"Math Is Cool" Championships — 2022-23

78th Grade — February 2023

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:* ***For 2023: all answers are integers***
  - *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) + 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			
78th 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.

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	Answer	
1	12	What is the largest factor of twenty-four, besides twenty-four?
2	14	What is the next number in the arithmetic sequence starting with two, six, and ten?
3	10 [minutes]	Alicia runs two-tenths of a mile in two minutes. At this rate, how many minutes does it take her to run a whole mile?
4	[x * 2y =] 40	If X equals four and Y equals five, what is the value of X times two Y?
5	[A+B=] 8	The probability that it will rain tomorrow is forty percent. As a reduced common fraction the probability that it will not rain tomorrow is A over B. What is the value of A plus B?
6	80000	Express seventy-two times ten to the fourth power divided by nine as an integer.
7	[A =] 30	A cylindrical tube is open at both ends, has a radius of three centimeters, and is five centimeters long. The external surface area of the tube is A times pi square centimeters. What is the value of A?
8	[A =] 4	Let A and B equal two distinct positive integers. If one-half of A equals two-thirds of B, what is the smallest possible value of A?

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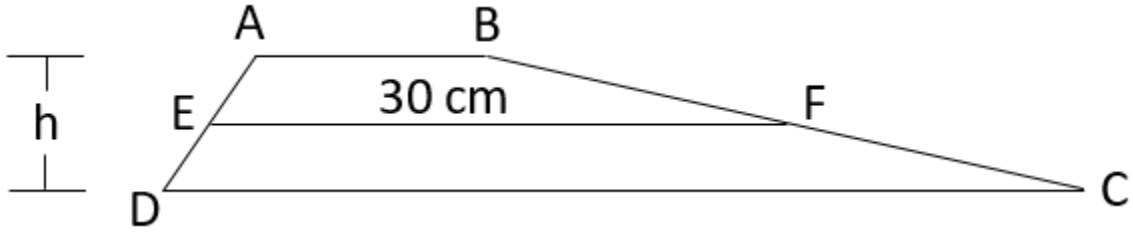
Individual Contest

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.

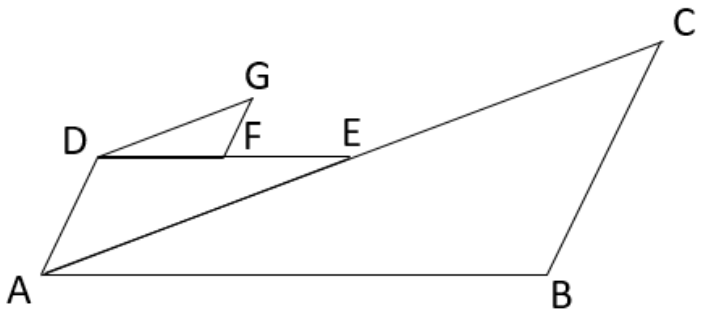
	Questions 1-30: 2 points each
1	Evaluate: 32 + 57
2	If 24 apples cost $20, what do 18 apples cost, in dollars?
3	Let A = (1)(3)(6) and let B = (2)(4)(8). What is the value of B – A?
4	In a line of cats there is one cat in front, one cat in back, and two cats who are neither in front nor in back. How many cats are in the line?
5	What is 20% of 330?
6	My card hand consists of 4 hearts, 4 diamonds, 3 clubs, and 2 spades. As a reduced common fraction, the probability that a card randomly selected from my hand is a heart is A/B. What is the value of A + B?
7	What is the greatest common factor of 60 and 50?
8	What is the median value in the following data set? 22, 24, 18, 34, 17, 23, 20, 15
9	Bibi rides her bike for 20 minutes and travels a total of 3 miles. What is her average speed in miles per hour?
10	In a right triangle, one of the acute angles has a measure of 27°. What is the number of degrees in the measure of the other acute angle?
11	In a group of 4 friends, each person shakes hands exactly once with each of their friends. How many handshakes occur?
12	How many square inches are in the area of a 1-foot by 3-foot rectangle?
13	As a reduced common fraction, $\frac{7}{6} - \frac{8}{9} = \frac{A}{B}$. What is the value of A + B?
14	The first three terms of an arithmetic sequence are 5, 10, and 15. What is the 7th term in the sequence?
15	Solve the following equation for x. 5x – 23 = 47
16	What is the remainder when 80 is divided by 13?

Continued on next page.

17	Evaluate: 6^3
18	Roland has taken 27 minutes to complete 45% of an application. How many additional minutes will he need to finish the application?
19	If a + b = 32 and a and b are positive integers, what is the largest possible value of $\frac{a}{b}$?
20	When flipping three coins the probability of not flipping either three heads or three tails as a reduced common fraction is A/B. What is the value of A + B?
21	How many multiples of 31 are there between 1 and 1000?
22	Consider the following data set: 5, 20, 30, 10, 15, 25, 30, 40, 35, 10, 25, 10 Let A be any random number in the data set. If A is replaced by B, such that B = A + 48, by how much does the mean of the data set increase?
23	In the addition problem shown, let A, B, and C each represent distinct single-digit positive integers. What is the value of A + B + C? A A A + B B A C 5
24	On a backpacking trip, while Xiaoyong is moving, he hikes at an average rate of 2.5 miles per hour. During one 10-mile hike, he takes four 30-minute breaks. With the breaks added to his total time, how many minutes on average does it take him to hike one mile during the trip?
25	In total there are 10 red, 15 blue, 12 green, and 18 yellow gummy bears in a jar. If two gummy bears are randomly drawn from the jar, the probability as a reduced common fraction that both are blue is A/B. What is the value of A + B?
26	In the trapezoid shown, $\overline{AB}$ is parallel to $\overline{DC}$, and E and F are the midpoints of sides $\overline{AD}$ and $\overline{BC}$. If EF = 30 centimeters and the area of trapezoid ABCD is 210 cm^2, what is the height h of ABCD, in centimeters? 
27	What is the smallest integer solution of x in the following inequality? $\frac{2}{3}x - 12 < \frac{3}{4}x - 36$
28	What percent of 1.1×10^{12} is 220×10^9 ?
29	A regular polygon has a perimeter of 168 inches. Let N stand for the number of sides in the polygon. If the side lengths must be integers, how many possible values can N have?
30	What is the sum of the terms which are integers in the infinite geometric sequence: 7776/2401, 1296/343, 216/49, . . .

Continued on next page.

Challenge Questions: 3 points each

31	In the figure, $\Delta ABC \sim \Delta EDA \sim \Delta DFG$ and DF = 3 cm, ED = 6 cm, AB = 12 cm, GF = 2 cm, AE = 8 cm. In centimeters, what is the perimeter of heptagon ABCEFGD? Note: the figure is not to scale. 
32	In a survey about apples, 61 people were asked whether they like Granny Smith, Honeycrisp, both, or neither. Everyone gave a response. There were 11 respondents who like both kinds of apples, 28 who like Honeycrisp, but not Granny Smith, and 9 who like Granny Smith, but not Honeycrisp. As a reduced common fraction, the probability that someone in the survey likes neither Granny Smith nor Honeycrisp is A/B. What is the value of A + B?
33	Let a ¤ b = $2a \cdot \sqrt{\frac{a}{b^2}}$. Evaluate 144 ¤ (36 ¤ 3).
34	How many 3-digit palindromes are multiples of 4, but do not have all three digits the same?
35	A regular decagon has multiple diagonals of varying lengths. The reduced common fraction of the total diagonals that have the longest possible length is A/B. What is the value of A + B?
36	Biff tells lies every Tuesday, Wednesday, and Thursday, and speaks the truth on the other days of the week. Eho tells lies on Fridays, Saturdays, and Sundays, and the other days of the week he speaks the truth. One day, Biff says, "Yesterday I was lying." Then Eho says "I was lying yesterday, too.". What day is it? Your answer should be an integer: 1 = Monday, 2 = Tuesday, 3 = Wednesday, 4 = Thursday, 5 = Friday, 6 = Saturday, 7 = Sunday.
37	An octahedral die has faces numbered 1 through 8 and a dodecahedral die has faces numbered 1 through 12. When an octahedral and a dodecahedral die are rolled together the probability that the sum of the two numbers showing is a prime number is the reduced common fraction A/B. What is the value of A + B?
38	Evaluate, and express your answer in base-5. Do not include the base 5 in your answer. $27_8 \cdot 38_9$
39	Two trains are traveling towards each other on the same track. Train 1 has an average speed of 30 km/hr and train 2 has an average speed of 40 km/hr. Exactly when the fronts of the two trains are 14 km from each other a bee begins flying from the front of train 1 to the front of train 2. As soon as the bee reaches the front of train 2, it turns around and flies toward the front of train 1. The bee continues flying back and forth between the two trains until the trains meet. If the bee flies at an average rate of 50 km/hr, how many total kilometers will the bee travel?
40	Six positive integers form a finite geometric sequence whose growth factor is an integer. The mean of the 6 numbers is 364 and the median is 108. What is the fifth number in the sequence?

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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	89
2	[$] 15 [dollars]
3	[B – A =] 46
4	4 [cats]
5	66
6	[A + B =] 17
7	10
8	21
9	9 [mph]
10	63 [°]
11	6 [handshakes]
12	432 [in^2]
13	[a + b =] 23
14	35
15	[x =] 14

	Answer
16	2
17	216
18	33 [minutes]
19	[a/b =] 31
20	[A + B =] 7
21	32 [multiples]
22	4
23	[A + B + C =] 10
24	36 [minutes]
25	[A + B =] 106
26	7 [cm]
27	[x =] 289
28	20 [%]
29	14 [values]
30	13

	Answer
31	41 [cm]
32	[A + B =] 74
33	24
34	18 [palindromes]
35	[A + B =] 8
36	5 [Friday]
37	[A + B =] 131
38	$11210_{[5]}$
39	10 [km]
40	486

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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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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 #4.

The following table compares minerals and vitamins contained in five leafy greens per 1-cup serving.

	Calcium (mg)	Potassium (mg)	Magnesium (mg)	Vitamin E (mg)	Vitamin C (mg)
Kale	24	79	8	0.3	19
Spinach	30	167	24	0.6	8
Collards	84	77	10	0.8	12.7
Arugula	32	74	9	0.1	3
Iceberg	13	102	5	0.1	2

*mg = milligrams

Source: 7 Leafy Greens: A Nutritional Comparison

1 How many times as much magnesium per 1-cup serving does spinach have compared with kale?

A) 2 B) 3 C) 4 D) 6 E) 16

2 Which leafy green in the table has the greatest amount of combined minerals (calcium, potassium, and magnesium) per 1-cup serving?

A) arugula B) collards C) iceberg D) kale E) spinach

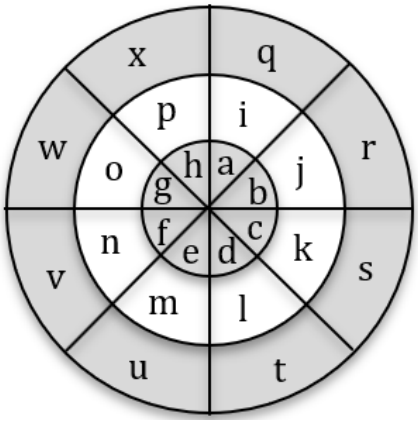
3 Which leafy green in the table has the median value in exactly one of the five columns of minerals and vitamins?

A) arugula B) collards C) iceberg D) kale E) spinach

4 The Recommended Dietary Allowance (RDA) of Magnesium is 400 mg daily for men. Two cups of collards plus one cup of kale will provide what percent of the RDA for a man?

A) 2.5% B) 4.5% C) 5.0% D) 7.0% E) None of these.

Continued on Next Page

	USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #5 THROUGH #7. Three friends, Rafa, Novak, and Roger play one round of singles tennis. A round is when Rafa plays one set against Novak, followed by Rafa playing one set against Roger, followed by Novak playing one set against Roger. In every set there is a winner and a loser. There are no ties.
5	If Roger wins two sets during the round, how many sets does he lose? A) 0 B) 1 C) 2 D) 3 E) 4
6	On a different day, the three friends play two rounds of singles tennis. If, during these two rounds, Novak wins three sets and Roger wins two sets, how many sets does Rafa lose? A) 1 B) 2 C) 3 D) 4 E) 5
7	On a third day, the friends play three rounds. What is the minimum number of sets that Roger needs to win so that it is possible for him to be the winner after the three rounds that day. To be the winner for the day means to win more total sets than either of the other two players. A) 2 B) 3 C) 4 D) 5 E) 6
	USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #8 THROUGH #10. In the diagram shown here, there are three concentric circles, whose radii are in a ratio of 1:2:3. The four line segments intersect at the center of the circles to form eight 45° angles. 
8	What fraction of the area of the total figure is contained in the combined sections labeled with the letters e, p, and r? A) 1/16 B) 1/8 C) 1/6 D) 1/5 E) 1/4
9	What is the ratio of the area of the combined sections labeled with the letters b and i compared to the area of the combined sections labeled with the letters r and d? A) 2:3 B) 3:4 C) 4:5 D) 1:1 E) Answer not given.
10	If AJ throws two darts which are guaranteed to land randomly anywhere on the board, what is the probability that he lands on the letters 'a' and 'j', in any order? A) $\frac{1}{144\pi}$ B) $\frac{1}{288}$ C) $\frac{\pi}{192}$ D) $\frac{1}{864}$ E) $\frac{1}{1728}$

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Key

Team Multiple Choice Contest – Answer Key

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

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

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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			
78th Grade	**TOTAL:**		

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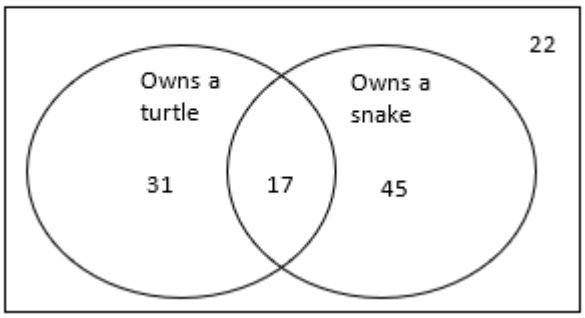
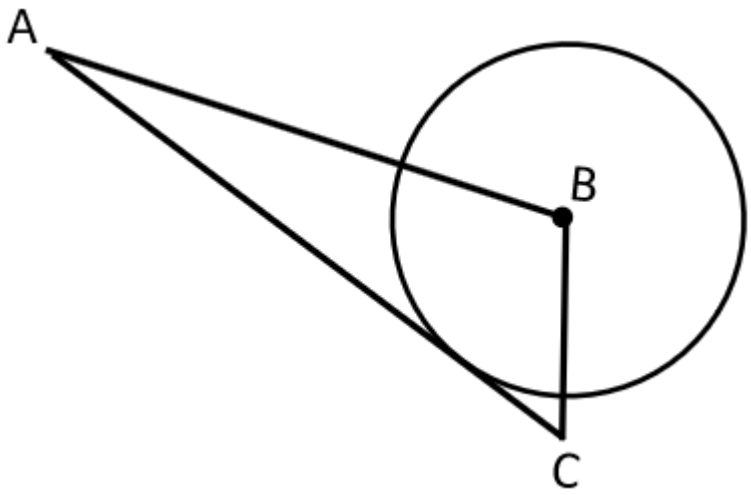
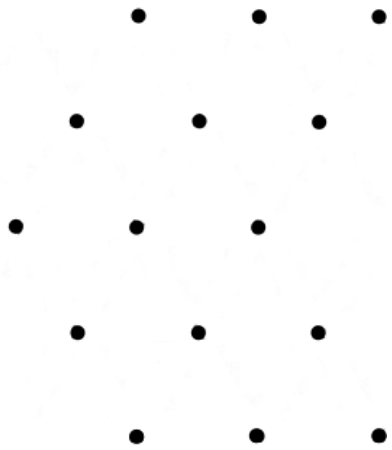
Team Contest

1	How many meters are in 3.2 kilometers?
2	A sequence begins as follows. What is the sum of x, y and z? 1, 1, 2, 3, 5, 8, 13, x, y, z, …
3	What is the arithmetic mean of the three numbers 10, 100, and 1000?
4	The diameter of a circle is 31 inches. The circumference of the circle is Aπ inches. What is the value of A?
5	Let A and B represent two distinct positive prime numbers. What is the smallest possible value of A + B such that A + B is a composite number?
6	What is the number of square centimeters in the surface area of a cube whose volume is 343 cm^3?
7	What is the sum of the integer solutions to the following inequality? $-13 < 6x < 26$
8	Based on the Venn Diagram below, the probability that someone owns a turtle is a reduced fraction A/B. What is the value of A + B? **Survey of 7th graders at Desert Hills Middle School** 

Continued on next page.

9	In the diagram the radius of circle B is 12 cm, $\overline{AB}$ = 37 cm, $\overline{BC}$ = 15 cm, and $\overline{AC}$ is tangent to circle B. In centimeters, what is the length of $\overline{AC}$? 
10	In the diagram below, assume each dot is equidistant from its closest neighbors in any direction. How many equilateral triangles can be created using any set of three of the dots as the vertices? 

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Key

Team Contest – Answer Key

78th Grade

	Answer
1	3200 [meters]
2	110
3	370
4	[A =] 31
5	[A + B =] 8
6	294 [cm^2]
7	7
8	[A + B =] 163
9	AC = 44 [cm]
10	34 [triangles]

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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			
78th Grade	**TOTAL:**		

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Linda Moore Triple Jump

1	On the school basketball team there are 15 players. Four of the players are taller than Catalina and 7 of the players are shorter than Catalina. How many of Catalina's teammates are the same height as her?
2	What percent of 150 is 18?
3	How many even-numbered cards are in a standard 52-card deck? Note: Aces and face cards are not numbered cards.
4	Rishi takes 10 minutes to ride his bike two-thirds of a mile. What is this rate in miles per hour?
5	Evaluate: $15 - 8 \cdot 2 + 9 \div 3$
6	What is the mode for the data set shown in the following stem-and-leaf plot? $2 \mid 1, 2, 5, 5, 6, 7, 7, 8, 9, 9$ $3 \mid 1, 1, 2, 4, 5, 7, 8, 9, 9, 9$ $4 \mid 1, 3, 3, 3, 3, 5, 7, 7, 8, 9$
7	The first three rectangular numbers are 2, 6, and 12. Visually, they can be represented as shown.  What is the sum of the next three rectangular numbers?
8	A sock drawer contains only 4 argyle, 6 brown, and 5 crimson socks. As a reduced common fraction, the probability that two socks that have been randomly selected from the drawer are matching is A/B. What is the value of A + B?
9	A group of robots all work at the same rate. A robot takes thirty seconds to complete one ten-inch weld and two minutes to assemble a particular auto component. An individual robot can do both tasks, but not simultaneously. What is the minimum number of robots needed to complete at least 150 ten-inch welds and assemble at least 80 components in less than one hour?
10	Positive integers A and B are in a ratio of 7:13 (A:B). What is the largest possible value of A + B, such that B – A is a three-digit integer?

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Key

Linda Moore Triple Jump – Answer Key

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	Answer
1	3 [teammates]
2	12 [%]
3	20 [cards]
4	4 [mph]
5	2
6	43
7	92
8	[A + B =] 136
9	4 [robots]
10	[A + B =] 3320

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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			
78th Grade	**TOTAL:**		

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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			
78th Grade	**TOTAL:**		

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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			
78th Grade	**TOTAL:**		

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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 — 2022-23

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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)

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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 largest factor of twenty-four, besides twenty-four?	
2	What is the next number in the arithmetic sequence starting with two, six, and ten?	14
3	Alicia runs two-tenths of a mile in two minutes. At this rate, how many minutes does it take her to run a whole mile?	10 [minutes]
4	If X equals four and Y equals five, what is the value of X times two Y?	[x * 2y =] 40
5	The probability that it will rain tomorrow is forty percent. As a reduced common fraction the probability that it will not rain tomorrow is A over B. What is the value of A plus B?	
6	Express seventy-two times ten to the fourth power divided by nine as an integer.	80000
7	A cylindrical tube is open at both ends, has a radius of three centimeters, and is five centimeters long. The external surface area of the tube is A times pi square centimeters. What is the value of A?	[A =] 30
8	Let A and B equal two distinct positive integers. If one-half of A equals two-thirds of B, what is the smallest possible value of A?	[A =] 4

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Key

COLLEGE BOWL ROUND #1

#	Problem	Answer
1	If a sunflower grows at a constant rate of one point five centimeters per hour, and starts at a height of zero centimeters, how tall with the sunflower be after three days, in centimeters?	108 [cm]
2	The side lengths of a triangle are nine inches, twelve inches and fifteen inches. In square inches, what is the area of the triangle?	54 [in^2]
3	In how many ways can six be written as the sum of two not necessarily distinct non-negative integers? The order of the integers does not matter.	4 [ways]
4	Three cards are randomly selected in a row from a standard deck of playing cards. Each time a card is selected, it is replaced in the deck. The probability that all three cards are red can be written as a reduced common fraction A/B. What is A + B?	[A + B =] 9
5	What is the sum of the first five terms of an arithmetic sequence whose first term is four and with a common difference of three?	50
6	Juan has sixteen coins, all of which are nickels or dimes. The total value of the coins is one dollar and five cents. How many nickels does he have?	11 [nickels]
7	In isosceles triangle DEF, the measure of angle D is ninety-eight degrees. What is the measure of angle E, in degrees?	41 [degrees]
8	How many numbers in the following set cannot be the square of a real number, one, four, twenty-five, seven, and negative eight?	1
9	Naveen has one hundred ninety-eight dollars to buy textbooks. He spends seventy-one dollars and seventy cents on a used Calculus textbook, and sixty-three dollars and thirty cents on a used Physics textbook. How much money in dollars does he have left?	63 [$]
10	What is the sum of the first six prime numbers?	41

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Key

COLLEGE BOWL ROUND #2

#	Problem	Answer
1	What is the mean value in degrees of the measure of all internal angles in a quadrilateral?	90 [°]
2	Two fair coins are tossed. What is the probability in percent that at least one of the coins comes up heads?	75 [%]
3	The side length of a square field is seventy-six meters. What length of wire fencing, in meters, will be needed to fence in the field?	304 [meters]
4	Jim and Dwight were the two candidates for school treasurer. Jim got twenty percent of the votes but lost by a margin of five hundred and forty votes. How many total votes were cast?	900 [votes]
5	Cosmo's PIN code is a four-digit integer. The sum of the four digits is twenty-two. Reading from left to right, the first and second digits are the same. The second digit is twice the third digit. The first digit is four times the fourth digit. What is Cosmo's PIN code?	8842
6	Andrea plants a rose bush in honor of her beloved dog Peanut. At the end of the first week, the bush has one rose, and the number of roses triples every week. How many roses are on the bush at the end of five weeks?	81 [roses]
7	The average of five numbers is forty-two. If the average of the first two numbers is forty-nine, and the average of the next two numbers is forty-five, what is the value of the last number?	22
8	Nine widgets cost thirty-six dollars in total. How many dollars will twenty widgets cost?	80 [$]
9	If A and B are two consecutive integers, and A is greater than B, then what is the value of A minus B minus four?	[A – B – 4 =] -3
10	Gatorade bottles are sold in packs of four or ten. Gabe wants to buy exactly forty-eight bottles. What is the smallest number of Gatorade packs that he must buy?	6 [packs]

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COLLEGE BOWL ROUND #3

#	Problem	Answer
1	The number zero point zero zero zero zero five three can be written in scientific notation as five point three times ten raised to the power of 'N'. What is the value of N?	[N =] -5
2	A survey of six hundred Mathcounts competitors was taken, and it was found that two hundred fifty-eight of the competitors like probability questions, and three hundred forty-two of the competitors dislike probability questions. If one competitor is randomly chosen, what is the probability in percent that they like probability questions?	43 [%]
3	Chandler eats one more peanut each day than he did on the previous day. If he eats three peanuts on the first day of the week, how many total peanuts does he eat in the entire week?	42 [peanuts]
4	A square has an area of four thousand two hundred and twenty-five square meters. What is the perimeter of the square, in meters?	260 [meters]
5	The fraction fifty-six over thirty-two is equivalent to what percentage?	175 [%]
6	Bowen is ten years old, and his mother is four times his age. After how many years will his mother's age be twice Bowen's age?	20 [years]
7	How many different arrangements of the letters A, B, C and D can be made in which no two adjacent letters are also adjacent letters in the alphabet? For example, no arrangement could include the letters A and B next to each other.	2 [arrangements]
8	Aaron has two hundred and sixty-four comic books, and they are all either Marvel or DC. He has three times as many Marvel as DC comic books. How many DC comic books does he have?	66 [DC comic books]
9	What is the mean minus the median of the following data set: two, three, three, three, four, five, five, eight, and twelve?	1
10	One circle and two distinct lines are drawn on a whiteboard. What is the largest possible number of points of intersection of these figures?	5 [points of intersection]

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COLLEGE BOWL ROUND #4

#	Problem	Answer
1	A pet store has twice as many hamsters as gerbils. If there are thirty total hamsters and gerbils, how many gerbils are there?	10 [gerbils]
2	There are two distinct whole numbers I am thinking of. When each of them is multiplied by seven, the two products are whole numbers greater than thirty but less than forty-five. What is the product of the two distinct whole numbers I am thinking of?	30
3	Kamal bakes a twenty-inch-by-sixteen-inch sheet cake. The sheet cake is cut into pieces that measure two inches by two inches. How many total pieces of cake are there?	80 [pieces]
4	A furniture store offers a dining room table at thirty percent off the marked price. The next week, the table is marked down an additional twenty percent off the discounted price. What is the total discount, in percent, from the original price?	44 [%]
5	Packard lifted weights for one hour and fifteen minutes each day from Monday through Friday. On the next three days, he lifted weights for one hour and thirty minutes each day. How many minutes would he have to lift weights on the ninth day to average eighty-five minutes of lifting time per day?	120 [minutes]
6	How many positive integers between ninety-nine and nine hundred ninety-nine contain exactly one zero?	162 [integers]
7	The first five terms of a geometric sequence are, three, A, B, C, and forty-eight. What is the value of C?	[C =] 24
8	Shen writes seven numbers on a whiteboard, one of which is two hundred and three. He adds up the seven numbers and gets two thousand and twenty-three. He then substitutes the number three hundred and two for two hundred and three and adds up the seven numbers again. What sum does he get?	2122
9	How many lines of symmetry does a square have?	4
10	How many different combinations of five-dollar bills and two-dollar bills can be used to make a total of seventeen dollars?	2 [combinations]

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COLLEGE BOWL ROUND #5

#	Problem	Answer
1	What is the smallest possible mean of four distinct positive even integers?	5
2	What is the value of nine cubed.	729
3	A solid white cube is painted red on all its faces. It is then cut into one hundred and twenty-five congruent small cubes. How many of the small cubes are painted red on exactly two of their faces?	36 [cubes]
4	Mr. Blaser's fourth grade class has some classroom pets. All of the pets except two are hamsters, all of the pets except two are turtles and all of the pets except two are lizards. How many total classroom pets are there?	3 [pets]
5	Ellie is selling girl scout cookies. She has Thin Mints, Samoas, Tagalongs and Lemon-ups. If a customer chooses two different kinds of cookies, how many different combinations can they get?	6 [combinations]
6	Julia has played one hundred and thirty-two chess matches, and her ratio of wins to draws to losses is six to three to two. How many games has she won?	72 [games]
7	A farmer has twelve chickens. Four of the chickens lay one egg every day. Four of the chickens lay one egg every other day. Four of the chickens lay one egg every four days. What is the maximum possible number of eggs the chickens could produce in ten days?	72 [eggs]
8	The year two thousand two was a palindrome. What is the product of the digits of the next year after two thousand two that is a palindrome?	4
9	Eileen cut a rectangular piece of paper into two congruent triangles with sides nine, forty, and forty-one centimeters. In square centimeters, what is the area of the rectangular piece of paper before it was cut.	360 [cm^2]
10	Find the sum: two plus four plus six plus eight plus ten plus twenty plus forty plus sixty plus eighty plus one hundred	330

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COLLEGE BOWL ROUND #6

#	Problem	Answer
1	What is thirty-eight times forty-seven?	1786
2	What is the value of X if one-half times the quantity X plus eleven equals twenty-nine over two.	[x =] 18
3	What is the height in centimeters of a right rectangular prism with a length of four cm, a width of three cm and a volume of one hundred and eight cubic centimeters?	9 [cm]
4	At a school party, people took turns guessing how many gumballs were in a large jar. No one guessed correctly, but the closest guesses were one hundred sixty-three, one hundred sixty-nine, and one hundred seventy-two. One of these guesses was off by one, one guess was off by two, and one guess was off by seven. How many gumballs were in the jar?	170 [gumballs]
5	Kai wants to save fifty dollars to buy a new phone case. He saves two dollars the first month, four dollars the second month, six dollars the third month, and so on, saving two dollars more each following month. In what month number will he have enough to buy the phone case?	[month number] 7 [th]
6	Hannah writes down all of the integers from one to two hundred and ten, inclusive. How many total digits did Hannah write?	522 [digits]
7	Starting at the origin of a coordinate plane, an ant crawls one unit to the right, two units up, three units to the right, four units up, five units to the right and six units up. How many units away from the origin is the ant now?	15 [units]
8	Max can type twenty-eight words per minute. At this rate, how many words can Max type in five-and-a-half minutes?	154 [words]
9	An urn contains two black marbles and three white marbles. If two marbles are chosen randomly, what is the probability in percent that they are the same color?	40 [%]
10	How many four-digit palindromes consist only of the digits one, two, or three, including any combination of these digits?	9 [palindromes]

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COLLEGE BOWL EXTRA QUESTIONS

#	Problem	Answer
1	Compute: One million ten thousand one hundred and one times one hundred and one.	102,020,201
2	A sphere has a volume of thirty-six pi cubic units. The area in square units of a circle with the same radius as the sphere can be written as A times pi. What is A?	[A =] 9
3	What is the sum of the distinct prime factors of one hundred and sixty-five?	19
4	A room has ten doors. In how many ways can a person enter through one door and exit out of a different door?	90 [ways]
5	Two six-sided dice are thrown. The probability that the product of the two numbers showing on the dice is a multiple of five can be written as a reduced common fraction A over B. What is A + B?	[A + B =] 47
6	If the sides of a square are doubled in length, by what percent will the area of the square increase?	300 [%]
7	The area of an equilateral triangle is two thousand five hundred times the square-root-of-three square units. What is the length of one side in units?	100 [units]
8	If A equals negative two, what is the largest value of a number in the following set: negative three A, four A, twenty-four over A, A squared, or one?	6

Proctoring Overview

You will receive a room packet envelope with the schedule and College Bowl rotations on the front. Each room packet includes:

1) the proctor instructions and the general instructions that you will be reading,
2) the proctor question/answers packet (this needs to be carefully controlled), and
3) sets of Mental Math, Individual, Multiple Choice, Team, and Triple Jump test materials.

(If not in the room packet, the proctor supervisor will provide blank scratch paper.)

When you receive the room packet, count to ensure that you have the correct number of tests for each event (16 Mental Math & Individual, 4 of each of the team events).

Key Points

- Act professional; focus on what you are doing.
- Your job is to proctor the students; that is, you administer tests, give time warnings, & monitor students for proper test taking behavior to ensure competition integrity and avoid issues like failing to put answers on the answer sheet.
- The proctor packet has Mental Math and College Bowl questions/answers. Keep the packet secure! Avoid opportunities for competitors to see the tests or answers.
- Student/school names and team numbers are critical on the answer sheets. Make sure that students fill out such identifying information.
- Keep track of time, and provide appropriate time warnings. Keep to the schedule as close as possible. Wait between events, if needed.
- Read & know the rules—competitors & spectators will, and they will call you on it.
- On questions that you read, read smoothly, enunciate clearly, and don't read too fast.
- If unsure of how to deal with an issue/question/concern, flag down the proctor supervisor and ask.
- Be respectful of your classroom — leave it tidy and arranged exactly as you found it. We don't want any displeased teachers!!
- Use the quick-reference guide on the next page for room setup and key information.

Schedule

Each of the 6 events includes about 5 minutes at the start for reading instructions or rearranging the room.

3:30 - 4:00	Coaches register (Library)	6:15 - 6:40	Proctors get dinner in proctor room
4:05 - 4:15	Orientation (Gym)	6:45 - 6:55	College Bowl #1
4:15 - 4:20	Students go to testing rooms	6:55 - 7:05	College Bowl #2
4:20 - 4:35	Mental Math	7:05 - 7:15	College Bowl #3
4:35 - 5:15	Individual Test	7:15 - 7:25	College Bowl #4
5:15 - 5:35	Team M.C. Test	7:25 - 7:35	College Bowl #5
5:35 - 5:55	Team Test	7:35 - 7:45	College Bowl #6
5:55 - 6:15	Triple Jump	8:00 - 8:30	Awards Ceremony (Gym)

1. Mental Math

Configuration: Students at individual desks spread out in the classroom. Alternating desks, students not next to teammates.

Scheduled Time: 4:20-4:35 PM (read instructions & test)

Duration: 30 seconds per question maximum (beginning after the 2nd reading)

Give Time warning at: 5 seconds

Number of questions: 8 (all students do the same questions)

Proctor Actions: Read each question twice, reading clearly and not too fast. Start the 30 second clock after the 2nd reading.

Key Points: Start by reading "General Instructions" then Mental Math instructions. Make sure everyone writes their name, school & team number on the answer sheet. No talking allowed. Except for the answer, no is writing allowed. Collect answer sheets and organize by team number, then alphabetically by first name of competitor, & staple sheets for the same team together.

2. Individual Test

Configuration: Students at individual desks; same arrangement as for Mental Math.

Scheduled Time: 4:35 PM (read instructions), 4:40-5:15 (test)

Duration: 35 minutes

Give Time warning at: 5 minutes & 30 seconds

Number of questions: 40

Proctor Actions: Ensure appropriate test-taking behavior. Prep for next event (or furtively read College Bowl questions to yourself).

Key Points: Read "Individual Test" instructions. Make sure everyone writes their name, team number, school, proctor name, & room number down on the answer sheet. Collect answer sheets, organize by team, then alphabetically by first name of competitor, and staple sheets for same team together.

3. Team Multiple Choice Test

Configuration: Groups of 4 desks, with the groups spread out in the classroom.

Scheduled Time: 5:15 PM (read instructions), 5:20-5:35 PM (test)

Duration: 15 minutes

Give Time warning at: 5 minutes & 30 seconds

Number of questions: 10

Proctor Actions: Ensure appropriate test-taking behavior. Prepare for next event.

Key Points: Read Mult. Choice instructions. Students can talk quietly & work together.

4. Team Test

Configuration: Groups of 4 desks spread out in the classroom (same as Team Mult. Choice).

Scheduled Time: 5:35 PM (read instructions), 5:40-5:55 PM (test)

Duration: 15 minutes

Give Time warning at: 5 minutes & 30 seconds

Number of questions: 10

Proctor Actions: Ensure appropriate test-taking behavior. Prepare for next event.

Key Points: Read Team Test instructions. Need to have school & team number on answer sheet. Students can talk quietly & work together.

5. Triple Jump

Configuration: Groups of 4 desks spread out in the classroom.

Scheduled Time: 5:55 PM (read instructions), 6:00-6:15 PM (test)

Duration: 15 minutes

Give Time warning at: 30 seconds and 5 seconds before each of three submittals.

Number of questions: 10

Proctor Actions: Ensure appropriate test-taking behavior. Collect Submittals #1, #2 and #3 at 5, 10 and 15 minutes.

Key Points: Read Triple Jump instructions. Need to have school & team number on answer sheets. There are THREE answer sheets and submittals. Students can talk quietly & work together

6. College Bowl

Configuration: Row of 9 desks (side by side) at the front of the room (CBA device on center desk).

Scheduled Time: 6:45 PM (read instructions), 6:50-7:45 PM (test)

Duration: 45 seconds per question (30 seconds per question if there is only one team, who will be only going against the clock)

Give Time warning at: 5 seconds

Number of questions: 10 per round, 6 rounds total

Proctor Actions: Read each question twice, reading clearly and not too fast. Start 45 (or 30) second clock after the 2nd full reading. Mark tally on white board as questions are answered and transfer the numeric total to the score sheets.

Key Points: Event is collaborative, talking is allowed. For a wrong answer, just say, "That is incorrect." (no verbal/visual clues that could be interpreted by the other team to arrive at an answer).

Summary of MIC Proctoring

(for proctors to read to themselves)

Pass out materials (answer sheet/test packets, scratch paper) for the current event to individuals or teams (as appropriate) so they can fill in the name, school, and team number information (very important!). Tell students to not lift the cover sheet or turn over the paper until you give the signal to start. Read the general instructions as the first item at the beginning of the competition (before Mental Math). Read the event-specific instructions just prior to each event and ask if there are any relevant questions. After reading the instructions, you can signal students to begin. Make sure one proctor is watching the time and giving appropriate time warnings (e.g., "five minutes remaining"). At the end of the event, tell competitors to stop work. Collect, sort, & staple the answer sheets (as appropriate) and keep them secure until handed off to a runner.

For the Mental Math/Individual tests, arrange students scattered throughout the classroom with **no student next to another student from their own school**. For the team tests, students will be in groups of 4 desks. The Relay will require the desks arranged in columns (front to back). College Bowl will require a line of 9 desks side-by-side across the front of the classroom.

For College Bowl, place the College Bowl apparatus (CBA) on a central desk in the line of desks at the front (4 desks on either side of the central one). One proctor will likely need to hold the CBA in place during the College Bowl rounds. Turn the apparatus on by depressing the button or flipping the dip switch. Students may try out the CBA prior to the 1st question. Note: while one light is blinking, the other light is locked out. There is no need to "reset" the device, just let the light finish blinking and it is ready to go.

Do not read the answer for College Bowl when you read the question (they are both on the same page). In College Bowl, if an incorrect answer is given, simply say "That is incorrect" and do not give any other cues about the answer (e.g., don't say "sorry, you were close" or exhibit interpretable body language). If both teams fail to supply a correct answer, announce what the correct answer was.

If there is an irregularity (i.e., lack of honesty, poor sportsmanship), make a note of the circumstances, flag the answer sheet, and report the issue to the proctor supervisor.

At the end of the day, return the desks to their original arrangement, recycle any unwanted test materials & used scratch paper, erase any marks you made on the whiteboard, and generally make sure the classroom is tidied up. Return the CBA, the room packet envelope, the proctor instructions, the contest rules packet, the proctor packet of questions, extra scratch paper, and unused test material to the proctor supervisor.

Detailed Instructions for Proctors

Grades 4-8

NO CALCULATORS ALLOWED ON ANY TESTS!

1. Check to make sure you have everything in your packet.
   - A. ***Mental Math:***
     1. 16 - colored Mental Math answer sheets
     2. Mental Math questions with answers (in the Proctor Packet)
   - B. ***Individual Test:*** 16 individual tests, with colored answer sheets attached
   - C. ***Team Multiple Choice Test:*** 4 team multiple choice packets (stapled), each containing 4 tests plus one colored answer sheet on top
   - D. ***Team Test:*** 4 team test packets (stapled), each containing 4 tests plus one colored answer sheet on top
   - E. ***Triple Jump:***
     4 team test packets (stapled), each containing 4 tests plus three colored answer sheets on top (one per submittal).
   - F. **College Bowl:**
     1. 4 - College Bowl score sheets
     2. College Bowl questions – 6 rounds (in the Proctor Packet)
   - G. Scratch paper (to be handed out as needed, but try not to waste it)
   - H. Electronic College Bowl Apparatus (CBA; usually distributed at dinner break)

   ALL *COLORED* ANSWER SHEETS WILL BE COLLECTED BY YOU AND WILL BE TAKEN TO THE SCORING ROOM (by RUNNERS) AS SOON AS THEY ARE FILLED OUT BY COMPETITORS. COMPETITORS CAN KEEP ALL OF THE WHITE SHEETS, IF THEY WOULD LIKE (OTHEWISE COLLECT THEM FOR RECYCLE).

   If you are missing anything, you can go get it before the opening ceremony. After the opening ceremony, contact the proctor supervisor/scoring room.

2. Take a photo or draw a picture on the whiteboard of how the classroom is laid out (so that it can be returned to its original configuration following the competition). Then set up the classroom desks for the first event (Mental Math).

Respect the teacher whose room you are using. Do not touch their computer or other items. Do not erase anything on their board. Leave the room tidy & in the exact original layout.

Mental Math

3. Arrange desks in a configuration suitable for individual testing (rows/grid of desks all facing forward, students in separated/alternating desks).

4. Put the Mental Math answer sheets face up on the desks such that students are spread out. Wait for students to arrive. You can fill out the proctor name and room

number (and perhaps team numbers) on all blank answer sheets, if you like. Read over the questions so you will be prepared to read them out loud.

5. After students sit down, check to make sure that no one from the same team is seated next to each other (i.e., "Team xxx, raise your hands."). Ask them to move, if needed.
6. **Check to make sure that students put their full name, school name, team number, and room number on their answer sheet and that the information is legible**.
7. Read the "GENERAL INSTRUCTIONS" (in the Proctor Packet) to the students. Then, read the "MENTAL MATH" instructions (in the Proctor Packet) to the students.
8. Begin the testing. Read each of the eight Mental Math questions to all of the students in the room, per the instructions.
9. At the conclusion of Mental Math, collect the answer sheets. Organize the answer sheets by team number, then alphabetically by first name of competitor. Staple each team's set of four answer sheets together. Promptly hand the packets of answer sheets to your runner for conveyance to the scoring room.

Individual Test

10. The seating configuration will remain unchanged (no swapping seats).
11. Hand out Individual Test packets with the colored blank answer sheet facing up. **Check to make sure that students put their full name, school name, team number, and room number on their answer sheet and that the information is legible**.
12. Read the "INDIVIDUAL TEST" instructions (in the Proctor Packet) to the students and begin the testing at the appointed time.
13. While students are taking the Individual Test, monitor the students for proper test-taking behavior and watch the time to provide 5-minute and 30-second warnings. Make sure students are writing answers on the answer sheet (not the test question pages). During this time you can also get the Individual Multiple Choice tests ready, read through the rules of subsequent events, and (carefully/secretively) look ahead to review the College Bowl questions (i.e., to avoid stumbling over the wording when it comes time to read the questions aloud). You will have observers in the room watching the College Bowl rounds, so make sure you understand the rules, how timing works, etc.
14. At the conclusion of Individual Test, collect the answer sheets. Organize the answer sheets by team number, then alphabetically by first name of competitor. Staple each team's set of four answer sheets together. Promptly hand the packets of answer sheets to your runner for conveyance to the scoring room. Students may keep or recycle their test question packets.

Team Multiple Choice

15. Change the room set-up to groups of 4 desks together so students can work as a team.
16. Hand out the tests and have teams fill out the top portion of the answer sheet. **Check answer sheets to make sure they are filled out correctly (school, team #, etc.).**
17. Read the "TEAM MULTIPLE CHOICE" instructions (in the Proctor Packet) to the students and begin the testing at the appointed time.
18. Monitor the students for proper test-taking behavior (talking is allowed), watch the time, and provide 5-minute and 30-second warnings. While students are taking the Team Multiple Choice test, get the Team Tests ready.
19. At the conclusion of the test, collect the answer sheets & hand them off to the runner.

Team Test

20. Keep the same seating arrangement in groups of four. Hand out the Team Test packets and have teams fill out the information at the top of the colored answer sheet. **Check the answer sheets to make sure they are filled out correctly (school, team #, etc.).**
21. Read the "TEAM TEST" instructions (in the Proctor Packet) to the students and begin the testing at the appointed time.
22. Monitor the students for proper test-taking behavior (talking is allowed), watch the time, and provide 5-minute and 30-second warnings. While students are taking the Team Test, get the Relay tests ready.
23. At the conclusion of the test, collect the answer sheets & hand them off to the runner.

Triple Jump

24. Keep the same seating arrangement in groups of four. Hand out the Triple Jump Test packets and have teams fill out the information at the top of EACH OF THE THREE colored answer sheet. **Check the answer sheets to make sure they are filled out correctly (school, team #, etc.).**
25. Read the "Triple Jump TEST" instructions (in the Proctor Packet) to the students and begin the testing at the appointed time.
26. An Answer Sheet must be submitted every 5 minutes (labeled: Submittal #1, Submittal #2, Submittal #3). Give time warning at 30 seconds and 5 seconds prior to each submittal. Collect the submittals promptly at 5 minutes, 10 minutes and 15 minutes.
27. At the conclusion of the test, staple the three answer sheets for each team together in order: Submittal #1 (top), #2, #3 (bottom) & hand them off to the runner.

28. At the conclusion of the Triple Jump, release the students for their break. If there is anything left (i.e., answer sheets) that should have been taken to the scoring room, give those to the runner or have a proctor take it to the scoring room now.

29. Set up your room for the College Bowl rounds and tidy up the room before you go to break. Set up a line of 9 desks side by side facing the front of the room. One team will be on each side (doesn't matter which) and the College Bowl apparatus will be stuck down on the desk in the middle. Another row of 8 desks should be set up in the middle of the room for the two teams not competing in a round. Other desks should be moved to the back of the room in an orderly fashion for the spectators.

30. Take your packet of College Bowl questions with you during break to keep them secure! Do not leave them in the room!

Dinner Break

31. AT BREAK — Eat dinner in the proctor room. Pick up your College Bowl apparatus (CBA) at this time. If you haven't already, you may want to read over the College Bowl questions to make sure you will be able to pronounce everything properly. Return to your room in time to place the CBA in position.

College Bowl Rounds

32. Place the CBA on the middle desk of the line at the front of the room (you may want to moisten the suction cups with a film of water). One proctor may need to hold the device down (and do timing). Do not press the button to "reset" the CBA (it's an on/off switch).

33. You will have the same teams that were previously in the room for the duration of all College Bowl rounds — if you have an extra/different team, they are in the wrong room and can be disqualified if they hear the questions! Help get them to the correct room.

34. Fill out the score sheets for each team in your room with their school name and team number. Call up the first 2 teams according to the sequence on the room envelope.

35. You will be reading Round #1 questions to two teams while the other two teams (and any spectators) wait in the back of the room out of line of sight of the competitors. Refer to the College Bowl schedule (on your room envelope) to see which two teams compete in each round. If a round only has one team, they will be competing against the clock and thus will have 30 seconds to answer, not 45 seconds. Record the final scores for each team on their score sheets (which you hold on to) after each round. Rounds 2-6 work the same way. Refer to the schedule to make sure the correct teams are competing at the correct time. Don't get ahead of schedule (or behind, for that matter!). If you finish a round early, please wait until the appointed time to start the next round. If you have any problems (including anyone questioning the rules or a decision made by a proctor) contact the proctor supervisor.

36. Who is keeping score? Who is keeping track of the time? YOU ARE !!!
37. Read the "COLLEGE BOWL" instructions (in the Proctor Packet) to all the students (just one time), then begin the testing for each round at the appointed times.
38. If you mis-read a question, replace it with one of the extra questions.
39. If a parent/coach/student protests an answer, make a note of the situation (the test, the problem number, who answered, what their answer was, etc.) and kindly state that the coach should bring up the issue with the contest director. Proceed as normal, scoring the question based on the answer key.
40. At the conclusion of all College Bowl rounds, get the score sheets promptly to the scoring room (either yourself or via a runner).
41. Release your group to the awards ceremony no earlier than 7:45 PM to avoid causing a disruption to other rooms. Have students help re-set the room.
42. At the end of the day, return the desks to their original arrangement, collect all scratch paper, erase any marks you made on the whiteboard, and generally make sure the classroom is tidied up. Return the College Bowl apparatus, proctoring envelope, and residual material to the proctor supervisor.

General Instructions

- 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: Note: for 2023 tests, all answers are integers.
  - 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 fifth 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., $\sqrt{2}$), 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.

Mental Math Instructions

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.

Individual Test Instructions

You will have 35 minutes to work on the Individual test, which consists of 40 questions. When you are prompted to begin, tear off the colored sheet and begin testing. Make sure your name and school are recorded on the answer sheet. The first 30 questions are worth two points each and questions 31-40 are worth 3 points each. Record your answers on the score sheet. No talking during the test. You will be given a 5 minute warning.

Team Multiple Choice Instructions

You will have 15 minutes to answer 10 multiple choice questions as a team. 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.**

Team Test Instructions

You will have 15 minutes to answer 10 questions as a team. 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.

Triple Jump Instructions

You will have 15 minutes to answer 10 questions as a team. However, you will submit a set of answers every 5 minutes. Notice that your answer sheets are labeled Submittal #1 (to be submitted after 5 minutes), Submittal #2 (to be submitted after 10 minutes) and Submittal #3 (to be submitted after 15 minutes). Each problem is scored as a 1 or 0 on each of the three submittals, for a total of 30 points. Answers that are written on one submittal sheet do NOT carry over to the next submittal sheet – they need to be entered again. You may change your answer for a question from one submittal to the next, if you feel that your previous answer was incorrect.

College Bowl Instructions

Read these to the competitors before the first round:

To maintain the integrity of the competition, spectators must stay in this room during a round of College Bowl questions. Once all readings for a round have been completed, you may leave.

All competitors must be facing the front of the room in one row. Teams not competing in the current round need to be behind the front row and in front of the spectators. All spectators need to be behind the competitors at the back of the room.

A maximum of ten questions per round will be scored. It is OK for both teams to score the same number of points! The proctor will record the points earned on each team's score sheet, which is retained by the proctor.

You may use scratch paper and pencil. You may talk with your team members while arriving at a solution.

An Electronic College Bowl Apparatus (CBA) will be used to identify the team who is first to have an answer.

During these rounds, each question will be read twice and a maximum time of 45 seconds after the second reading of the question is completed will be allowed for a team to answer. If a team buzzes in after the second reading and gives an incorrect response, the other team has the remainder of the 45 seconds to respond. A team is allowed only one attempt at buzzing in and answering per question. You may interrupt (buzz in) while a question is being read, however, if you do, the proctor will stop reading, and an immediate response is needed. If the correct response is given, the proctor will proceed to the next question. Otherwise, the question will be re-read for the other team, making sure it has two full readings. If an immediate response is not given after a team buzzes in, their lack of an answer in a timely manner is considered incorrect. In the event that only one team is competing in a round (i.e., one team is absent), the team competing will have a maximum of 30 seconds after the completion of the second reading in which to buzz in. The proctor will give a 5-second time warning.

Wait to be acknowledged by the proctor before giving an answer. This avoids the situation of blurting out an answer when the other team buzzed in first.

If two students from the same team answer at the same time with different answers, the answer will be considered incorrect.

If a problem arises with one of the questions, an extra question will be asked to replace that question.

If the round finishes early, you need to stay in the room for the remaining time.

Mental Math Questions

Relay Answers

College Bowl Questions/Answers