"Math Is Cool" Masters — 2024-25
6th grade — April 26, 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.*
  - *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, 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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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

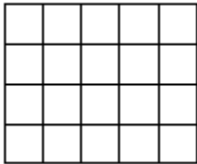|	Answer	
1	9	What is one-half of ten plus one-third of twelve?
2	54	What is the next term in the geometric sequence starting with two, six, and eighteen?
3	15 [quarters]	One-third of Ryan's quarters have a value of one dollar and twenty-five cents. How many quarters does Ryan have altogether?
4	16	What is the sum of the smallest two positive prime numbers that differ by six?
5	8 [= mean]	What is the mean of the integers four, six, eight, ten, and twelve?
6	10 [cm]	A right triangle has integer side lengths and an area of twenty-four square centimeters. In centimeters, what is the length of the hypotenuse of the triangle?
7	[x =] 30	Solve the equation for X: three-point-five X minus forty-one equals sixty-four
8	13 [blue jellybeans]	The probability of randomly selecting one red jellybean from a jar containing red, orange, and blue jellybeans is one-sixth. The probability of randomly selecting one orange jellybean is two-fifths. What is the smallest number of blue jellybeans that could be in the jar?

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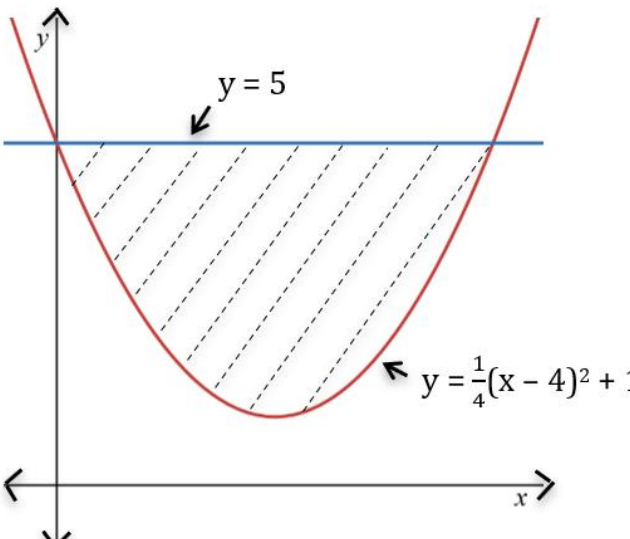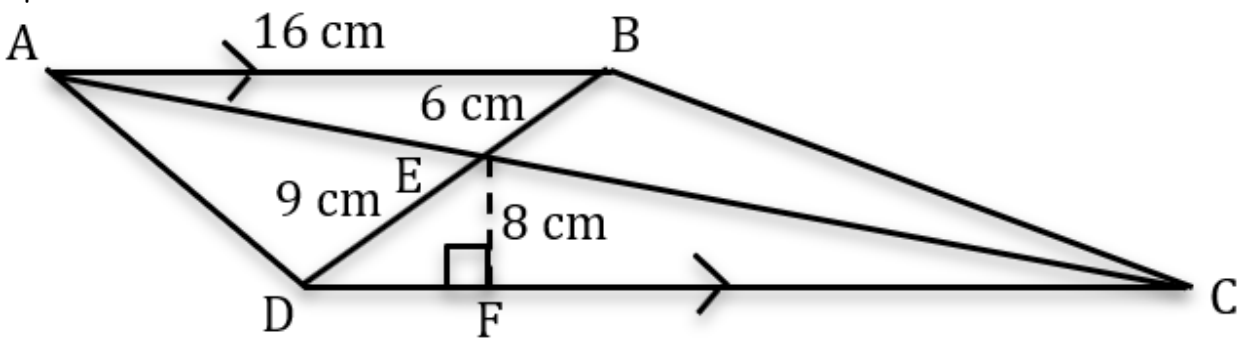
Individual Contest

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: $5^3 + 5^2 + 5$
2	What is the sum of the prime numbers between 50 and 60?
3	A car travels at an average rate of 32 miles per hour. How many minutes will it take for the car to travel 40 miles?
4	In inches, what is the perimeter of a rectangle with a side length of 6 inches and an area of 60 in^2?
5	Sarina is 34 years old, and her only son is 7 years old. In how many years will she be twice her son's age?
6	What percent of 90 is 54?
7	Evaluate the expression when x = 8: $x^2 - 6x - 5$
8	Starting with the 3rd term in the following sequence, each term is the product of the previous two terms. What is the fifth term? 1/2, 6, 3, . . .
9	What is the mean of the following data set? {1, 12, 14, 5}
10	There are twenty 1 x 1 squares in the grid shown. How many 3 x 3 squares are in the grid? Note: the 3 x 3 squares may overlap each other.
11	The spinner shown here consists of 8 congruent sectors. As a percentage, what is the probability of the spinner landing on either 3 or 8 when it is spun one time?
12	There are 5280 feet in a mile and 3 feet in a yard. How many yards are in 1/5 of a mile?
13	In a middle school math class, 1/6 of the students prefer using pens and the rest prefer using pencils. If there are 30 students in the class, how many students prefer pencils?

14	Evaluate: $\frac{1}{2} + \frac{1}{3} + \frac{1}{10} + \frac{1}{15}$
15	The prime factorization of 50 can be written in the form $a \cdot b^2$, where a and b are distinct prime numbers. What is $a + b$?
16	In the expression ABC + DEF = 612, ABC and DEF represent two 3-digit integers consisting of single-digit integers A, B, C, D, E, and F, such that A = 2D, B = E, and C = F. What is ABC – DEF?
17	The 1st and 3rd terms of an arithmetic sequence are 4 and 8.6. What is the sum of the 2nd, 5th, and 6th terms?
18	A block of cheese in the shape of a triangular prism has a volume of 0.025 cubic meters. How many cubic centimeters are in the volume of the block of cheese?
19	In how many distinct ways can the letters of the word BANANA be arranged such that the As are all next to each other and the Ns are all next to each other?
20	Evaluate: $98 - (25/5)^2 + 2(4 - 7)^3$
21	Currently, Downtown Freddy has made 28% of his 3-point attempts. If he makes 11 of his next 20 three-point attempts his percentage of attempts made will rise to 30%. How many total 3-point attempts does Downtown Freddy currently have?
22	Biff can decorate two cakes in 25 minutes. If Eho helps, the two of them working together can decorate three cakes in 30 minutes. In minutes, how long would it take Eho to decorate a cake by himself?
23	If $21_3 + 32_4 = A_5$, where A is a two-digit integer, what is A? Do not include the base in your answer.
24	A set of 4 numbers has a mean of 15. When three positive integers are added to the set, its new mean is 21. What is the largest possible integer that could be among the three that were added to the set?
25	The solutions to the equation $x + x + x = x^3$ are x = 0 and $x = \pm\sqrt{A}$. What is A?
26	Two-thirds of the players on Sanjay's baseball team bat right-handed. One-fourth of the players on Min's baseball team bat left-handed. Min's team has four-fifths the number of players of Sanjay's team. What is the number of players on Min's team? Note: there are no switch-hitters on either team, and both teams have fewer than 20 players.
27	How many three-digit palindromes are there in which the digits are all even? Note: zero is considered to be even.
28	When evaluating the given expression in scientific notation, the answer can be written in the form $a.b \cdot 10^c$, where $1 \leq a.b < 10$ and a, b, and c are integers. What is a + b + c? 39,000,000,000 ÷ 30,000 = $a.b \cdot 10^c$
29	Let $(\sqrt{A} + \sqrt{B})(\sqrt{A} - \sqrt{B}) = 4$, where A and B are single digit positive integers. What is the largest possible value of A + B?
30	Lorelei randomly draws 5 cards from a deck that consists of 13 hearts and 13 clubs. Three of the five cards are hearts and two are clubs. She then draws two more cards. As a simplified fraction, the probability that at least one of her next two draws will be hearts is A/B. What is A + B?
	Continued on next page.

Challenge Questions: 3 points each

31	What is the sum of the positive factors of 135?
32	Ms. Badger gave the following homework assignment to her class of frogs and toads: "You must complete a swamp project by the end of the week. You may work alone or in frog-toad pairs." As it turned out, 1/3 of the frogs worked in frog-toad pairs, while 5/9 of the class worked alone. As an integer, what is the ratio of frogs to toads in the class?
33	An infinite sequence has 8 as its 1st term. In this sequence the 1st term is multiplied by 10 to get the 2nd term, the 2nd term is divided by 5 to get the 3rd term, 20 is added 3rd term to get the 4th term, and the 4th term is divided by 2 to get the 5th term. The four operations are repeated sequentially to generate the infinite sequence. What is the sum of the 77th, 78th, 79th, and 80th terms in the sequence?
34	In figure below the graphs of the equations $y = 5$ and $y = \frac{1}{4}(x - 4)^2 + 1$ are shown. How many grid points (x, y) exist inside the shaded region defined by the intersection of the two graphs such that x and y are integers, not including points that are on either graph.
35	The vertices of a hexagon are labeled with the numbers 4 through 9 in random order. The diagonals of the hexagon are labeled with the sum of the two integers at their endpoints. What is the mean of the labels of the diagonals?
36	In the figure shown, $\overline{AB} \parallel \overline{CD}$, BE = 6 cm, DE = 9 cm, AB = 16 cm, and EF = 8 cm. How many square centimeters are in the area of ΔACD?

37	An experiment consists of selecting a marble at random from a jar containing 7 blue and 7 red marbles, noticing its color, putting it back in the jar, shaking the jar, and selecting a 2nd marble at random. This experiment is repeated 4 times. As a simplified fraction, the probability that the result of 2 of the experiments is both marbles are blue, and the result of the other 2 experiments is both marbles are red, is A/B. What is A + B?
38	A rubber ball is dropped from a height of 54 inches. Each time it strikes the ground the ball bounces up 2/3 of the vertical distance of the previous fall. In inches, what is the total vertical distance that the ball travels?
39	How many ways are there to make a sum of 8 by adding two or more positive integers together? The order of the integers being added is not important.
40	Two candles of equal heights but different thicknesses are lit, and both burn at a constant linear rate. The first candle takes 4 hours to burn completely, and the second candle takes 5 hours to burn completely. If the two candles are lit at the same time, after how many minutes will the second candle be twice the length of the first candle?

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<div style="float:right;border:1px solid;">KEY</div>

6th Grade 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	155
2	112
3	75 [minutes]
4	32 [inches]
5	20 [years]
6	60 [%]
7	11
8	54
9	8 [= mean]
10	6 [squares]
11	25 [%]
12	352 [yards]
13	25 [students]
14	1
15	[a + b =] 7

#	Answer
16	[ABC – DEF =] 200
17	35
18	25,000 [cm^3]
19	6 [ways]
20	19
21	250 [attempts]
22	50 [minutes]
23	[A =] 41
24	85
25	[A =] 3
26	12 [players]
27	20 [palindromes]
28	[a + b + c =] 10
29	[A + B =] 14
30	[A + B =] 73

#	Answer
31	240
32	2 [frogs to toads]
33	2990
34	15 [grid points]
35	13
36	160 [cm^2]
37	[A + B =] 131
38	270 [inches]
39	21 [ways]
40	200 [minutes]

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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 #3. Rectangular prism ABCDEFGH has dimensions x by y by z as shown.
1	Let x = 9 inches, y = 3 inches, and z = 5 inches. What is the volume of prism ABCDEFGH? A) 108 in^3 B) 135 in^3 C) 145 in^3 D) 162 in^3 E) 180 in^3
2	Let x = 15 m, y = 6 m, and z = 8 m. What is the area of rectangle DCFE? Hint: sketch the rectangle in the diagram. A) 150 m^2 B) 170 m^2 C) 225 m^2 D) $45\sqrt{29}$ m^2 E) 255 m^2
3	Imagine an ant walks only along the edges of the prism and let x = 12 cm, y = 5 cm, and z = 6 cm. What is the shortest total distance the ant must travel to be able to walk the entire length of each edge at least once? A) 92 cm B) 104 cm C) 107 cm D) 108 cm E) 115 cm

Continued on Next Page

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

In a Magic Square the numbers in all rows, columns, and diagonals have the same sum, which is known as the magic constant.

In the 3-by-3 example shown here, the magic constant is 15. Also, it is important to note that all 9 numbers are different from each other.

In the 4-by-4 example shown here, the magic constant is 34 and similarly to the 3-by-3 example, all 16 numbers are different from each other.

4	3	8
9	5	1
2	7	6

7	12	1	14
2	13	8	11
16	3	10	5
9	6	15	4

---

4 In the 3-by-3 Magic Square shown here, what is the value of A?

A) 1 B) 3 C) 4 D) 8 E) 14

A	7	12
13	9	5
6	11	10

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5 A 3-by-3 Magic Square consists of 9 consecutive odd integers whose mean is 9. What is the magic constant?

A) 8 B) 9 C) 12 D) 18 E) 27

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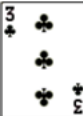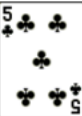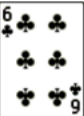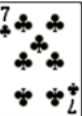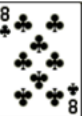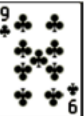
6 In the partially filled in 4-by-4 Magic Square shown here, what is the value of the missing integer in the upper right-hand square?

A) 7 B) 10 C) 11 D) 14 E) 19

		15	?
17	12	5	8
		18	
16	13		

There are 52 cards in a standard deck, shown here.
There are 4 suits: Clubs, Spades, Hearts and Diamonds.
"Face Cards" include Jacks, Queens, and Kings.
Black cards include all Clubs and Spades.
Red cards include all Hearts and Diamonds.
A **Euchre deck** contains 24 cards: the Nine, Ten, Jack, Queen, King and Ace of each suit.

7 How many cards in the given picture of a standard deck have letters on them?

A) 8   B) 12   C) 16   D) 18   E) 20

8 What is the ratio of face cards to non-face cards in a standard deck of cards?

A) 3/13   B) 3/10   C) 4/13   D) 2/5   E) 15/37

9 A card is randomly selected from a **Euchre deck** and removed from the deck. Then a second card is randomly selected. What is the probability that the second card is black?

A) 11/46   B) 6/23   C) 11/23   D) 1/2   E) 12/23

10 Bart and Lisa are playing a game using a **Euchre deck** in which they take turns drawing a card at random from the deck. Before each turn, the card that was drawn in the previous turn is returned to the deck which is then shuffled. If Bart draws a heart, he wins. If Lisa draws a face card, she wins. They keep taking turns until somebody wins. If Bart draws first, what is the probability that Lisa will be the winner of the game, no matter how long the game takes?

A) 3/8   B) 33/64   C) 291/512   D) 4/5   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	B
2	A
3	C
4	D
5	E
6	D
7	C
8	B
9	D
10	E

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Room #   School Name   Team #

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

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

STUDENTS: DO NOT WRITE IN SHADED REGIONS

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

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Team Contest

1	A regular hexagon has a perimeter of 78 inches. In inches, how long is one side of the hexagon?
2	Solve for x: 17x – 61 = 20 + 14x
3	How many inches are in 7.25 feet?
4	Evaluate the expression: $-\dfrac{170}{(7+3^3)} + 21 \cdot \dfrac{2}{3}$
5	It takes Drake 24 minutes to read his bedtime story. Kendrick can read the same story 1.2 times as fast as Drake. In minutes, how long does it take Kendrick to read the story?
6	An infinite sequence progresses such that after the first two terms, each successive term is the product of all terms that have come before. If the first four terms are 5/6, 4/5, 2/3, and 4/9, the 5th term is the simplified fraction A/B. What is A + B?
7	A data set includes the numbers 12, 18, 10, 16, and a number, N, that is a different positive integer from the other four. What is the sum of all values of N that make the mean and the median of the data set equal?
8	The sum of two numbers is 12 and the sum of their squares is 94. What is the product of the two numbers?
	Continued on next page.

9	In the figure shown here, there are 4 congruent smaller circles inside a larger circle. Two of the smaller circles are tangent to each other at the center of the larger circle and there is a chord of length 16 cm that is tangent to one of these circles. The other two smaller circles are internally tangent to the large circle, but do not intersect or overlap with the two circles that are tangent to each other at the center. The area of the shaded region in terms of π is $A\pi$ cm^2. What is A?

16 cm
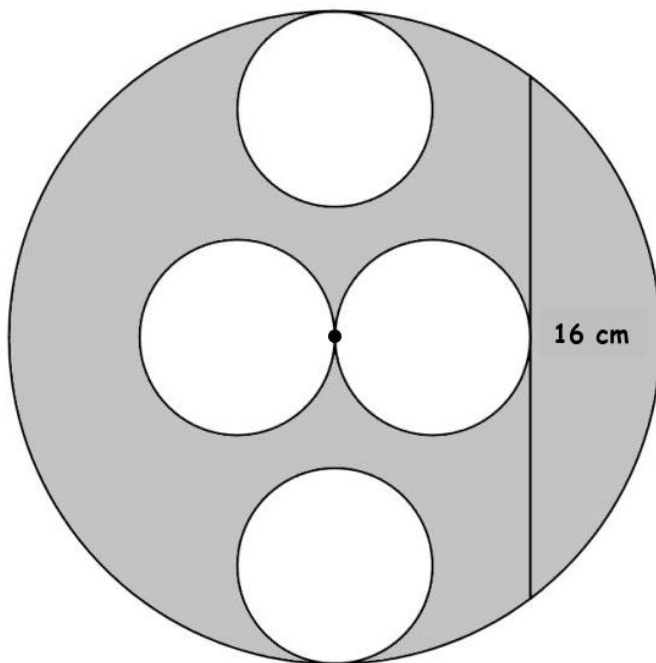
10	The digits from 1 to 9, each being used exactly once, can be arranged in the following grid such that each of the 3-digit numbers reading across the rows from left to right is a perfect square, and the 3-digit number reading down the diagonal from top left to bottom right is also a perfect square. What is the 3-digit number in the 3rd column, reading from top to bottom?
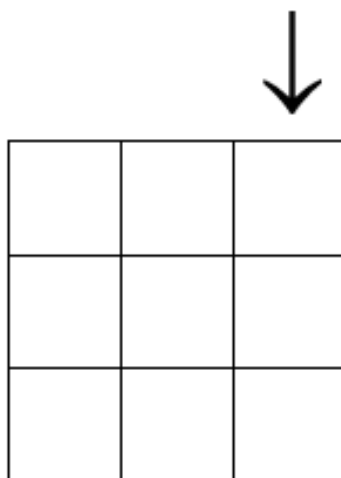
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Key

Team Contest – Answer Key

6th grade

	Answer
1	13 [inches]
2	[x =] 27
3	87 [inches]
4	9
5	20 [minutes]
6	[A + B =] 97
7	42 [= sum]
8	25
9	[A =] 64
10	194

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_____   _____   _____
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.
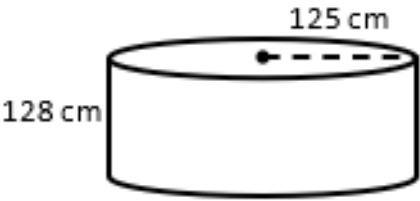
STUDENTS: DO NOT WRITE IN SHADED REGIONS

	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	A scooter travels at an average rate of 15 miles per hour. In miles, how far will the scooter travel in thirty-six minutes?
2	A circle is plotted on the rectangular coordinate system. The center of the circle is at the point (7, -10). The circle touches the y-axis at exactly one point. How many units is the radius of the circle?
3	How many positive multiples of 132 (including 132) are less than 1000?
4	Three fair coins are flipped. As a simplified fraction, the probability that exactly two of the coins show heads is A/B. What is A + B?
5	A set of five distinct positive integers has a mean of 9, which is also the median. What is the largest possible range R, where R = the largest integer minus the smallest integer in the set.
6	If a □ b = $\sqrt{a^2 + b^2}$, then what is ($\sqrt{71}$ □ $\sqrt{73}$) □ 5?
7	A cylinder has a radius of 125 centimeters and a height of 128 centimeters. In terms of π, the number of cubic meters in the volume of the cylinder is Aπ m^3. What is A?
8	The base-5 number 4A1$_5$, where A represents a digit from 0 to 4 inclusive, is equal to the base-6 number 2B4$_6$, where B represents a digit from 0 to 5 inclusive. What is A + B?
9	It is possible for an orchard's cherries to be harvested by 16 workers in 3 hours, with everyone working at the same constant rate. At this rate, if one worker starts the harvest at 8 AM, and one additional worker joins the harvest each hour on the hour, then how long in minutes will it take to complete the harvest? Note, the harvest may be completed with fewer than 16 workers.
10	A regular 6-sided (numbered 1 – 6), a regular 12-sided (numbered 1 – 12), and a regular 20-sided die (numbered 1 – 20) are rolled together. As a simplified fraction, the probability that the number showing on exactly 2 of the 3 dice is the same is A/B. What is A + B?

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Linda Moore Triple Jump – Answer Key

6th grade

	Answer
1	9 [miles]
2	7 [units]
3	7 [multiples]
4	[A + B =] 11
5	[R =] 22
6	[a □ b =] 13
7	[A =] 2
8	[A + B =] 6
9	558 [minutes]
10	[A + B =] 281

Final Score *(out of 10)*

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:		

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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			
6th 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			
6th 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.

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

Total Score for Each Round

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

DO NOT USE TALLY MARKS ON THIS SHEET. WRITE THE TOTAL SCORE FOR EACH ROUND.

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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 one-half of ten plus one-third of twelve?	
2	What is the next term in the geometric sequence starting with two, six, and eighteen?	
3	One-third of Ryan's quarters have a value of one dollar and twenty-five cents. How many quarters does Ryan have altogether?	
4	What is the sum of the smallest two positive prime numbers that differ by six?	
5	What is the mean of the integers four, six, eight, ten, and twelve?	
6	A right triangle has integer side lengths and an area of twenty-four square centimeters. In centimeters, what is the length of the hypotenuse of the triangle?	
7	Solve the equation for X: three-point-five X minus forty-one equals sixty-four	
8	The probability of randomly selecting one red jellybean from a jar containing red, orange, and blue jellybeans is one-sixth. The probability of randomly selecting one orange jellybean is two-fifths. What is the smallest number of blue jellybeans that could be in the jar?	

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College Bowl Round #1

#	Problem	Answer
1	How many inches are in two and one-ninth of a yard?	76 [inches]
2	As a simplified fraction, the probability of drawing a red ten from a standard deck is A over B. What is A plus B?	[A + B =] 27
3	A circle has a circumference of twenty-two pi inches. In terms of pi, the area of the circle is 'A' pi square inches. What is A?	[A =] 121
4	The product of three distinct positive prime numbers is seven hundred and fifteen. What is the sum of the three prime numbers?	29
5	How many three-letter arrangements can be made with the letters in the word RATES, spelled R – A – T – E – S, such that the letters are in alphabetical order? A letter can only be used once.	10 [arrangements]
6	Out of eleven thousand species of birds there are sixty bird species that are flightless. As a simplified fraction, the ratio of birds that can fly to birds that can't is A over B. What is A plus B?	[A + B =] 550
7	Brantley can build three sandcastles in two hours and fifteen minutes. Sawyer can build two sandcastles in an hour. In minutes, how long would it take Brantley and Sawyer to build one sandcastle working together?	18 [minutes]
8	If A minus B equals five and A plus B equals nine, then what is A times B?	[A · B =] 14
9	What is the mean of the six numbers: twenty, thirty, forty, eighty, ninety, and ninety-four?	59 [= mean]
10	Let X equal thirty-five over five and Y equal forty-four over four. What is X squared times Y?	[$x^2 \cdot y =$] 539

COLLEGE BOWL ROUND #2

#	Problem	Answer
1	A cyclist rides one mile in eight minutes. At this rate, how far would the cyclist ride in two hours?	15 [miles]
2	What is the product of two and six to the third power divided by four to the second power?	27
3	The first two terms of an arithmetic sequence are eleven and fifty. What is the sixth term in the sequence?	206 [= 6th term]
4	How many multiples of three are between fifty-five and one hundred and fifteen?	20 [multiples]
5	What is the median of a data set consisting of all distinct three-digit multiples of one hundred and fifty-four?	539 [= median]
6	In a field there are only pigs and chickens. Altogether the animals in the field have thirty-four eyes and fifty-six legs. How many chickens are in the field?	6 [chickens]
7	As simplified fractions, the ratio A to B equals three over five and the ratio B to C equals one over three. In how many ways is this possible if A, B, and C are positive integers less than one hundred?	6 [ways]
8	How many yards are in half a mile?	880 [yards]
9	A rectangle has an area of one hundred and twenty square feet. The length of the rectangle is fifteen feet. In feet, what is the length of the diagonal of the rectangle?	17 [feet]
10	Three standard dice are rolled. As a simplified fraction, the probability that each die shows either a three or a six is A over B. What is A plus B?	[A + B =] 28

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COLLEGE BOWL ROUND #3

#	Problem	Answer
1	How many centimeters are in one hundred and twenty-seven meters?	12,700 [cm]
2	The first two terms of a geometric sequence are eighty-one and fifty-four. What is the fifth term?	16
3	A and B are positive integers. If A times B equals thirty-six and B divided by A equals nine, what is A plus B?	[A + B =] 20
4	A ten-by-ten square is plotted on a coordinate plane, such that two of its sides are parallel with the y-axis and one of its vertices is the point five comma five. What is the number of grid points inside the square in which both coordinates are even?	25 [grid points]
5	The number, N, has a prime factorization of A times B, where A and B are two distinct positive prime numbers. What is the smallest possible three-digit value of N?	[N =] 106
6	A certain coin has a zero-point-six chance of landing heads when flipped and a zero-point-four chance of landing tails. When the coin is flipped three times, as a simplified fraction, the probability that at least one of the three flips results in heads is A over B. What is A plus B?	[A + B =] 242
7	How many triangles with integer side lengths are possible with a perimeter of twelve centimeters?	3 [triangles]
8	Three test scores are eighty-five percent, ninety-two percent, and ninety-three percent. What score in percent is needed on the next test to raise the average to ninety-two percent?	98 [%]
9	Solve for X: zero-point-four X plus five equals seventeen	[x =] 30
10	What is the sum of two squared plus three squared plus four squared plus five squared?	54

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College Bowl Round #4

#	Problem	Answer
1	How many two-digit integers are larger than thirty-three?	66 [integers]
2	What is one thousand minus five hundred minus forty minus three?	457
3	The height of a triangle is twelve centimeters, and the base is fourteen centimeters. What is the number of square centimeters in the area of the triangle?	84 [cm²]
4	In a sequence, successive terms are generated by alternating between multiplying the previous term by ten and then dividing the resulting term by five. The first three terms of such a sequence are three, thirty, and six. What is the ninth term in this sequence?	48
5	Solve the equation for X: two X over three plus four-fifths equals five X over six minus eight-fifteenths	[x =] 8
6	Ernesto can scoop ice cream for twenty cones in half an hour. Maria scoops ice cream at one-point-five times the rate of Ernesto. Bianca scoops at one-point-two times the rate of Maria. Working together, how many cones can the three of them scoop in fifteen minutes?	43 [ice cream cones]
7	Rectangle A has its length decreased by twenty percent and its width increased by one hundred and fifty percent to create Rectangle B. The area of Rectangle A is what percent of the area of Rectangle B?	50 [%]
8	What is the sum of the cubes of the two smallest positive prime numbers?	35
9	A, B, and C represent three distinct positive integers, and A is a two-digit integer. If A is greater than B, which is greater than C, then what is the smallest possible value of A plus B plus C?	[A + B + C =] 13
10	What is the median of the set of numbers: one hundred, two hundred, three hundred fifty, four hundred thirty, five hundred, and six hundred?	390

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COLLEGE BOWL ROUND #5

#	Problem	Answer
1	What is two squared plus eighteen minus the square root of twenty-five?	17
2	Solve for X: thirteen X minus sixteen equals seventy-five	[x =] 7
3	A jar has twenty-one marbles that are either red or blue. The probability of randomly selecting a red marble from the jar is three-sevenths. How many blue marbles are in the jar?	12 [blue marbles]
4	A set of five distinct positive integers has a mean of twenty-three. What is the smallest possible value of the largest integer in the set?	25
5	In the set of positive integers less than thirty, what is the sum of the first and last in the longest string of consecutive composite numbers?	52
6	How many two-digit integers exist, such that the ones digit is larger than the tens digit?	36 [integers]
7	How many square inches are in one-third of a square yard?	432 [in^2]
8	What percent of eighty-five is thirty-four?	40 [%]
9	The Fibonacci sequence begins with the terms one, one, two, three, and continues indefinitely. What is the sum of the first seven terms?	33
10	A car drives at an average rate of thirty-five miles per hour. How many miles does the car travel in twelve minutes?	7 [miles]

COLLEGE BOWL ROUND #6

#	Problem	Answer
1	How many meters are in two point three kilometers?	2300 [meters]
2	A square has an area of two hundred and fifty-six square inches. In inches, what is the perimeter of the square?	64 [inches]
3	An infinite series begins with the terms two-fifths, five-eighths, eight-elevenths, and so on. The product of the first five terms as a simplified fraction is A over B. What is A plus B?	[A + B =] 19
4	One-eighteenth of the living beings in the mythical land of Dormor are goblins, one ninth are elves, one twelfth are trolls, and the rest are humans. As a simplified fraction, the ratio of goblins to trolls is A over B. What is A plus B?	[A + B =] 5
5	It takes ten workers five days to build twenty birdhouses. How many days would it take three workers to build twelve birdhouses?	10 [days]
6	The formula for converting Fahrenheit "F" to Celsius "C" is: C equals five-ninths times the quantity F minus thirty-two. How many degrees Fahrenheit is twenty-five degrees Celsius?	77 [°] or [degrees]
7	A card is drawn at random from a standard deck and not replaced. If it is red, all remaining red cards are removed from the deck. If it is black, no cards are removed. Then a second card is drawn. As a simplified fraction, the probability that the second card is black is A over B. What is A plus B?	[A + B =] 89
8	Two integers are represented by A and B. Let A be thirty-one units away from zero on a number line and let B be fourteen units away from A. How many different values could B have?	4 [values]
9	Four numbers have a mean of eighteen. Three of the numbers are one, sixteen, and twenty-nine. What is the fourth number?	26
10	What is forty-nine times sixteen divided by twenty-eight?	28

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Key

COLLEGE BOWL – EXTRA QUESTIONS

#	Problem	Answer
1	How many ways are there to arrange the letters in the word APPLE, spelled A – P – P – L – E, where the Ps are not next to each other?	36 [ways]
2	Solve for X: seventy-five minus ten X equals fifteen	[x =] 6
3	The first three terms of an arithmetic sequence are five, twenty-one, and thirty-seven. What is the eighth term in the sequence?	117
4	A rectangular prism has a length of six inches, a width of five inches, and a height of ten-thirds inches. What is the number of cubic inches in the volume of the prism?	100 [in^3]
5	What is the largest two-digit integer whose prime factorization is in the form A times B cubed, where A and B are distinct positive prime numbers?	88
6	How many grams are in three-point-two kilograms?	3200 [grams]
7	A circle has an area of 144π square centimeters. Its radius is increased by 25 percent to make a new circle. In terms of π, the number of square centimeters in the area of the new circle is Aπ. What is the value of A?	[A =] 225
8	How many positive seven-digit numbers are there?	9000000 [numbers]
9	The first positive odd number is one. What is the thirty-second positive odd number?	63
10	Let A = 1 + 2 + 3 + 4 + 5 + 6 + 7. What is A squared?	784