"Math is Cool" Masters – 2018-19

November 17, 2018
High School Mental Math Contest

Follow along as your proctor reads these instructions to you. Your Mental Math score sheet is on the back.

GENERAL INSTRUCTIONS applying to all tests:

- *Good sportsmanship is expected throughout the competition by <u>all</u> involved, both competitors and observers. Display of poor sportsmanship may result in disqualification.*
- *Calculators or any other aids may not be used on any portion of this contest.*
- *Unless stated otherwise, all rational, non-integer answers need to be expressed as reduced common fractions except in case of problems dealing with money. In the case of problems requiring dollar answers, answer as a decimal rounded to the nearest hundredth (ie, to the nearest cent).*
- *All radicals must be simplified and all denominators must be rationalized.*
- *Units are not necessary as part of your answer unless it is a problem that deals with time and in that case, a.m. or p.m. is required. However, if you choose to use units, they must be correct.*
- *Leave all answers in terms of π where applicable.*
- *Do not round any answers unless stated otherwise.*
- *Record all answers on the colored cover sheets in the answer column only.*
- *Make sure all answer sheets have all the information (name, team number, etc.) at the top of the sheet filled out.*
- *Tests will be scored as a 0 if answers are not recorded on the answer sheets.*
- *Blank answer sheets and answer sheets with no name will be scored as a 0.*

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

*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/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

"Math is Cool" Masters -- 2018-19

School:_____Room # _____ Team #_____

Name: _____Proctor: _____

High School   <u>Mental Math</u> – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

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/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			

"Math is Cool" Masters – 2018-19

High School – November 17, 2018
Mental Math Contest

Mental Math – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

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/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

#	Problem
1	What is the product of four-sevenths and fourteen?
2	What is the sum of the X and Y coordinates of the point negative-five-comma-seven after it has been reflected across the line Y-equals-X?
3	What is the slope of the line three-X-plus-four-Y-equals-nineteen?
4	What is the area, in square meters, of an equilateral triangle with side lengths of eight meters?
5	What percent of one hundred forty is twenty-one?
6	When three standard six-sided dice are rolled, what is the probability that none of them show the same number?
7	Two lines are initially perpendicular, but then one is rotated 53° clockwise and the other is rotated 39° counter-clockwise. What is the measure, in degrees, of the larger angle between the two lines?
8	A pond contains ducks and dogs. Looking from shore, you count 43 heads. While snorkeling, you count 142 feet. How many dogs are there?

"Math is Cool" Masters -- 2018-19

School: _____ Room # _____ Team #_____

Name: _____ Proctor: _____

High School   <u>Mental Math</u> – 30 sec per question

8 problems read orally to everyone - Approximately 8% of Individual Score - 25% of team score

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/her pencil down, the maximum wait time is 30 seconds after completion of the second reading of the question before another question is asked. You may continue to work on a problem while the next question is being read. The value of each question is a one or zero. Each student will be asked the same eight questions. Individual scores used to determine individual placing will be determined by the sum of the Mental Math score and the Individual Test score for each individual. In addition, the top three Mental Math scores from one team will be totaled and doubled and will contribute to 25% of the team score.*

	Answer
1	8
2	2
3	-3/4
4	$16\sqrt{3}$ [square meters]
5	15 [percent]
6	5/9
7	178 [degrees]
8	28 [dogs]

"Math is Cool" Masters – 2018-19

November 17, 2018

Total # Correct:

STUDENT NAME: _____   **School Name:** _____

Circle Math: **Geometry Algebra 2 Pre-Calculus   Calculus**   Team #: _____   Room #: _____

High School Individual Contest – Score Sheet
DO NOT WRITE IN SHADED REGIONS

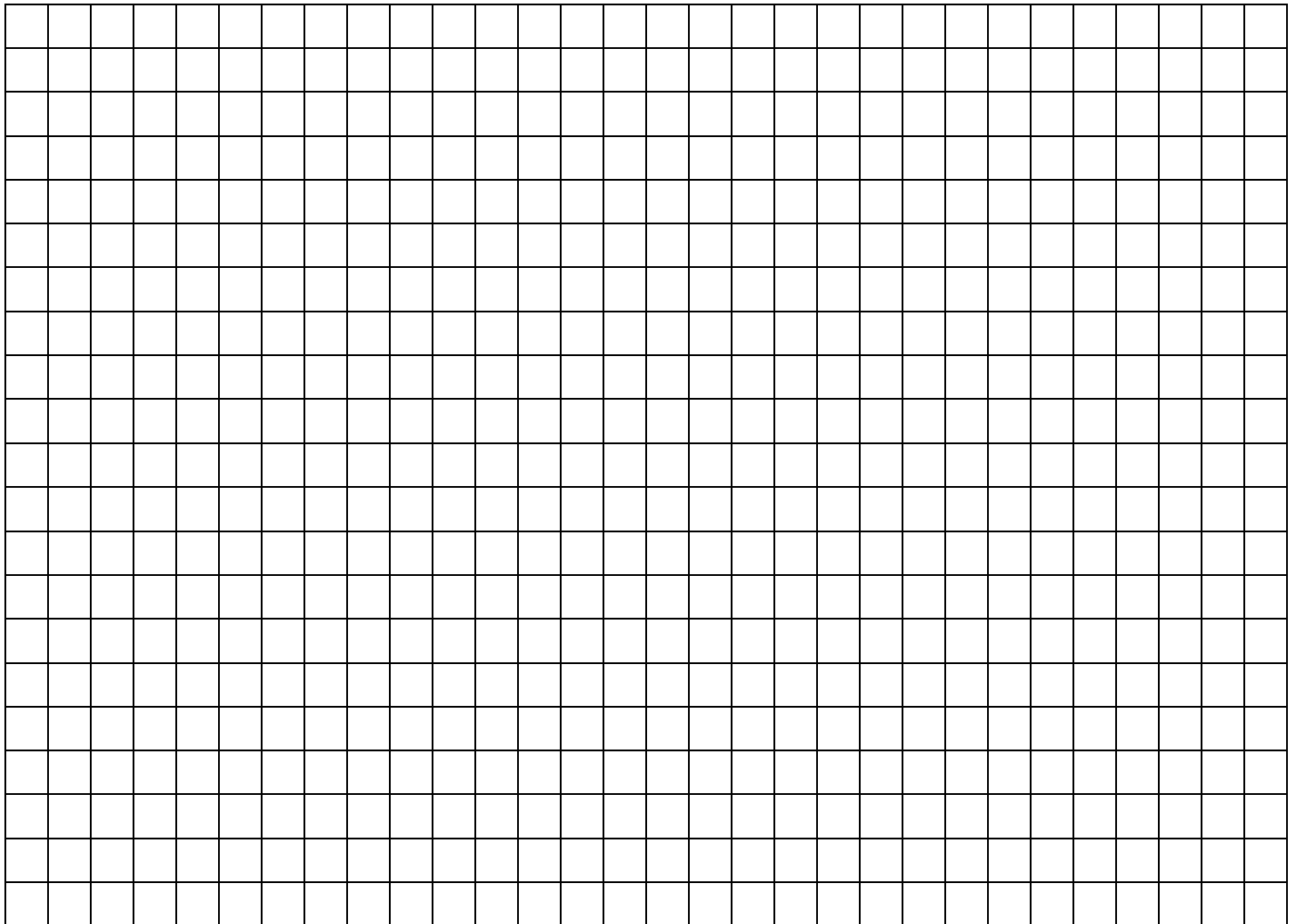|	Answer	1 or 0	1 or 0		Answer	1 or 0	1 or 0		Answer	1 or 0	1 or 0	Math
1				16				31				
2				17				32				
3				18				33				
4				19				34				
5				20				35				
6				21				36				
7				22				37				
8				23				38				
9				24				39				
10				25				40				
11				26				41				**PreCal/**
12				27				42				**Calculus**
13				28				43				Only
14				29				44				
15				30				45				
1 -15 Total				**16 – 30 Total**				**31 – 45 Total**				

"Math is Cool" Masters – 2018-19

November 17, 2018
High School Individual Contest

Tear this cover sheet and scratch paper off and fill out the top of the colored answer sheet prior to the start of the test. The graph below is for your use, if needed.
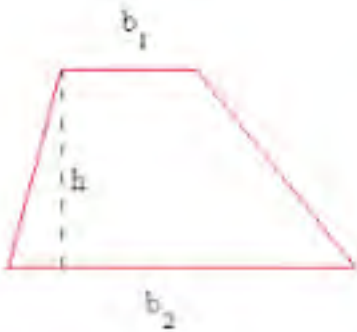
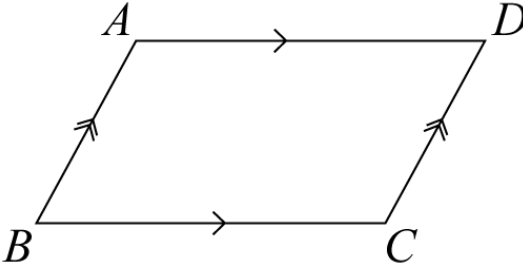**INDIVIDUAL TEST – High School - 35 minutes**

You may NOT be seated next to anyone from your school. If you are MOVE NOW to avoid being disqualified! 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 raw score will be 2 points for correct answers to problems 1-30 and 3 points for 31-40. Record your answers on the score sheet. No talking during the test. You will be given a 5 minute time warning.

"Math is Cool" Masters – 2018-19

November 17, 2018
High School Individual Contest

		Questions 1-30: 2 points each
1		During the yearly Math is Cool test writing retreat, Gregg attended a wedding as a friend of the groom. The wedding was supposed to be 90 minutes long and start at 10:30 A.M. Unfortunately, the groom showed up 16 minutes before the ceremony was originally supposed to end and the ceremony ended up being 102 minutes long. At what time did the wedding end? Answer using A.M. or P.M..
2		Mahen is purchasing supplies of math construction in a store where 8% sales tax is charged (rounded to the nearest cent). She has $14.83 and needs to purchase a compass for $7.25, a protractor for $4.35 and a straight edge for $5.50. How much more money, in dollars and rounded to the nearest cent, does she need to purchase all three items?
3		Given the set of ordered pairs {(3,2), (-8, 1) (7, 6), (x, -4)} what values of x are not possible if the set of ordered pairs is a function?
4		A builder is reading a set of blueprints that has a scale of ¾ inch equals 6 feet. How many square feet would be in a room that measures 6 inches by 3 ¾ inches on the blueprint?
5		The line y = -3x-2 is subjected to a dilation about the origin of 3, which causes every point on the line to be 3 times farther away from the origin than it used to be. What is the new y-intercept after the dilation? Answer as an ordered pair.
6		Evaluate: $\sqrt[3]{64^2}$
7		Solve for x: $3^{5x-6} = 81$
8		If the area of the trapezoid is 54 square feet, b_2 = 24 feet and h = 3 feet, what is the length of b_1 in feet? Picture not drawn to scale.
9		What is closest to the standard deviation of the following set of data? {7, 7, 8, 8, 11, 15, 20, 25, 25, 27} A) -5 B) 8 C) 25 D) 100
10		What is the y-coordinate of the vertex of the quadratic given by f(x) = (x - 4)(x + 6) ?
11		3 gallons of 20% saltwater solution is combined with 4 gallons of 50% saltwater solution. What is the percent of the new saltwater solution, to the nearest whole number?
12		The length of one of the diagonals of a kite is 20 inches and the area of the kite is 120 square inches. What is the length of the other diagonal of the kite in inches?

13	Eho drove 1/5 as far as Ned, who drove 1/5 as far as Biff, who drove 1/5 as far as Bobby. If Bobby drove 625 miles, how far did Eho drive?

14	Which of statements A-D are true?
	    A. The sum of 2 rational numbers is rational
	    B. The sum of a rational number and an irrational number is irrational
	    C. The product of a nonzero rational number and an irrational number is rational
	    D. The product of a nonzero rational number and an irrational number is irrational.

15	Evaluate eleven to the seventh power divided by one hundred twenty-one to the second power.
16	Evaluate: $((2i)^3 - (3i)^2)(i^6 - (2i)^{-1})$
17	It takes a boat twice as long to go a certain distance upstream against the current as it does to go the same distance downstream with the current. What is the ratio of the speed of the stream to the speed of the boat?
18	What is the geometric mean of 5 and 125?
19	If the area of a circle is 25π m², what is the area of the circumscribed square in square meters?
20	The area of the parallelogram is 160 square feet. The length of AD is 20 feet and the length of BA is 16 feet. In degrees, what is the measure of angle B? Figure not necessarily drawn to scale.
21	Simplify by rationalizing the denominator: $\frac{4}{6+\sqrt{2}}$
22	A cow is tied to an outside corner of a rectangular barn, all of the doors of which are closed. The barn measures 4 m by 8 m, and the cow's rope is 12 m long. What is the area, in square meters, that the cow can graze?
23	Two people start running in the same direction from the same point on a quarter-mile long track. One of them runs at 4 miles per hour (mph) and the other runs at 8 mph. How many times will they be at the same point on the track if they run for 8 hours, including their starting point and perhaps their ending point?
24	What are the roots of the equation $n^3 - 7n - 6 = 0$?
25	How many two-digit counting numbers are divisible by each of their digits?
26	What is the sum of the first 9 terms of the arithmetic sequence whose first three terms are 2, 10, and 18?
27	When six friends sit next to one another in a row at the movies, Amy sits next to Ben, Carl does not sit next to Diane, and Eddie sits somewhere to Fiona's left. In addition, Amy sits somewhere to Carl's right, Ben sits next to Eddie, and Diane sits somewhere to Fiona's left. If Amy is somewhere to Eddie's right, what are the initials of the friends from left to right?
28	When $25,000 is placed in an account earning 20% annual interest compounded semi-annually, how many dollars will be in the account after three years? Answer to the nearest hundredth (cent).
29	Two circles have radii of 2 m and 7 m, and their centers are 13 m apart. What is the length, in meters, of their common external tangent?
30	I randomly distribute 12 identical candies among three Trick-or-Treaters. In how many ways could I do this where no two of them receive the same number of candies?

Challenge Questions: 3 pts each

31	What is the smallest counting number with exactly 12 factors?
32	When the digits of a four-digit counting number are reversed to create a new four-digit counting number, the new number is 5445 less than the original. What is the smallest possible value of the original number?
33	In a dataset of 7 test scores from 0 to 100 inclusive, the mean is 36, the median is 25, and the unique mode is 60. What is the smallest possible value of the range?
34	An ant is on the face of a cube with edges measuring five centimeters. The ant starts one centimeter from an edge and two centimeters from another, and wishes to travel to a point on an edge one centimeter from the farthest vertex. What is the shortest distance he can walk along the surface of the cube to accomplish this?
35	If it is currently 4:27:56 PM, what time will it be in 27196 seconds? Include AM or PM.
36	Consider the function $k(m) = 5 - \sqrt{m-2}$, with a domain and range that are subsets of the real numbers. Express the range of the function in interval notation.
37	What is the tens digit when 99^{99} is evaluated?
38	How many different five-card poker hands are considered two pair? Two pair is two cards of one rank, two cards of another rank, and one card of a third rank, such as 33799.
39	A circular rug with a radius of 9 meters is pushed into the corner of a rectangular room so that it touches two walls. A smaller circular rug needs to be designed to fit into the corner so that it touches both walls and the large rug. What should the radius of this smaller rug be, in meters?
40	A group of friends splits the cost of the Pizzapocalypse. If there had been one more person, each person would have paid 80 cents less. If there had been one fewer person, each person would have paid $1.20 more. How many dollars does a Pizzapocalypse cost?

IF taking Pre-Calculus or Calculus, continue to questions 41 - 45

41	If $\sin(u) = \frac{7}{25}$ for $\frac{\pi}{2} < u < \frac{3\pi}{2}$, evaluate $\cos(u)$.
42	Evaluate: $$\int_{-2}^{2} 2x^3 - x^2 - 1 \, dx$$
43	What is the inverse matrix of $\begin{bmatrix} -1 & -2 \\ 1 & 0 \end{bmatrix}$?
44	ΔQRS has side lengths $q = 2$ and $r = 4$, and $m\angle S = 120°$. What is the length of $\overline{QR}$?
45	What are the coordinates, in the form (x, y), of the global minimum of $y = 3x^4 + 16x^3 + 6x^2 - 72x - 11$?

"Math is Cool" Masters – 2018-19

November 17, 2018

Total # Correct:

KEY

STUDENT NAME: _____ **School Name:** _____

Proctor Name: _____ Team #: _____ Room #: _____

High School Individual Contest – Score Sheet
DO NOT WRITE IN SHADED REGIONS

	Answers		Answers		Answers
1	1:26 P.M.	**16**	$-5 + 25i/2$	**31**	60
2	[$]3.64	**17**	1:3 or 1/3 or 1 to 3	**32**	6501
3	3, -8, 7 (any order)	**18**	25	**33**	38
4	1440 [square feet]	**19**	100	**34**	$\sqrt{65}$
5	(0, -6)	**20**	30[º]	**35**	12:01:12 AM
6	16	**21**	$(12 - 2\sqrt{2})/17$	**36**	$(-\infty, 5]$
7	2	**22**	128π	**37**	9
8	12 [feet]	**23**	129	**38**	123552
9	B	**24**	-1, -2, 3	**39**	$27 - 18\sqrt{2}$
10	-25	**25**	14	**40**	$24.00
11	37[%]	**26**	306	**41**	$-24/25$
12	12 [inches]	**27**	CEBADF	**42**	$-28/3$
13	5 [miles]	**28**	$44,289.03	**43**	2x2 Matrix: {0, 1 // -1/2, -1/2}
14	A, B, D (in any order)	**29**	12 [meters]	**44**	$2\sqrt{7}$
15	1331	**30**	72	**45**	$(1, -58)$

Math is Cool" Masters – 2018-19
9th-10th Grade – November 17, 2018

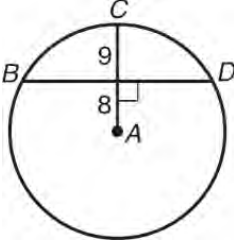Student Name _____

Proctor Name _____ Room # _____

SCHOOL NAME _____ **Team #_____**

INDIVIDUAL MULTIPLE CHOICE - 15 minutes – 10 problems – 20% of team score
This test is the only test where you will be penalized for incorrect responses. You will receive 2 points for a correct letter response, 0 points for leaving it blank and -1 point for an incorrect response. It is not necessary to write your personal name on the test, but you may put it at the bottom of the test so your coach will be able to give you back the correct test. This test is taken individually, but it is part of your team score, including zeros for missing team members. Your team score will be calculated by taking the mean of your four team members' scores. When you are prompted to begin, tear off the colored sheet and begin testing. **Since this is a multiple choice test, ONLY a letter response should be indicated as an answer on the answer sheet.** *No talking during the test.*

DO NOT WRITE IN SHADED REGIONS

	Answer	-1, 0 or 2	-1, 0 or 2
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

"Math is Cool" Masters – 2018-19

9th-10th Grade – November 17, 2018
Individual Multiple-Choice Contest

1	Consider the quadratic equation $x^2 + 6x – 7 = 0$. Which of the following equations is equivalent? A) (x+6)(x-1)=0 B) (x+3)(x+3)=0 C) (x+3)²=16 D) (x+3)²=7 E) Answer not given.

2	Given the following sequence: 7, 10, 13, 16, 19, …
	
	Select all functions that could create the above sequence.
	
	    I. f(x) = 3x+ 4, x∈ {1, 2, 3, 4, …..}
	    II. f(x) = f(x-1) + 3, f(1) = 7, x∈ {1, 2, 3, 4, …..}
	    III. f(x) = 3f(x-1), f(1) = 7, x∈ {1, 2, 3, 4, …..}
	    IV. f(x) = f(x-1) + 3, f(2) = 7, x∈ {2, 3, 4, 5 …..}
	
	A) I and II only B) II and III only C) III only
	D) I, II and IV E) Answer not given.

3	A graph of the function g(x) is shown. Which function rule could represent g(x)? A) $g(x) = (x + 4)^2 – 8$ B) $g(x) = (x – 4)^2 – 8$ C) $g(x) = (x + 1)(x + 7)$ D) $g(x) = (x – 1)(x + 7)$ E) Answer not given.
4	60 students were asked if they take Math and/or Science. 51 students take math, 44 students take science, and 38 students take both math and science. What is the probability that a randomly chosen student takes math or science? A) 19 / 20 B) 19 / 60 C) 95 / 133 D) 1 E) Answer not given.

5	What is the length of $\overline{BD}$? A) 34 B) 15 C) 17 D) 30 E) Answer not given.

6	Which conic section is the following equation an example of? $$4x^2 + 8x - 8y^2 + 21y = 199$$ A) parabola B) hyperbola C) ellipse D) circle E) Answer not given.

7	I start with 1 gallon of lemonade. To make the lemon flavor last longer, after I drink 1/4 of a gallon, I fill the rest with water. I then drink 1/2 a gallon of that solution and fill the rest with water. I then refill it after I drink 2/3 of the remaining solution, but this time I refill it with lemonade. How many gallons of lemonade is left? A) 1/12 B) 1/8 C) 2/3 D) 19/24 E) Answer not given.

8	How many palindromes are there between 250 and 625 that don't contain the digits 4 or 7? A) 21 B) 22 C) 25 D) 37 E) Answer not given.

9	What is the sum of all counting numbers that have the property that the sum of their positive factors is 372? A) 372 B) 601 C) 756 D) 906 E) Answer not given.

10	Roger could build the brick wall in 12 hours and Presley could build it in 8 hours. They worked together, and it took them 5 hours to build the wall, because they laid 100 fewer bricks per hour than they should have working together. How many bricks are in the wall? A) 12,000 B) 12,500 C) 12,800 D) 14,400 E) Answer not given.

Math is Cool" Masters – 2018-19
9th-10th Grade – November 17, 2018

Student Name

Proctor Name _____ Room # _____

SCHOOL NAME _____ **Team #_____**

INDIVIDUAL MULTIPLE CHOICE - 15 minutes – 10 problems – 20% of team score
This test is the only test where you will be penalized for incorrect responses. You will receive 2 points for a correct letter response, 0 points for leaving it blank and -1 point for an incorrect response. It is not necessary to write your personal name on the test, but you may put it at the bottom of the test so your coach will be able to give you back the correct test. This test is taken individually, but it is part of your team score, including zeros for missing team members. Your team score will be calculated by taking the mean of your four team members' scores. When you are prompted to begin, tear off the colored sheet and begin testing. **Since this is a multiple choice test, ONLY a letter response should be indicated as an answer on the answer sheet.** *No talking during the test.*

DO NOT WRITE IN SHADED REGIONS

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

"Math is Cool" Masters – 2018-19
9th-10th Grade – November 17, 2018

Final Score:

SCHOOL NAME _____ **Team #** _____

Proctor Name _____ Room # _____

First Score
(out of 10)

Team Contest – Score Sheet

TEAM TEST - 15 minutes – 30% of team score

*When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as **1 or 0**. Record all answers on the colored answer sheet.*

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

"Math is Cool" Masters – 2018-19

9th-10th Grade – November 17, 2018
Team Contest

1	In the system of equations: $$Ax + 3y = 17$$ $$5x + By = -1$$ the solution is (x,y) = (4,3). Find the sum of A and B.
2	What is the center of the circle given by the equation $x^2 + y^2 - 6x + 8y - 39 = 0$?
3	Write $\log_2 32 = 5$ in the form $A^B = C$. What is the sum of A and C?
4	Find "a" and "c" in the function $f(x) = ax^2 - 6x + c$ to model the sequence 1, -2, 1, 10, where $f(0) = 1$, $f(1) = -2$, etc. What is the sum of "a" and "c"?
5	A marionberry cinnamon roll is a right prism with a square base and side lengths of 2 inches and 5 inches. If they are sold at $0.45 per cubic inch, what is the sum of all possible prices for the roll?
6	In the cryptarithm below, each instance of a letter represents the same digit (0-9) and different letters represent different digits (e.g. if one A is a 1, all A's are 1s and B cannot be 1). What is the largest possible value of the six-digit number ABCDEF? $ABC + DEA = CFDD$
7	When a fair coin is flipped seven times, what is the probability that at least one sequence of three heads in a row occurs?
8	Which of the following numbers is largest: $L = 80^{12}$, $M = 3^{48}$ or $N = 6000^6$
9	A ball with a radius of 20 centimeters is rolled into the corner of a room, and a ball with a radius of 15 centimeters is set on top of the first ball so that it touches the first ball and both walls. How many centimeters is the top of the smaller ball above the floor?
10	When five integers are added two at a time, the sums are 4, 6, 12, 28, 34, 36, 37, 43, 45, and 67. What is the positive difference between the largest and smallest of the five numbers?

SCHOOL NAME _____ **Team #** _____

Proctor Name _____ Room # _____

Team Contest – Score Sheet

TEAM TEST - 15 minutes – 30% of team score

*When you are prompted to begin, tear off the colored sheet and give a copy of the test to each of your team members and begin testing. Each problem is scored as **1 or 0**. Record all answers on the colored answer sheet.*

DO NOT WRITE IN SHADED REGIONS

	Answer
1	-5
2	$(3, -4)$
3	34
4	4
5	[$]31.50
6	861937
7	47/128
8	$M = 3^{48}$
9	$35 + 5\sqrt{47}$ [cm]
10	39

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round

Order Turned In	1	2	3	4	5	
Question Number						Total
Score	1 or 0	2 or 0	3 or 0	4 or 0	5 or 0	

After filling out the top of each of these half sheets, tear off the top sheet and give to your proctor so he/she can keep score.

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round

Order Turned In	1	2	3	4	5	
Question Number						Total
Score	1 or 0	2 or 0	3 or 0	4 or 0	5 or 0	

After filling out the top of each of these half sheets, tear off the top sheet and give to your proctor so he/she can keep score.

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round   # #1

Answer for Question # _____ Answer: _____

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round

#2

Answer for Question # _____ Answer: _____

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round

#3

Answer for Question # _____ Answer: _____

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round

#4

Answer for Question # _____ Answer: _____

"Math is Cool" Masters -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round

#5

Answer for Question # _____ Answer: _____

"Math is Cool" Masters – 2018-19

9th-10th Grade – November 17, 2018
Pressure Round Contest

1	Tom left Seattle driving to Spokane 280 miles away at 4:00 p.m., driving at a constant speed of 60 mph. If David left Seattle at 5:00 p.m, what is the exact speed, in mph as a reduced fraction, that David must drive in order to arrive in Spokane at the same time as Tom?
2	Suppose I discovered that my cat had a taste for the adorable little geckoes that live in the bushes and vines in my yard, back when I lived in Arizona. In one month, suppose he deposited the following on my carpet: six gray geckoes, twelve geckoes that had dropped their tails in an effort to escape capture, and fifteen geckoes that he'd chewed on a little. Only one of the geckoes was gray, chewed on, and tailless; two were gray and tailless but not chewed on; two were gray and chewed on but not tailless. If there were a total of 24 geckoes left on my carpet that month, and all of the geckoes were at least one of "gray", "tailless", and "chewed on", how many were tailless and chewed on but not gray?
3	What is the sum of all values of "b" that allows $x^2 + bx + 360$ to be factored over the set of rational numbers?
4	Unit squares are put together to form a 6x9 rectangle. If I cut the rectangle in half along a diagonal, how many squares would I cut through?
5	A cowboy is leaving the town of Origin at (0, 0), and needs to visit the river to get water before returning to his camp at (-14, 9). If the river has equation $x - y = 4$, what is the shortest distance the cowboy can travel?

"Math is Cool" Masters – 2018-19
9th-10th Grade – November 17, 2018

Proctor Name _____Room #_____

SCHOOL NAME _____ **Team #_____**

PRESSURE ROUND - 10 minutes – 5 problems - 5 rounds – 15% of team score

When it is time to begin, you will be handed a packet of five problems. There is a copy of the problems for each team member. Two minutes after the start of the test you are expected to submit an answer for one of the problems (it can simply be a guess). The maximum value of this answer is 1 point. In another two minutes you are expected to submit another answer to one of the four remaining problems; its maximum value is two points. This process will continue until all the problems are answered and each consecutive problem's worth will go up by one point. You must submit your answers on the colored sheets given to you. If you do not have an answer at the end of a two minute period, you must still submit an answer sheet with an identified problem number on it. Failure to do so will result in loss of points. This event is timed, and you will be given a verbal 5 second warning and told to hold your answer sheet up in the air. You may keep working as the sheets are collected. If a team answers the same question more than once, only the first answer will be scored and the other attempts will be ignored.

Pressure Round Answers

	Answer
1	840/11 [mph]
2	3
3	0
4	12
5	$\sqrt{493}$

"Math is Cool" Masters -- 2018-19

High School

School: _____ Team #_____

Proctor: _____ Room #_____

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

Do not use tally marks.

"Math is Cool" Masters -- 2018-19

High School

School: _____ Team #_____

Proctor: _____ Room #_____

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

Do not use tally marks.

"Math is Cool" Masters – 2018-19

High School – November 17, 2018

COLLEGE BOWL – SET 1

#	Problem	Answer
1	A point is located at three comma five. The point is moved down 7 units and right 9 units then reflected across the line y = x. What quadrant is the point now in?	[quadrant] 2
2	A triangle has two angles with a measure of 37 degrees and 49 degrees. What is the measure of the angle that is supplementary to the third angle?	86[°]
3	Bobbie has 400 pieces candy. He gives half of his candies to Billy. Of the remaining, he gives half of those to Biff. Of the remaining amount, he gives an equal maximum integer amount to his three other friends. How many pieces of candy does he have left for himself?	1 [piece of candy]
4	How many degrees are in an exterior angle of a regular twenty-four-sided polygon?	15 [degrees]
5	Express the cube root of fifty-six in simplest radical form.	Two times the cube root of seven.
6	What is the greatest common divisor of two hundred twenty-one and two hundred ninety-nine?	13
7	How many distinct ways can the letters of the word S-L-I-D-E-R-S be rearranged if the exact sequence S-L-I must appear in the rearrangement?	120 [ways]
8	What is the units digit of fourteen to the sixth power?	6
9	The first two terms of an arithmetic sequence are 5 and 12. What is the sum of the first ten terms of this sequence?	365
10	In a three-four-five triangle, what is the tangent of the smallest angle?	Three-fourths

"Math is Cool" Masters – 2018-19

High School – November 17, 2018

COLLEGE BOWL – SET 2

#	Problem	Answer
1	Express zero-point-three-three-three repeating as a fraction.	One-third
2	The sum of four angles in a pentagon is 300 degrees. What is the measure of the 5th angle?	240[°]
3	Biff is preparing to go fishing. He needs to choose 3 fishing poles from the 6 fishing poles he has. He also needs to choose 3 reels from the 5 reels he has and 2 kinds of bait from his 4 different kinds of bait. How many ways can he prepare to go fishing?	1200 [ways]
4	What is the probability that, when four fair twelve-sided dice are rolled, all numbers showing are different?	$\dfrac{55}{96}$
5	What values of G satisfy eight-G-squared-minus-nine-G-minus-fourteen-equals-zero?	2 and $-\dfrac{7}{8}$ Both required
6	If the price of an item is increased by 20% and then this new price is increased by 30%, what is the overall percentage increase from the original price?	56[%]
7	How many positive factors do two hundred thirty-six and two hundred forty share?	3 [ways]
8	A right triangle has hypotenuse 34 and one leg of 16. What is its area?	240 [sq un]
9	What is the remainder when seventeen to the fourth power is divided by five?	1
10	A goat is on the end of a 50-foot rope attached to a stake in the ground. Keeping the rope stretched tight, the goat walks fifty-pi-over-three feet without turning around. How many degrees does the rope rotate at the stake?	60[°]

"Math is Cool" Masters – 2018-19

High School – November 17, 2018

COLLEGE BOWL – SET 3

#	Problem	Answer
1	When I double my favorite number, reduce the result by thirteen, and then divide that result by three, the final result is nineteen. What is my favorite number?	35
2	Five and one-half pounds of sugar cost $3.41. How many dollars does 2 pounds of sugar cost?	[$]1.24
3	What is sixty-five percent of sixty?	39
4	What is the fourth term of the geometric sequence with first term seventeen and third term one hundred fifty-three?	459
5	What is the sum of the factors of two hundred ten?	576
6	How many prime numbers are greater than one hundred ninety and less than two hundred?	4
7	Let R, S, and T be the roots of the polynomial Y equals three-X-cubed plus seven-X-squared plus twenty-one-X plus one-hundred-forty-seven. What is the sum of R-times-S, R-times-T, and S-times-T?	7
8	What is the logarithm base four of one thousand twenty-four?	5
9	What is the second largest four-digit number whose thousands digit is twice its tens digit?	8948
10	An ice cream company made a pie chart showing the number of vanilla, chocolate and strawberry cones sold last month. If 100 vanilla, 150 chocolate and 50 strawberry cones were sold, what would the central angle, in degrees, be for the strawberry cones in the pie chart?	60[°]

COLLEGE BOWL – SET 4

#	Problem	Answer
1	How many elements are in the intersection of the set of positive two-digit integers and the set of multiples of 6?	15
2	To make a dice game different, Stedman wrote different numbers on the two dice faces. On one dice he wrote 5, 6, 7, 8, 9, 11 and on the other he wrote 1,1,1,1,1,1. If he rolls both dice, what is the probability the sum is even?	2/3
3	What is forty-nine percent of three-hundred?	147
4	What is the probability of rolling three fair six-sided dice and getting a sum of four?	1/72
5	A line intersects the x-axis at the point nine-COMMA-zero and is perpendicular to the line three-X minus two-Y equals seventeen. At what point does this line intersect the y-axis?	(0,6) or 0 comma 6.
6	A red bike rolls down a ten-foot slope in two minutes. A blue bike rolls two-thirds of the distance in seventy-five percent of the time. Expressed as a fraction, what is the ratio of the blue bike's speed to the red bike's speed?	$\dfrac{8}{9}$
7	What is the coefficient of the X-cubed term in the expansion of the quantity five-X-minus-two [PAUSE] to the fifth power?	5000
8	A regular polygon has its vertices named in clockwise order, starting with A, B, C, etc. A line drawn through vertex E and vertex Q passes through the center of the figure. How many sides does the polygon have?	24
9	What is the least common multiple of 8 and 54?	216
10	Find the value of P if the slope of the line passing through the point eight comma seven and the point four comma P is negative one-half.	9

"Math is Cool" Masters – 2018-19

High School– November 17, 2018

COLLEGE BOWL – SET 5

#	Problem	Answer
1	The sum of three consecutive even integers is 144. What is the smallest of the integers?	46
2	What is the product of one hundred forty-one and one hundred fifty-nine?	22419
3	In a game of Hide & Seek, Zack and Yessica see one another when they are thirty-two feet apart, and the chase is on! If Zack chases Yessica at a speed of five feet per second, and Yessica runs away at a speed of three feet per second, how many seconds will it take Zack to catch Yessica?	16 [seconds]
4	What is the length of the altitude to the hypotenuse of a right triangle with leg lengths of five and twelve?	$\frac{60}{13}$ [un]
5	If P-of-N is two-N plus three, evaluate P-inverse of negative-fifteen.	-9
6	What is the slant height of a cone with radius eight and volume one hundred twenty-eight pi?	10 [un]
7	Translate the following base two number to base eight: one one zero one zero zero one zero.	$322_{[8]}$
8	What is the area, in square meters, of a triangle with sides measuring nine meters, seven meters, and fourteen meters?	$12\sqrt{5}$ [sq m] Twelve times the square root of five
9	At an art show with eight participants, there are five blue ribbons to be awarded. In how many ways might the ribbons be awarded?	56 [ways]
10	The length of one side of a square is three-X plus four while another side is five-X plus 2. What is the value of X?	1 [un]

"Math is Cool" Masters – 2018-19

High School – November 17, 2018

COLLEGE BOWL – SET 6

#	Problem	Answer
1	After the line Y equals three-X plus four has had a dilation of 5 about the origin, what is the new slope?	3
2	Convert zero-point one-three-three-three-three repeating to a reduced fraction. Note that only the three repeats.	2/15
3	As I'm about to turn off my light on Halloween, two Trick-or-Treaters show up, and I decide to give them everything I have left: seven identical candy bars. If I don't pay any attention to fairness (all the candy might go to one Trick-or-Treater), in how many ways might I distribute the candy?	8 [ways]
4	What are the coordinates of the vertex of the parabola y equals three X-squared minus six X plus one?	$(1, -2)$
5	A basket is filled by randomly selecting four fruits from a pile of six apples and eight oranges. What is the probability that the basket contains two apples and two oranges?	$\dfrac{60}{143}$
6	What is the area of a regular hexagon with a perimeter of 48?	$96\sqrt{3}$
7	How many positive integers less than or equal to one thousand are multiples of five and/or twelve?	267
8	A right triangle has a hypotenuse measuring 26 ft and one leg measuring 24 ft. What is the length, in feet, of the other leg?	10 [feet]
9	What are the coordinates, in the form X-COMMA-Y, of the point one-third of the way from negative-eight-COMMA-negative-seven to thirteen-COMMA-negative-four?	$(-1, -6)$ Negative-one-COMMA-negative-six
10	Let x be the number of seconds in a normal, non-leap year. How many zeroes does x end in?	3

"Math is Cool" Masters – 2018-19

High School – November 17, 2018

COLLEGE BOWL – EXTRA

#	Problem	Answer
1	When three fair coins are flipped, what is the probability that they show exactly two tails?	$\dfrac{3}{8}$
2	What is the mean of the median, mode, and range of the data set five, three, nine, two, two?	4
3	The area of a 45-degree angle sector in circle is 8pi what is the circumference?	16pi [un]
4	What is the midpoint between the point six comma negative-four and the point two comma eight?	(4, 2)
5	What is the largest number that cannot be expressed as a sum of positive multiples of seven and thirteen?	71
6	What is the area of a circle that circumscribes an equilateral triangle with side length four?	$\dfrac{16\pi}{3}$ [sq un]
7	What is the sum of the six smallest positive perfect squares?	91
8	Convert five-PI-over-sixteen radians into degrees and minutes.	56°15′ 56 degrees 15 minutes