"Math Is Cool" Championships — 2024-25

6th Grade — January/February 2025

Sponsored by:

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 will result in disqualification.*
- *Competitors may not use calculators or any other aids on any portion of this contest.*
- *Unless stated otherwise:*
  - *All answers are integers, and any non-integer answers will be "coded" as integers.*
  - *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, 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) + 1·(Triple Jump) + 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).

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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			
6th Grade	**TOTAL:**		

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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)
Bracketed items […] in the answer key are optional.

6th Grade

	Answer	
1	13	What is the mean of the set of integers from eleven to fifteen inclusive?
2	[$] 1750 [dollars]	Phoebe and Monica are going to evenly split the cost of a three-thousand-five-hundred dollar car. How many dollars will Phoebe pay for her share of the car?
3	7 [circles]	What is the maximum number of non-overlapping circles of radius one centimeter that can fit inside a two-centimeter-by-fifteen-centimeter rectangle?
4	2 [prime numbers]	How many prime numbers are between twenty-four and thirty-two?
5	25	What is three-fourths of twelve plus four-thirds of twelve?
6	495 [minutes]	Hamta left home for school at seven thirty AM, and returned home on the same day at three forty-five PM. How many minutes was Hamta away from home?
7	[N =] 8	The first three terms of a geometric sequence are one hundred twelve, fifty-six, and twenty-eight. Let term number N be the first term in the sequence that is less than one. What is N?
8	120 [ways]	Min has four standard dice, where one is red, one is yellow, one is green, and one is blue. If she rolls them all together, in how many ways can three of the dice show the same number while the fourth die shows something different?

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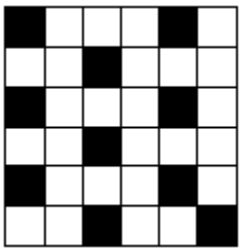
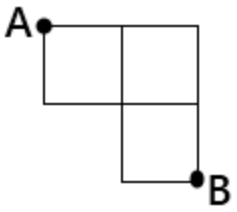
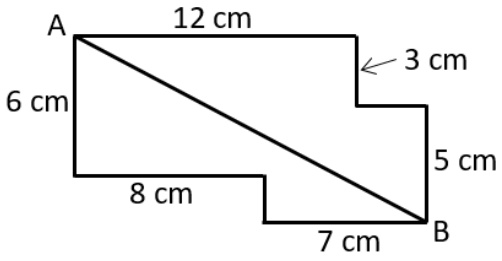
Individual Contest

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.

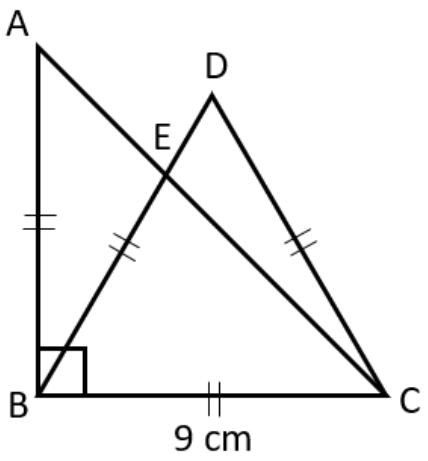
	Questions 1-30: 2 points each
1	How many nickels make 85 cents?
2	What is the largest 2-digit multiple of 10?
3	The mean of three numbers is 20. If two of the numbers are 8 and 13, what is the third number?
4	Guillermo has one white hat, two blue hats, and three brown hats and he randomly selects one to wear on a given day. As a reduced common fraction, the probability that he takes a blue hat is A/B. What is A + B?
5	Evaluate: 1111 – 111 + 11 – 1
6	How many square inches are in the area of a rectangle with a length of 7 inches and a width of 12 inches?
7	In the grid of squares shown below, as a reduced common fraction, the ratio of black squares to white squares is A/B. What is A + B? 
8	How many meters are in 2.3 kilometers?
9	A dish has 4 green marbles, 7 clear marbles, and 8 orange marbles. If marbles are randomly taken from the dish, what is the minimum number needed to be taken that would guarantee at least one of each color?
10	Solve the equation for x: 6x – 21 = 69
11	Lincoln can wash 12 plates in 3 minutes. In minutes, how long does it take him to wash 56 plates?
12	What percent of 25 is 10?
13	What is the 6th term in the arithmetic sequence whose first three terms are 8, 31, and 54?
14	A number is randomly selected from the integers 1 through 20. As a percent, what is the probability that the selected number is larger than 16?

Continued on next page.

15	How many ways are there to draw a path from A to B that must only lie on top of horizontal and/or vertical segments in the figure shown and in which your pencil can only move right or down? 
16	What is the largest prime factor of 104?
17	As a reduced common fraction, the sum of the following two numbers is A/B. What is A + B? $1\frac{2}{3} + 2\frac{3}{4}$
18	What is the median of the following set of numbers? 11, 6, 17, 9, 12, 4, 1, 25
19	What is the smallest integer solution to the inequality? 19 < 2x + 6
20	The area of a circle with diameter 10 inches is Aπ in^2. What is A?
21	How many ways are there to arrange the letters in the word CROW, if C must be the third letter?
22	Let set A = {9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99}, set B = {5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95}, and set C. = {15, 30, 45, 60, 75, 90}. As a reduced common fraction, the probability that a randomly chosen number from set A is also a member of both sets B and C is P/Q. What is P + Q?
23	What is the sum of the distinct prime factors of the number 2025?
24	The Fibonacci Sequence is 1, 1, 2, 3, 5, 8, and so on. A different increasing sequence (Let's call it the New Sequence), has 10 as its first term. The second term in the New Sequence results from adding the first term in the Fibonacci Sequence to the first term of the New Sequence. The third term in the New Sequence results from adding the second term in the Fibonacci Sequence to the second term of the New Sequence. If this pattern continues, what is the ninth term of the New Sequence?
25	Leon takes 125 seconds to complete one lap on the track at school. Ayanna runs at a rate that is 5/4 times as fast as Leon. How many seconds does it take Ayanna to complete one lap on the same track?
26	In centimeters, what is the length of $\overline{AB}$ in the figure? Note: All external edges of the figure are either horizontal or vertical. 
27	The following expression simplifies to the reduced common fraction A/B. What is A + B? $\frac{10^3 - 10}{5^5 + 5^2}$
Continued on next page.	

28	What is the largest possible number in a data set with 5 distinct positive integers and a mean of 14?
29	The lengths of two parallel sides of square ABCD are multiplied by 1.4 and the lengths of the other two parallel sides are multiplied by 1.6 to create rectangle EFGH. As a reduced common fraction, the ratio of the area of rectangle EFGH to the area of square ABCD is P/Q. What is P + Q?
30	Nayeli has 1.5 times as many dimes as nickels and the value of her dimes and nickels is $4.40. How many nickels does she have?

Challenge Questions: 3 points each

31	A bathtub takes 6 minutes to fill up when the drain is closed and 10 minutes to fill up when the drain is open. In minutes, how long does it take to empty a full tub?
32	The base-10 number $279 = 139_b$, where $b > 0$. What is the value of b?
33	At a summer ping pong academy for teenagers 1/7 of the residents are left-handed and 6/7 of the residents are right-handed. Exactly 1/3 of the left-handed residents and 3/10 of the right-handed residents use a red paddle. What is the smallest possible number of residents at the academy?
34	What is the mean of all integers that are 6 more than 55 times their reciprocal?
35	A data set consists of 5 positive integers, 4 of which are distinct from each other and one that is the same as one of the 4 distinct integers. The mean and the mode of the data set are both 9. What is the positive difference between the greatest possible range and the smallest possible range of a data set that meets these conditions?
36	Josue and Felicity take turns rolling a fair 12-sided die with faces numbered 1 through 12. The first player to roll an odd prime number is the winner of the game. If Felicity goes first, as a reduced common fraction, the probability that she wins the game is A/B. What is A + B?
37	How many 5-digit positive integers can be created using the digits 2, 3, 4, 5, 6, 7, and 8, such that all 5 digits in a given integer are different and no two even digits may be next to each other?
38	In the figure, AB = BC = CD = BD = 9 cm and $\overline{AB} \perp \overline{BC}$. In simplified form, the area of ΔBCE can be expressed as $\frac{M-N\sqrt{P}}{Q}$ where M, N, P, and Q are positive integers, GCF(M, N, Q) = 1, and the largest perfect square factor of P is 1. What is M + N + P + Q? 

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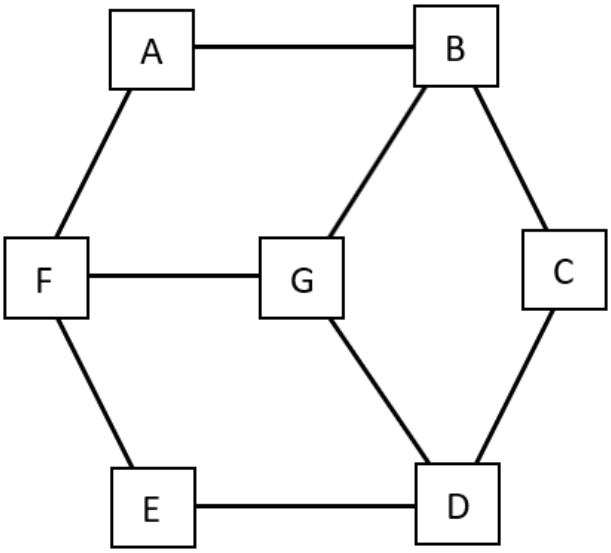
39	Two real numbers from 1 to 6, inclusive, are chosen at random. As a percent, what is the probability that the positive difference between the two numbers is greater than 1?
40	Each of the letters A, B, C, D, E, F and G in the figure shown will be replaced with a different value from the set {2, 3, 4, 5, 6, 7, 8}. If the sums of the four numbers at the vertices of quadrilaterals ABGF, BCDG, and DEFG are each 18, what is the sum of all numbers that can replace G? 

"Math Is Cool" Championships – 2024-25

KEY

Individual Contest – Answer Key

SCORERS: Bracketed […] items in answer key are optional. Just mark the score as 0 or 1 and add up those values to reflect total correct.
First Scorer – use the right-hand columns so 2nd scorer can do a blind scoring.

	Answer
1	17 [nickels]
2	90
3	39
4	[A + B =] 4
5	1010
6	84 [in^2]
7	[A + B =] 18
8	2300 [meters]
9	16 [marbles]
10	[x =] 15
11	14 [min]
12	40 [%]
13	123
14	20 [%]
15	5 [ways/paths]

	Answer
16	13
17	[A + B =] 65
18	10
19	[x =] 7
20	[A =] 25
21	6 [ways]
22	[P + Q =] 13
23	8
24	64
25	100 [seconds]
26	17 [cm]
27	[A + B =] 46
28	60
29	[P + Q =] 81
30	22 [nickels]

	Answer
31	15 [minutes]
32	[b =] 15
33	105 [residents]
34	3
35	18
36	[A + B =] 8
37	576 [integers]
38	[M + N + P + Q =] 331
39	64 [%]
40	10

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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:			

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January/February 2025

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

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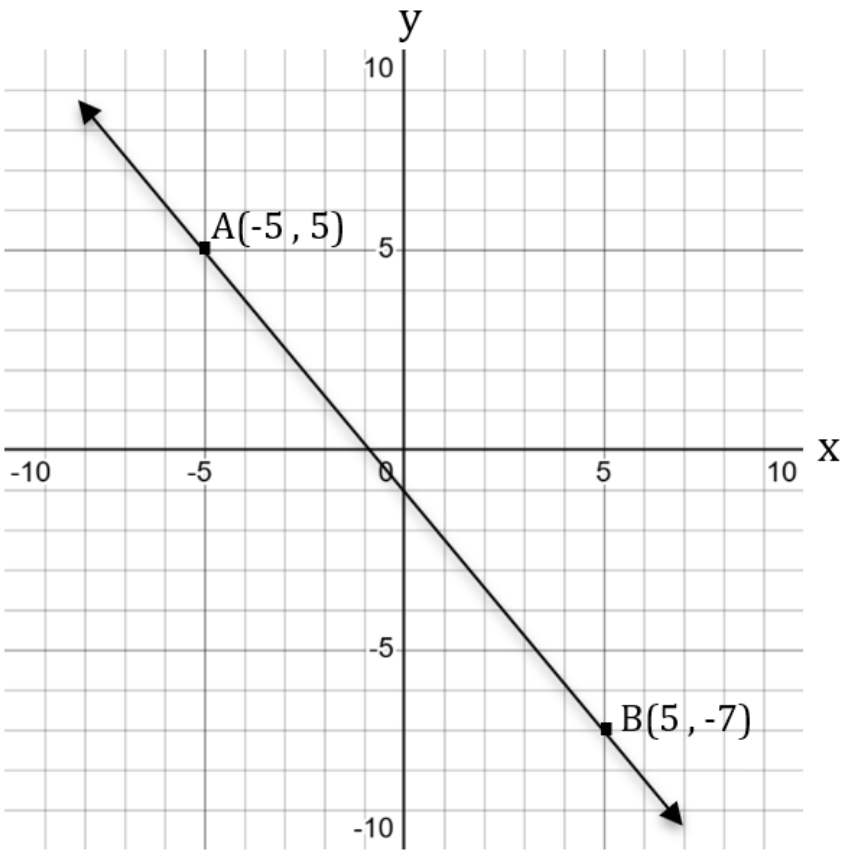
Team Multiple Choice Contest

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #1 THROUGH #3.



1 The sum of the coordinates of point A is 0 and the sum of the coordinates of point B is -2. What is the sum of the coordinates of the point where $\overleftrightarrow{AB}$ crosses the y-axis (aka: the y-intercept)?

A) -1 B) -1/2 C) 0 D) 1/2 E) 1

2 An ant walks straight up from point B until it can make a single 90° left turn and then walk straight to point A. If the length of one side of a grid square is one unit, how many units will the ant have traveled from A to B?

A) 11 B) 20 C) 22 D) 24 E) 25

3 Point C is three units to the right of point A and point D is ten units straight up from point B. What is the distance between C and D?

A) $2\sqrt{10}$ units B) $\sqrt{53}$ units C) $\sqrt{58}$ units D) $2\sqrt{17}$ units E) 9 units

Continued on Next Page

	USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #4 THROUGH #6. When you divide two numbers, if the divisor does not go into the dividend evenly, there will be a remainder. For example, the divisor 8 goes into the dividend 50 six times, with a remainder of 2. In other words, 50 ÷ 8 = 6 remainder 2. The following three problems have to do with remainders.
4	What is the remainder when 60 is divided by 7? A) 3 B) 4 C) 5 D) 6 E) 7
5	When A is divided by 11, the remainder is 9. When A is divided by 13, the remainder is 3. What is the largest 2-digit value of A? A) 20 B) 29 C) 31 D) 42 E) 84
6	What is the remainder when 2^{2025} is divided by 40? A) 4 B) 8 C) 16 D) 24 E) 32
	USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #7 THROUGH #10. The following four problems involve solving algebraic equations.
7	Solve for x: $10x - 7 = 53$ A) -6 B) -4.6 C) 6 D) 7 E) 9
8	Solve the equation $C = \frac{5}{9}(F - 32)$ for F. A) $F = \frac{5}{9}C + 32$ B) $F = \frac{5}{9}(C - 32)$ C) $F = 1.8(C + 32)$ D) $F = \frac{9}{5}C + 32$ E) $F = 1.8C - 57.6$
9	If $x + 3/y = 1/7$ and $y + 3/x = 84$, what is the value of the product xy? A) -3 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2 E) 3
10	Given $a - b = 4$ and $a^2 + b^2 = 116$, what is the value of $a^3 - b^3$? A) 536 B) 664 C) 728 D) 856 E) Answer not given

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Key

Team Multiple Choice Contest – Answer Key

6th Grade

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

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

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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. ***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

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

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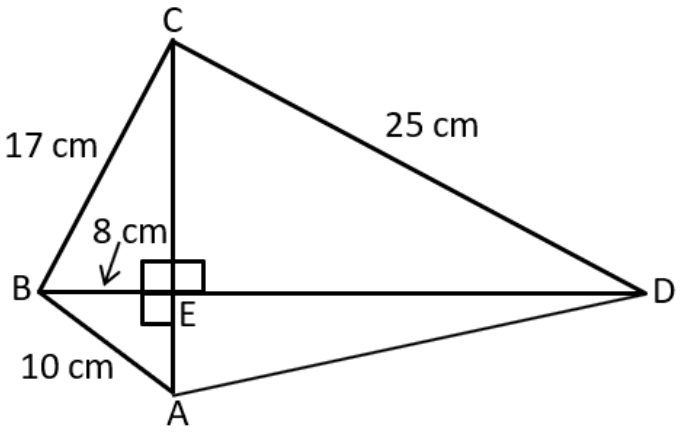
6th Grade — January/February 2025

Team Contest

1	Evaluate: $\frac{(3-6)^3}{(-9)} - 17 + ((-5)^2 - 1)$
2	In the 8th grade class of Park Middle School, there are 95 students. Two-fifths of these students have a dog. Forty-one of them have a cat and 27 of them have both a dog and a cat. How many of the 95 students don't have a cat or a dog?
3	How many positive prime numbers less than 50 have 7 as at least 1 of their digits?
4	As a reduced common fraction, the median of the following data set is A/B. What is A + B? {7/10, 1/2, 2/3, 2/5, 1/3}
5	Tanishi has $4.37 in coins that consist only of quarters, dimes, nickels, and pennies. She has one nickel among her coins. What is the smallest total number of coins she could have?
6	In the figure, AB = 10 cm, BC = 17 cm, CD = 25 cm, and BE = 8 cm. The length of AD is $P\sqrt{Q}$ cm, where P and Q are integers, and Q does not have a factor that is a perfect square other than 1. What is P + Q? 
7	A particular number series increases alternately by adding 10 and then by multiplying by 1/2. For example, if the first term in the series is 6, the next four terms would be 16, 8, 18, 9, and so on. What is the smallest possible integer in the series if the first term is 330?
8	If N is a perfect cube and a factor of 11!, what is the largest value of N?
9	Let A and B be two distinct three-digit positive integers, such that A + B > 1960, A > B, and A – B = D. What is the median of all possible values of D?
10	In a hand of 8 cards there are 4 hearts and 4 clubs. The cards are randomly selected one at a time without replacement and laid on a table. As a reduced common fraction, the probability that the 6th card laid on the table is a heart is A/B. What is A + B?

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Key

Team Contest – Answer Key

6th Grade

	Answer
1	10
2	43 [students]
3	4 [prime numbers]
4	[A + B =] 3
5	22 [coins]
6	[P + Q =] 111
7	15
8	[N =] 1728
9	19
10	[A + B =] 3

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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			
6th Grade	**TOTAL:**		

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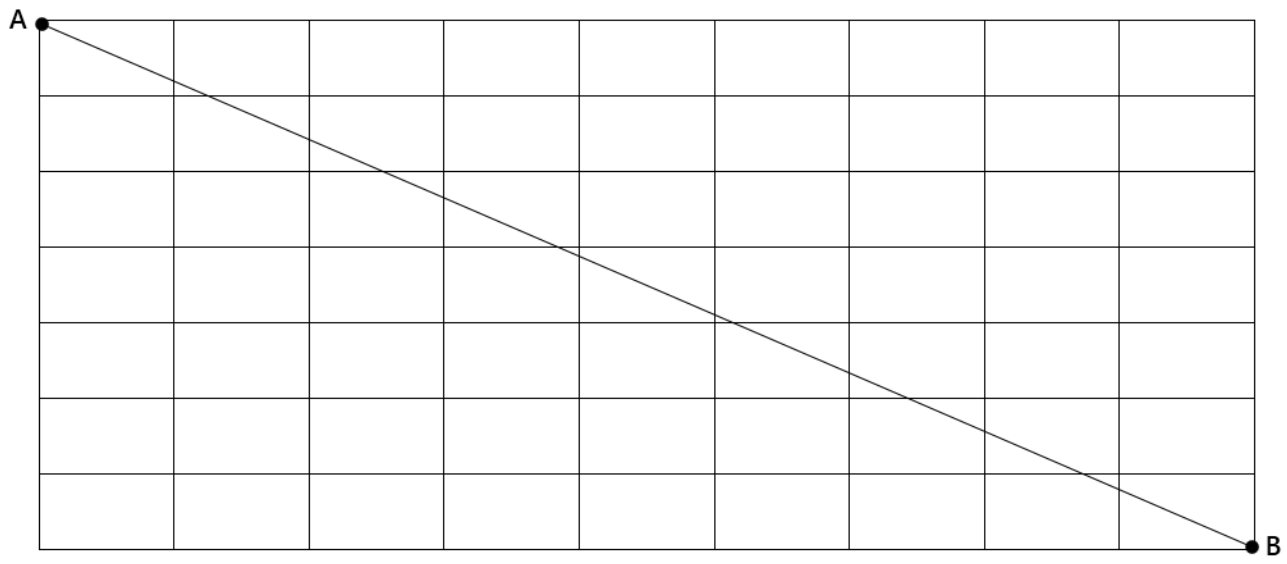
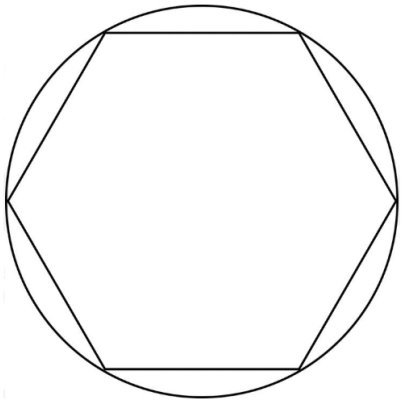
Linda Moore Triple Jump

1	Evaluate the following expression when a = 1 and b = 4: $5a^2b^2 + 7ab^3$
2	One gallon is equivalent to about 3.78541 liters. To the nearest integer number of milliliters, how many milliliters are in one gallon?
3	Horace takes 6 minutes to walk a quarter mile home from school. Horace's average rate of walking home from school is A.B miles per hour. What is A + B?
4	The first three terms of a geometric sequence are 1458, 486, and 162. What is the 7th term in the sequence?
5	The rectangular grid shown below consists of some number of congruent non-overlapping rectangles and point A is connected to point B with a segment. How many of the congruent non-overlapping rectangles does $\overline{AB}$ *not* pass through? 
6	A pair of standard dice are rolled. As a reduced common fraction, the probability that the sum of the two numbers showing is greater than 6 and less than 10 is A/B. What is A + B?
7	As a reduced common fraction, the following expression simplifies to A/B. What is A + B? $$\frac{1}{2+\frac{3}{4+\frac{5}{6}}}$$

Continued on next page.

8	A regular hexagon is inscribed in a circle, as shown here. Given that the area of the hexagon is $294\sqrt{3}\ cm^2$, the circumference of the circle can be written as $A\pi$ cm. What is A? 
9	Juana can build a large shed in 5 days less than it takes her brother Carlos. If they built it together it would take them 6 days. How many days would it take Carlos to build the shed by himself?
10	What is the only 7-digit base-7 number in which the first digit on the left tells how many 0s, the second digit from left tells how many 1s, the third digit tells how many 2s, the fourth digit tells how many 3s, the fifth digit tells how many 4s, the sixth digit tells how many 5s, and the seventh digit tells how many 6s are in the number? You do not need to include the "base 7" in your answer.

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Key

Linda Moore Triple Jump – Answer Key

6th Grade

	Answer
1	528
2	3785 [ml]
3	[A + B =] 7
4	2
5	48 [rectangles]
6	[A + B =] 17
7	[A + B =] 105
8	28 [= A]
9	15 [days]
10	$3211000_{[7]}$ [base 7]

"Math Is Cool" Championships — 2024-25

6th Grade — January/February 2025

Final Score *(out of 30)*

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

Linda Moore Triple Jump – 15 minutes – ~15% of team score

When you are prompted to begin, tear off the three colored answer sheets and give a copy of the test to each of your team members and begin testing. Record all answers on this colored answer sheet. This Submittal #1 will be collected after 5 minutes.

SUBMITTAL #1

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			
6th Grade	**TOTAL:**		

"Math Is Cool" Championships — 2024-25

6th Grade — January/February 2025

Room #	School Name	Team #

Linda Moore Triple Jump – 15 minutes – ~15% of team score

This Submittal #2 will be collected after 10 minutes.

SUBMITTAL #2

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			
6th Grade	**TOTAL:**		

"Math Is Cool" Championships — 2024-25

6th Grade — January/February 2025

Room #	School Name	Team #

Linda Moore Triple Jump – 15 minutes – ~15% of team score

This Submittal #3 will be collected after 15 minutes.

SUBMITTAL #3

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			
6th Grade	**TOTAL:**		

"Math Is Cool" Championships — 2024-25

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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.

"Math Is Cool" Championships — 2024-25

6th Grade — January/February 2025

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

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 mean of the set of integers from eleven to fifteen inclusive?	
2	Phoebe and Monica are going to evenly split the cost of a three-thousand-five-hundred dollar car. How many dollars will Phoebe pay for her share of the car?	
3	What is the maximum number of non-overlapping circles of radius one centimeter that can fit inside a two-centimeter-by-fifteen-centimeter rectangle?	
4	How many prime numbers are between twenty-four and thirty-two?	
5	What is three-fourths of twelve plus four-thirds of twelve?	
6	Hamta left home for school at seven thirty AM, and returned home on the same day at three forty-five PM. How many minutes was Hamta away from home?	
7	The first three terms of a geometric sequence are one hundred twelve, fifty-six, and twenty-eight. Let term number N be the first term in the sequence that is less than one. What is N?	
8	Min has four standard dice, where one is red, one is yellow, one is green, and one is blue. If she rolls them all together, in how many ways can three of the dice show the same number while the fourth die shows something different?	

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Key

COLLEGE BOWL ROUND #1

#	Problem	Answer
1	How many even integers are there between eleven and forty-nine?	19 [even integers]
2	If three X plus four Y equals sixty-five and X equals eleven, what does Y equal?	[y =] 8
3	Biff can prepare sixteen bags of tater tots in twenty minutes. Eho prepares tater tots at a rate that is twice as fast as Biff. How many minutes does it take Eho to prepare twenty-four bags of tater tots?	15 [minutes]
4	A certain bag of M-and-Ms contains ten green, twenty-two brown, six red, seven yellow, and five blue M-and-Ms. If one M-and-M is randomly chosen, what is the probability in percent that it is not yellow?	86 [%]
5	An eight-inch-by-eight-inch square is cut out from a piece of paper. It is then cut into as many two-inch-by-three-inch rectangles as possible, such that there is only one scrap leftover. In inches, what is the perimeter of the scrap?	8 [inches]
6	What is the largest two-digit integer that is the product of three distinct prime numbers?	78
7	An infinite series begins with the terms one-third, two-fourths, three-fifths, and so on. The ninth term in the series is A over B. What is A plus B?	[A + B =] 20
8	What is the mean of the two-digit positive multiples of twenty-two?	55 [= mean]
9	Let A be a single-digit positive integer, let B be a two-digit positive integer, and let C be a three-digit positive integer. What is the largest possible positive difference between C and the sum of A and B?	988
10	Let A equal one plus twenty plus three hundred plus four thousand plus fifty thousand. What is A divided by three?	18107

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Key

COLLEGE BOWL ROUND #2

#	Problem	Answer
1	What is the greatest positive difference between any two prime numbers less than thirty?	27
2	How many square inches are in two and a half square feet?	360 [in^2]
3	As a reduced common fraction, one-third plus three-fifths equals A over B. What is two times A?	[2A =] 28
4	The first three terms of a sequence are twelve, twenty, and eight, where starting with the third term, each successive term is the positive difference between the previous two terms. What is the one hundredth term in this sequence?	4
5	The expression six X squared plus X minus forty can be factored into the quantity two X minus A times the quantity three X plus B. What is B?	[B =] 8
6	How many positive integers less than two hundred and fifty are multiples of four and ten, but not six?	8 [integers]
7	Bert can decorate three cakes in an hour. Ernie decorates cakes at a rate that is one and a half times Bert's rate. How many minutes would it take the two of them working together to decorate three cakes?	24 [minutes]
8	As a reduced common fraction, the probability of drawing two cards one at a time with replacement, from a standard deck, that are both aces is A over B. What is A plus B?	[A + B =] 170
9	Thirty-five is seven percent of what number?	500
10	The measures of three of the angles in a convex quadrilateral are sixty-one, ninety-two, and one hundred and eight. How many degrees are in the measure of the fourth angle?	99 [°]

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COLLEGE BOWL ROUND #3

#	Problem	Answer
1	An ultimate frisbee team has twelve girls and nine boys. As a reduced common fraction, the ratio of girls to total players on the team is A over B. What is A plus B?	[A + B =] 11
2	As a reduced common fraction, the value of X in the equation five X over eight equals seven over nine is A over B. What is A plus B?	[A + B =] 101
3	What is thirty times fifty-three divided by three?	530
4	In a sequence the fourth term is the mean of the first three terms, and each successive term is the mean of the previous three terms. If the first three terms are negative fifteen, one, and thirty-two, what is the sixth term?	17 [= 6th term]
5	The probability that the Mustangs will win any given game is sixty percent. As a percentage, what is the probability that they will win exactly one of their next two games?	48 [%]
6	How many integers are greater than seven point nine and less than thirty-one point one?	24 [integers]
7	A data set contains seven distinct positive integers, the median is thirteen, and the mean is fourteen. What is the largest possible number in the set?	50
8	In degrees, what is the measure of the complement of the supplement of a one-hundred and sixteen degree angle?	26 [°]
9	Abe is six years older than Ben, who is currently ten years old. How old in years was Abe when he was twice as old as Ben?	12 [years old]
10	If three carpenters can build twenty-seven cabinets in six days, how many cabinets can five carpenters build in ten days?	75 [cabinets]

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COLLEGE BOWL ROUND #4

#	Problem	Answer
1	What is eighty-three times seventy-seven?	6391
2	What is the sum of the first six terms of the geometric sequence whose first three terms are one, three, and nine?	364
3	Each of the smallest six positive prime numbers is doubled to make a set of six even integers. What is the median of the set of six even integers?	12
4	Jenna took sixty-three minutes to read fifty-seven pages of her current book which is two hundred and sixty-six pages long. At this rate, how many minutes will it take her to read the rest of the book?	231 [minutes]
5	What is the smallest two-digit composite number that has exactly two distinct composite numbers as factors?	27
6	Let A be one hundred and fifty percent of B. Let C be two hundred and fifty percent of D. Let A equal C. What percent of B is D?	60 [%]
7	A cone and a cylinder have the same volume. The cylinder has a radius that is half the radius of the cone. As a reduced common fraction, the ratio of the height of the cylinder to the height of the cone is A over B. What is A plus B?	[A + B =] 7
8	A fathom is equivalent to six feet. The average depth of Iceland's Blue Lagoon is two-thirds of a fathom. What is the average depth of Blue Lagoon in inches?	48 [inches]
9	Solve the following equation for X: five X over two equals one hundred sixty-five over six	[x =] 11
10	As a reduced common fraction, the ratio of the number of positive single-digit even integers to the number of positive single-digit odd integers is A over B. What is A plus B?	[A + B =] 9

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COLLEGE BOWL ROUND #5

#	Problem	Answer
1	Shira has six dimes, seven pennies, two nickels, and five quarters in her pocket. If she randomly selects one coin from her pocket, what is the probability in percent that it is a dime?	30 [%]
2	In centimeters, what is the diameter of a circle whose area is one hundred and sixty-nine pi square centimeters?	26 [centimeters]
3	Serena's scores on her last three rounds of golf were eighty-two, eighty-five, and seventy-seven. What score does she need on her next round to lower her average to exactly eighty?	76
4	The absolute value of A minus B equals eight and the absolute value of between B minus C equals nine. Let D equal the greatest possible absolute value of A minus C, and let E equal the smallest possible absolute value of A minus C. What is D – E?	[D – E =] 16
5	What is the smallest possible sum of two positive integers whose greatest common factor is thirteen and whose least common multiple is one hundred and thirty?	91
6	Angela and Megan begin at the same place and time to run around a circular four-hundred-meter track. Angela's average rate is two hundred and forty meters per minute and Megan's average rate is twenty percent faster than Angela's. After how many seconds will Megan pass Angela for the first time?	500 [seconds]
7	Every page of a one-hundred and twenty-one-page book is numbered. How many times does the digit six appear in the page numbering?	22 [times]
8	What is three-eighths divided by one sixteenth?	6
9	One-fourth of the Skittles in a bag of sixty are green, one-sixth are yellow, three-tenths are purple, and the rest are orange. How many Skittles are orange or purple?	35 [orange or purple skittles]
10	Solve the following equation for X: seven X minus twenty-three equals negative two X plus one hundred thirty-nine	[x =] 18

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COLLEGE BOWL ROUND #6

#	Problem	Answer
1	How many millimeters are in two and four-fifths of a meter?	2800 [mm]
2	If A equals four B, and three A minus five B equals fifty-six, what is A?	[A =] 32
3	Rae can paint ten boards in sixteen minutes. At this rate, how many boards can she paint in forty minutes?	25 [boards]
4	A jar contains twenty marbles that are all either green or blue. After one-fourth of the green marbles are removed there are then seventeen marbles left in the jar. As a percentage, what is the probability of randomly selecting a blue marble from the original contents of the jar?	40 [%]
5	How many positive two-digit integers less than forty are there, such that each digit is a different positive factor of the integer?	4 [integers]
6	Let A, B, C, and D each be replaced randomly by a different member of the set six, nine, twelve, and fifteen. What is the largest possible value of A times B minus C times D?	126
7	As a reduced common fraction, the ratio A over B is three over seven, where A does not equal three and B does not equal seven. When four is added to A, the new ratio is four over seven as a reduced common fraction. What is B?	[B =] 28
8	What is the positive difference between the largest two-digit prime number and the smallest one-digit prime number?	95
9	What is the tenth term in the arithmetic sequence whose first term is ten and whose fourth term is nineteen?	37
10	What is the median of the following set of numbers: nineteen, one hundred and nine, nine, twenty-nine, seventy-nine, and eighty-nine?	54