounded on all four sides by a 3-inch wide mat and then surrounded by a 5.5-inch wide frame (see figure at right). What is the total area, in square inches, of the frame? 
36	Sanjay's shoes aren't selling very well. He decides to mark down his prices by 20%. This doesn't help at all, so he marks down his prices again by 30%. What is the overall percent markdown from the original price?
37	The product of 3 consecutive counting numbers is 1716. What is the sum of those three numbers?
38	A train is moving at 3000 feet per minute. It passes through a tunnel that is 3 miles long. It takes 5.5 minutes for the train to completely pass through the tunnel. How long, in feet, is the train?
39	Joshua works for his grandparents weeding the blueberry patch. The first day he earns $0.15. After that he earns three times as much each day as he did the day before. So, on the second day he earns $0.45, on the third day he earns $1.35, and so on. What is the total number of dollars that Joshua will have earned after working for 7 days in a row?
40	A bag contains red, blue, yellow, and green marbles. The probability of drawing a red, blue, or yellow marble out of the bag is 1/7, 3/10, or 2/5, respectively. There are between 100 and 200 marbles in the bag. How many green marbles are in the bag?

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KEY

Individual Contest – Answer Key

SCORERS: Bracketed […] items are optional. Just score as 0 or 1 and add up those values to reflect total correct.
First Scorer – use the right-hand columns.

	Answer
1	888
2	180
3	5:15 PM
4	[$] 1.53
5	1040
6	10
7	16
8	43800[.0000]
9	13/20
10	20 [% or percent]
11	45 [songs]
12	5
13	334 [toes and fingers]
14	22 [units]
15	Friday

	Answer
16	492 [students]
17	1650 [feet]
18	12 [sloths]
19	17 [apples]
20	164 [LEGO pieces]
21	372
22	16
23	75 [° or degrees]
24	288 [outfits]
25	420
26	9/70
27	3 [hours]
28	24 [mm]
29	252 [AR points]
30	1/5

	Answer
31	105π [cm^2]
32	May 2nd
33	29
34	45
35	913 [in^2]
36	44 [% or percent]
37	36
38	660 [ft]
39	[$] 163.95
40	22 [green marbles]

5th Grade

May 18, 2019

"Math Is Cool" Masters – 2018-19

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:			

5th Grade

May 18, 2019

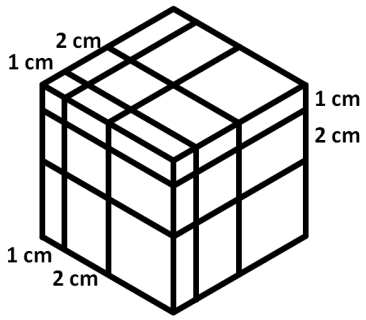
Scorers: Just score as 0 or 1 and add up those values (i.e., just work with number correct).

"Math Is Cool" Masters — 2018-19

5th Grade — May 18, 2019

Sponsored by: The UPS Store

Team Multiple Choice Contest

	USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #1 THROUGH #3. A puzzle cube consists of a 6 cm cube that has had the outside painted entirely pink. After painting, each dimension of the cube has been cut twice, so that the first cut is 1 cm and the second cut is 2 cm beyond the first cut. Assume the black lines are just for illustration and have no width. 
1	Into how many total pieces has the puzzle cube been cut? A) 9 B) 18 C) 22 D) 27 E) Answer Not Given
2	What is the volume, in cubic centimeters, of the lone piece in the puzzle cube that has no paint on any of its sides? A) 2 B) 6 C) 10 D) 12 E) Answer Not Given
3	What is the surface area, in square centimeters, of the painted portion of the smallest piece in the puzzle? A) 1 B) 3 C) 6 D) 10 E) Answer Not Given

Continued on Back Side

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #4 THROUGH #6.

Tonya decides to open a sweet shop, called The Bean, that specializes in jelly beans. The wholesale cost is the price that Tonya pays to Moses Lake Candy (MLC) Wholesale Company for their beans. The suggested retail price is the price that the manufacturer suggests sweet shops (like The Bean) charge their customers. Customers at The Bean can purchase jelly beans by weight in any quantity.

Jelly Bean Type	Quantity Ordered (lbs.)	Wholesale Cost for Entire Order	Suggested Retail Price
Jelly Belly	34	$85	$1.50 per ounce
SweetBean	50	$280	$11 per pound
Jellicious	57	$400	$3 per ounce
Tasty 'n Tart	20	$375	$15.50 per half-pound
SmellyJelly	16	$20	$6.50 per pound

4 If Tanya sells her jelly beans for the suggested retail price, what is the median retail price, in dollars, for 1 pound of jelly beans?

A) 6.50 B) 24.00 C) 31.00 D) 280.00 E) Answer Not Given

5 Which type of jelly bean has the cheapest wholesale price per pound?

A) Jelly Belly B) SweetBean C) Jellicious D) Tasty 'n Tart E) SmellyJelly

6 Instead of 20 lbs of Tasty 'n Tart Jelly Beans and 16 lbs of SmellyJelly Beans, MLC Wholesale accidentally shipped 20 lbs of SmellyJelly and 16 lbs of Tasty 'n Tarts. Tonya complains to MLC Wholesale, and they adjust her bill. What is the adjusted total cost, in dollars, for Tanya's whole order of jelly beans? Round your answer to the nearest dollar.

A) 848 B) 958 C) 1090 D) 1160 E) Answer Not Given

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #7 THROUGH #10.

In the World of Cars, the racers all drink gas (i.e., gasoline). Different types of gas have different prices and give different gas mileage. Lightning McQueen, The King, and Chick Hicks are racecars, and they each prefer a different type of gas, which is what they each use, unless stated otherwise.

Type of Gas	Price per Gallon	Miles per Gallon (mpg)	Preferred By
SuperRacer Plus	$5	50	Lightning McQueen
SpeedMaxx	$7	63	The King
Octane Supreme	$2	30	Chick Hicks

7 If Lightning McQueen drinks one quart of each gas type, how many miles can he travel?

A) 143/4 B) 143 C) 50 D) 25/2 E) Answer Not Given

8 Each of the three racers purchase $10 of their preferred kind of gas. Which racer will be able to travel the farthest?

A) Chick Hicks B) Lightning McQueen C) The King
D) Tie between Lightning McQueen and the King E) Answer Not Given

9 How many dollars does it cost for Chick Hicks, Lightning McQueen, and The King to travel together for 100 miles? Round your answer to the nearest cent.

A) 14.00 B) 29.64 C) 27.67 D) 27.78 E) Answer Not Given

10 Lightning McQueen drinks two gallons of SuperRacer Plus and three gallons of Octane Supreme. Then he drives 114 miles, using a proportional amount of each type of gas. How many gallons of gas are left in his tank?

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

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Key

Team Multiple Choice Contest – Answer Key

5th Grade

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

	Answer
1	D
2	E ($8\ cm^3$)
3	B
4	B
5	E
6	C
7	A
8	A
9	D
10	D

"Math Is Cool" Masters — 2018-19

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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			
5th Grade	TOTAL:		

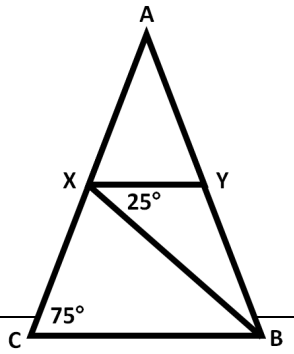
"Math Is Cool" Masters — 2018-19

5th Grade — May 18, 2019

Sponsored by: The UPS Store

Team Contest

1	The state of Washington has an area of 71,362 square miles. The city of Moses Lake has an area of about 21 square miles. Rounded to the nearest hundred, how many times larger is the state of Washington than the city of Moses Lake?
2	Azucena has 95 cents. Brisa has 43 cents. Conrad has 80 cents, and DeShawn has 75 cents. Each person has only a single type of standard U.S. coin. No two people have the same type of coin. How many coins do they have all together?
3	A locust, which weighs approximately 3 grams, can eat an amount equal to its own weight every day. How much, in kilograms, could 1000 locusts eat during the month of May? Assume no weight gain by the locusts.
4	A sloth moves at a rate of 2 meters in one minute. A giant tortoise moves at a rate of 300 meters in one hour. If the sloth and the giant tortoise have a race, how many meters apart will they be after 5 minutes?
5	Peter owns a factory making widgets. It costs $10,000 to run the factory each day. It costs $5 to produce each widget. He sells each widget for $25. How many widgets does he need to sell in a day to break even? Note: you "break even" when cost = sales.
6	Twin prime numbers are prime numbers with a difference of 2. For example, 3 and 5 are twin primes. The numbers 5 and 7 are also twin primes. Find the largest twin prime pair with both primes less than 100 and calculate their product.
7	Daisy Duck has 8 ducklings. How many ways can Daisy and her ducklings line themselves up if Daisy is always at the front of the line?
8	Six people can make 16 chocolates in four minutes. How many people does it take to make 40 chocolates in 2 minutes?
9	If a square has diagonals of length of 10, what is the area of the square?
10	In the diagram at right, ΔABC and ΔAXY are isosceles, with AX congruent to AY and AB congruent to AC. Find the degree measure of angle XBC.



"Math Is Cool" Masters — 2018-19

5th Grade — May 18, 2019

Key

Team Contest – Answer Key

5th Grade

	Answer
1	3400 [times larger]
2	73 [coins]
3	93 [kg]
4	15 [m]
5	500 [items]
6	5183
7	40,320 [ways]
8	30 [people]
9	50 [units^2]
10	25 [° or degrees]

"Math Is Cool" Masters — 2018-19

5th Grade — May 18, 2019

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			
5th Grade	**TOTAL:**		

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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 #1		**Answer**
Quest. 1	What is the positive difference between 251 and 76?	175
Quest. 2	You have quarters and nickels in your pocket. If you have 3 quarters and the total value of the coins is in your pocket is TNYWG cents, how many nickels are in your pocket?	20 [nickels]
Quest. 3	You have a rectangle with a perimeter of TNYWG cm. If each short side of the rectangle is 3 cm long, what is the area of your rectangle?	21 [cm^2]
Quest. 4	How many 5's are used to number the pages of a book with 6 times TNYWG pages in it? (Numbering starts on page 1 and numbers such as 15 count as one 5 being used.)	23 [fives]
Robert Dirks' Relay #2		**Answer**
Quest. 1	A flat of rainier cherries cost as much as three boxes of chocolates. A box of chocolates costs one-fifth as much as a bouquet of flowers. If a bouquet of flowers costs $10, how many dollars does a flat of rainier cherries cost?	[$] 6
Quest. 2	How many diagonals does a polygon with TNYWG sides have?	9 [diagonals]
Quest. 3	Starting with the number 2, a list of consecutive prime numbers is written until there are TNYWG numbers on the list. What is the greatest number in the list?	23
Quest. 4	You have TNYWG cents in your pockets in coins. Your friend gives you an additional $1.42, also all in coins, which you add to your pocket. The possible coins include quarters, dimes, nickels, and pennies. What is the least number of coins you could have in your pocket?	14 [coins]

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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.

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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.

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5th Grade — May 18, 2019

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.

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5th Grade — May 18, 2019

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 #1 – Person 1	
Question 1	What is the positive difference between 251 and 76?

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Robert Dirks' Relay #1 – Person 1	
Question 1	What is the positive difference between 251 and 76?

Robert Dirks' Relay #1 – Person 2	
Question 1	What is the positive difference between 251 and 76?
Question 2	You have quarters and nickels in your pocket. If you have 3 quarters and the total value of the coins is in your pocket is TNYWG cents, how many nickels are in your pocket?

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Robert Dirks' Relay #1 – Person 2	
Question 1	What is the positive difference between 251 and 76?
Question 2	You have quarters and nickels in your pocket. If you have 3 quarters and the total value of the coins is in your pocket is TNYWG cents, how many nickels are in your pocket?

Robert Dirks' Relay #1 – Person 3	
Question 2	You have quarters and nickels in your pocket. If you have 3 quarters and the total value of the coins is in your pocket is TNYWG cents, how many nickels are in your pocket?
Question 3	You have a rectangle with a perimeter of TNYWG cm. If each short side of the rectangle is 3 cm long, what is the area of your rectangle?

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Robert Dirks' Relay #1 – Person 3	
Question 2	You have quarters and nickels in your pocket. If you have 3 quarters and the total value of the coins is in your pocket is TNYWG cents, how many nickels are in your pocket?
Question 3	You have a rectangle with a perimeter of TNYWG cm. If each short side of the rectangle is 3 cm long, what is the area of your rectangle?

Robert Dirks' Relay #1 – Person 4	
Question 3	You have a rectangle with a perimeter of TNYWG cm. If each short side of the rectangle is 3 cm long, what is the area of your rectangle?
Question 4	How many 5's are used to number the pages of a book with 6 times TNYWG pages in it? (Numbering starts on page 1 and numbers such as 15 count as one 5 being used.)

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Robert Dirks' Relay #1 – Person 4	
Question 3	You have a rectangle with a perimeter of TNYWG cm. If each short side of the rectangle is 3 cm long, what is the area of your rectangle?
Question 4	How many 5's are used to number the pages of a book with 6 times TNYWG pages in it? (Numbering starts on page 1 and numbers such as 15 count as one 5 being used.)

Robert Dirks' Relay #2 – Person 1	
Question 1	A flat of rainier cherries cost as much as three boxes of chocolates. A box of chocolates costs one-fifth as much as a bouquet of flowers. If a bouquet of flowers costs $10, how many dollars does a flat of rainier cherries cost?

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Robert Dirks' Relay #2 – Person 1	
Question 1	A flat of rainier cherries cost as much as three boxes of chocolates. A box of chocolates costs one-fifth as much as a bouquet of flowers. If a bouquet of flowers costs $10, how many dollars does a flat of rainier cherries cost?

Robert Dirks' Relay #2 – Person 2	
Question 1	A flat of rainier cherries cost as much as three boxes of chocolates. A box of chocolates costs one-fifth as much as a bouquet of flowers. If a bouquet of flowers costs $10, how many dollars does a flat of rainier cherries cost?
Question 2	How many diagonals does a polygon with TNYWG sides have?

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Robert Dirks' Relay #2 – Person 2	
Question 1	A flat of rainier cherries cost as much as three boxes of chocolates. A box of chocolates costs one-fifth as much as a bouquet of flowers. If a bouquet of flowers costs $10, how many dollars does a flat of rainier cherries cost?
Question 2	How many diagonals does a polygon with TNYWG sides have?

Robert Dirks' Relay #2 – Person 3	
Question 2	How many diagonals does a polygon with TNYWG sides have?
Question 3	Starting with the number 2, a list of consecutive prime numbers is written until there are TNYWG numbers on the list. What is the greatest number in the list?

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Robert Dirks' Relay #2 – Person 3	
Question 2	How many diagonals does a polygon with TNYWG sides have?
Question 3	Starting with the number 2, a list of consecutive prime numbers is written until there are TNYWG numbers on the list. What is the greatest number in the list?

Robert Dirks' Relay #2 – Person 4	
Question 3	Starting with the number 2, a list of consecutive prime numbers is written until there are TNYWG numbers on the list. What is the greatest number in the list?
Question 4	You have TNYWG cents in your pockets in coins. Your friend gives you an additional $1.42, also all in coins, which you add to your pocket. The possible coins include quarters, dimes, nickels, and pennies. What is the least number of coins you could have in your pocket?

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Robert Dirks' Relay #2 – Person 4	
Question 3	Starting with the number 2, a list of consecutive prime numbers is written until there are TNYWG numbers on the list. What is the greatest number in the list?
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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 ON THIS SHEET. WRITE THE TOTAL SCORE FOR EACH ROUND.

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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 ON THIS SHEET. WRITE THE TOTAL SCORE FOR EACH ROUND.

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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 positive difference between 35 and 28?	
2	What is six squared?	
3	What is two point three times twenty?	
4	Emily goes to the farmer's market and buys seven cucumbers for a total of ninety-one cents. How many cents does one cucumber cost?	
5	If yesterday was Tuesday, what day of the week will it be three days before two weeks from now?	
6	Angle A is complementary to angle B, and angle B is complementary to angle C. If angle B is eighty (eight-zero) degrees, what is the sum of the measures of angle A and angle C?	
7	A spelling bee is down to six finalists. From these six finalists, how many ways are there to award first, second, and third places, assuming no ties?	
8	You roll a standard six-sided die two times in a row. As a reduced fraction, what is the probability that you will roll a prime number first, followed by a composite number?	

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Key

Robert Dirks' Relay Contest – Answer Key

(Proctor — Hide this Key from View of Competitors)

ROBERT DIRKS' RELAY #1

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
175	20 [nickels]	21 [cm^2]	23 [fives]

ROBERT DIRKS' RELAY #2

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
[$] 6	9 [diagonals]	23	14 [coins]

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Key

COLLEGE KNOWLEDGE BOWL ROUND #1

#	Problem	Answer
1	The interior angles of a polygon have a sum of 180 degrees. How many sides does this polygon have?	3 [sides]
2	What is 15% of 60?	9
3	The movie Avengers: Endgame broke records by bringing in one billion, two-hundred-nine thousand dollars on its opening weekend. How many zeros does it take to write this number?	7 [zeros]
4	One cinnamon bun costs two-dollars and 98 cents. How much, in dollars, will it cost to buy four cinnamon buns?	11.92 ("11 dollars and 92 cents" or "eleven point ninety-two")
5	The film *Avengers: Endgame* is three hours and 20 minutes long, including previews. You arrive late and have missed five percent of the film. How many minutes are left in the film?	190 [minutes]
6	A watch gets 2 seconds slower every minute. How many minutes will it take for the watch to become a 3 full minutes behind?	90 [mintues]
7	As a reduced improper fraction, what is one-fourth plus three-sevenths plus five-twenty-eighths plus 1?	13/7 ("thirteen over seven" or "thirteen sevenths")
8	Rosario can arrange the books on her shelf in 24 different ways. How many books does Rosario have?	4 [books]
9	How many degrees will the minute hand of an analog clock have moved while you wait for 15 minutes after school for mom to pick you up?	90 [degrees]
10	What is the next term in the following sequence: 1, 4, 9, 16	25

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Key

COLLEGE KNOWLEDGE BOWL ROUND #2

#	Problem	Answer
1	What is the median of the following set of numbers: 66, 4, 88, 99, 77, 71, and 16	71
2	What is the 128th term in the sequence: 1, 2, 3, 1, 2, 3, and so on?	2
3	What is 17 squared?	289
4	Ryan walks 5 feet south, 15 feet west, and 3 feet east. How many feet distant (in a straight line) is Ryan from his original position?	13 [feet]
5	What is the surface area of a cube with a side length of seven centimeters?	294 [sq. cm]
6	95 percent out of a total of 440 reviews for the movie *Avengers: Endgame* were positive. How many positive reviews did Endgame receive?	418 [reviews]
7	Timmy enjoys babysitting his little sister. They play with toys one-third of the time. They play soccer two-fifths of the time, and they read books the rest of the time. What fraction of their time is spent reading?	4/15 ("four fifteenths" or "four over fifteen")
8	What is the product of 52 and 96?	4992
9	A particular human head has 60 hairs in every square inch. If there are 40 square inches on the head, how many hairs are on the head?	2400 [hairs]
10	Your math teacher spends 45 minutes a day, 4 days a week, coaching your math team. How many hours a week does your math teacher spend coaching?	3 [hours]

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Key

College Knowledge Bowl Round #3

#	Problem	Answer
1	Dobby has 6 red socks, 2 golden socks, 4 white socks, and 12 purple colored socks in a basket. Dobby closes his eyes and chooses a sock at random. What is the probability that Dobby chooses a purple sock?	$\frac{1}{2}$ ("one half" or "one over two")
2	What is the square root of 121, squared?	121
3	What is the largest prime factor of 60?	5
4	What is the next term in the sequence that starts with the following six numbers? 3, 3, 6, 9, 15, and 24	39
5	One gallon of water weighs approximately 8 pounds. A human body is two-thirds water. If Bill weighs 144 pounds, how many gallons of water are in Bill's body?	12 [gallons]
6	Hooke's law says that the force of a spring equals elasticity times how far the spring is stretched. If the force is 20 and the elasticity is 5, then how far was the spring stretched?	4 [units]
7	What is the area of a right triangle with legs of length 5 and 8?	20 [square units]
8	What is nine to the third power?	729
9	What is the product of eighteen and zero point five?	9
10	If thirteen children divide 76 pencils evenly amongst themselves, how many pencils are left over?	11 [pencils]

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Key

COLLEGE KNOWLEDGE BOWL ROUND #4

#	Problem	Answer
1	You attend math camp 5 days a week for 3 weeks during summer vacation. How many days do you attend math camp?	15 [days]
2	What is the smallest positive non-prime factor of 100?	1
3	A case of soda has 24 cans. If each can has 12 fluid ounces, then how many fluid ounces of soda do 2 cases have?	576 [fluid ounces]
4	How many positive factors does the number 200 have?	12 [factors]
5	The Pacific Crest Trail stretches approximately 2,650 miles from Mexico to Canada. If Suzy hikes an average of 25 miles a day, how many days will it take her to hike the entire trail?	106 [days]
6	Hector the Hiker must spend 136 days hiking to reach the end of the Pacific Crest Trail. If he stops to rest every 7th day and does no hiking that day, how many total days will it take him to finish hiking the trail?	155 [days]
7	You roll 2 fair, six-sided dice. What is the probability that the sum of the two dice is a 4?	1/12 ("one twelfth" or "one over twelve")
8	While working on your homework, the minute hand of an analog clock moves through 108 degrees. How long did it take you to do your homework?	18 [minutes]
9	If the College Bowl rounds started late at 6:07 PM, and each of the 6 rounds takes 15 minutes, at what time will College Bowl be over?	7:37 PM
10	How many distinct diagonals does a regular pentagon have?	5 [diagonals]

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Key

College Knowledge Bowl Round #5

#	Problem	Answer
1	What is 32 divided by zero-point-eight?	40
2	I roll a fair, 20-sided die with faces labeled 1 through 20. What is the probability that I roll a prime number?	2/5 ("two fifths" or "two over five")
3	Anya makes slime by adding one gallon of glue, two quarts of shaving cream, and one cup of borax solution to a mixing bowl. Assuming that amounts are additive, how many cups of slime materials are in Anya's bowl?	25 [cups]
4	A group of students is ordering soda. Two-sevenths of the students order Orange Soda. If ten students ordered Orange Soda, how many total students are in the group?	35 [students]
5	If "x" is the number of days in June, then what is 3 times "x" minus 7?	83
6	Apples are 58 cents each, and pears are 34 cents each. How many more cents do 3 apples cost than 4 pears?	38 [cents]
7	The ratio of the angles in a triangle is three-to-four-to-five. What is the smallest angle measure, in degrees?	45 [degrees]
8	The 3 angles of a triangle are 32 degrees, 71 degrees, and X degrees. What is X divided by 11?	7
9	What time is it 94 minutes after 11:28 PM?	1:02 AM
10	What is the volume of a rectangular prism with side lengths of 5, 3, and 7?	105

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Key

COLLEGE KNOWLEDGE BOWL ROUND #6

#	Problem	Answer
1	What is the sum of the first five odd counting numbers?	25
2	What is the second largest factor of 138?	69
3	How many times does the digit 4 show up in the first 25 counting numbers?	3 [times]
4	What is the height of a rectangular prism if it has a volume of 225 square feet and its base has a width of 5 feet and length of 9 feet?	5 [feet]
5	Kyle goes to an ice cream shop that has chocolate, vanilla, and strawberry ice cream. How many different ways can he buy a double scoop of ice cream?	9 [ways]
6	My phone has 30% of a full battery charge. If a full charge lasts for 7 hours, then how many minutes do I have before my phone reaches 0% battery charge?	126 [minutes]
7	To celebrate Pi Day, your math club coach ordered 14 pies and cut them into 6 pieces each. There are 12 kids in your math club. When slices are divided evenly, how many pieces of pie does each member of your team get to eat?	7 [pieces of pie]
8	How many edges does a triangular pyramid have?	6 [edges]
9	What is the sum of the fifth and seventh prime numbers?	28
10	What is 546 minus 119?	427

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Key

COLLEGE KNOWLEDGE BOWL ROUND — EXTRA Qs

#	Problem	Answer
1	What is the sum of one-hundred-fifty-three and seventy-five?	228
2	The radius of a circle is 3 inches. How many inches long is the diameter of this circle?	6 [inches]
3	How many sides does a heptagon have?	7 [sides]
4	What is the positive difference between 97 and 203?	106
5	A rectangle has one side that has a length "x" and the other side is of length "2x." What is the area of this shape when 5x equals 25?	50 [sq. units]
6	As a reduced fraction, if you roll a fair, six-sided die, what is the probability that you will roll a multiple of 3?	1/3 ("one third" or "one over three")