"Math is Cool" Championships – 2018-19

#sponsor

#date

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.

<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.*

Final Score:

(Out of 8)

"Math is Cool" Championships -- 2018-19

School:_____Room # _____ Team #_____

Name: _____Proctor: _____

High School **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.*

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

“Math is Cool” Championships – 2018-19

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High School – #date

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 seventeen and three?
2	After driving twelve miles towards work, Bobbie realized he had forgotten his calculator and returned home to get it. If Bobbie lives twenty miles from work, how many total miles did he drive before he got to work?
3	What is the circumference of a circle whose area is forty-nine pi square centimeters?
4	A soup company doubled the diameter of their soup cans. If the volume of the old soup can was two cups, what is the volume of the new soup can?
5	Two fair six-sided dice are rolled. What is the probability that the sum of the numbers showing is eight?
6	What is the sum of the terms of the infinite geometric sequence where the first term is one and third term is four ninths?
7	If forty-eight over x equals x over twenty-seven, what is x?
8	What is the remainder when fifty four thousand three hundred twenty one is divided by eleven?

Final Score:

KEY

(Out of 8)

"Math is Cool" Championships -- 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	51
2	44 [miles]
3	14π [cm]
4	8 [cups]
5	5/36
6	3
7	36
8	3

"Math is Cool" Championships – 2018-19

#date

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
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	Math
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				**PreCal/**
42				**Calculus**
43				Only
44				
45				
31 – 45 Total				

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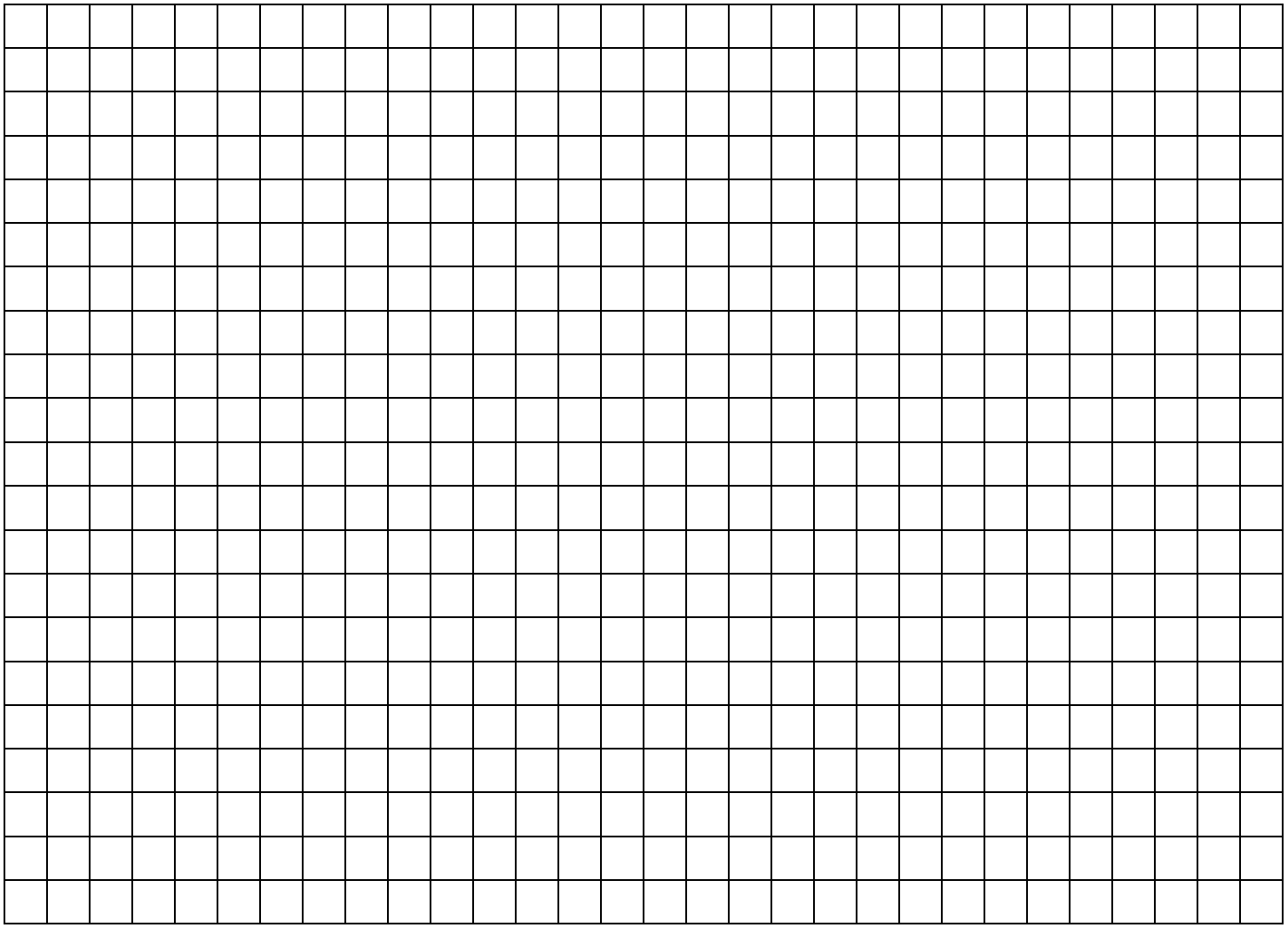
#date

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.



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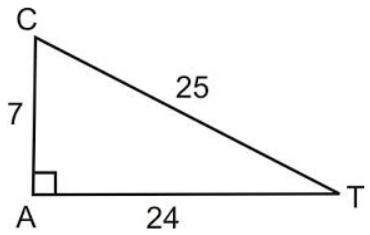
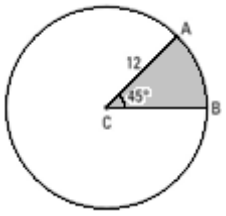
High School Individual Contest

	Questions 1-30: 2 points each
1	Solve for x: $8x - 2 = 54$
2	If there are 7 power sockets allocated randomly to 9 devices, what is the probability that a particular device does not get a power socket?
3	How many lines of symmetry does a regular hexagon have?
4	What is the tangent of c in the triangle below? (Angle c is located at vertex C) 
5	What is the distance between the two points $(-5, -1)$ and $(-10, 11)$?
6	Carol is building a fence to keep deer from eating the plants in her organic garden. The garden is in the shape of a rectangle with measurements of 60 feet by 90 feet. She needs a fence post every 15 feet. How many fence posts will she need to complete the garden?
7	What is the y-intercept of the function below? Write as an ordered pair. $f(x) = 2x^2 - 6x + 1$
8	What is the least common multiple of 72 and 60?
9	What is the product of the mean and the median of the set {1, 2, 4, 5, 10, 12, 15}?
10	In how many distinct ways can the letters of the word SNAKE be arranged?
11	What is the area of the shaded region shown, in terms of π? 
12	What is the slope of the line perpendicular to $-8y - 11x = 19$?

13	What is 25% of 40% of 250?
14	I toss 3 fair coins. What is the probability that exactly 2 of the coins land on heads?
15	What is the slope of the line that passes through the points $(-3, 5)$ and $(5, 9)$?
16	Evaluate: $(9 + 7)(81 - 63 + 49)$
17	What is the measure, in degrees, of each interior angle of a regular octagon?
18	How many positive factors of 84 are even?
19	What is the sum of the first 5 terms of the geometric sequence that begins with 16 and has the ratio $\frac{3}{2}$?
20	In base 10, what is 625_8?
21	Dome sells gas for $\$3.62\frac{9}{10}$ per gallon, while Lizard charges $\$3.44\frac{9}{10}$ per gallon. For a purchase of 9 and a half gallons, how many dollars and cents would you save by buying from Lizard instead of Dome?
22	Let $x = \frac{2^{20} * 2^{21}}{2^{15}} - \frac{2^6 * 2^{47}}{2^{29}}$. What is the prime factorization of x?
23	Given $f(n) = f(n-1) + 2$ and $f(5) = 20$, calculate: $f(1) + f(2) + f(3) + f(4)$
24	Find the positive difference between a and b given: $4a - 3b + c = 0$ $5b - 2c = -4$ $a - 2b - c = 15$
25	Tom writes 5 math questions per hour, and 80% of them are flawless. James writes 7 questions per hour and 90% are flawless. How many hours, rounded to the nearest integer, would it take the two of them to produce 41 flawless questions?
26	A rancher is purchasing hay for her cows for the winter. She knows that a round bale (round bales are cylindrical) that has a diameter of 4 feet and a height of 4 feet will feed 21 cows for one day. She can only find round bales with a diameter of 5 feet and a height of 4 feet. How many bales will she need to buy if she needs to feed 75 cows for 175 days?
27	Find the y-coordinate of the third vertex of the equilateral triangle with its first two vertices at (-3,0) and (3,0) that contains the point (0,3).
28	Evaluate $(1 + i)^{12}$
29	Bobby used the expression $40{,}000(A)^{48}$ to find the amount of money, in dollars, in an account after $40,000 was invested for 4 years at 6% compounded monthly. As a decimal, what is the value of A?
30	Let $a[\|]b = \frac{a^b}{b^2}$. What is $(2[\|]3)[\|]2$?

Challenge Questions: 3 pts each	
31	Given that the sum of the roots of $$y = \frac{x^2 - 3x}{5x - 1} - \frac{m - 1}{m + 1}$$ is zero, what is m?
32	What is the distance between the point (4, -7i) and the line 2x+3iy=13?
33	Find $a^3 + b^3$, given that $a + b = 6$ and $ab = 2$.
34	What is the total surface area of a cone with radius 7 and height 24?
35	Evaluate the infinite expression: $$\log_2(2 + \log_2(2 + \log_2(2 + \cdots)))$$
36	Twelve fair six-sided dice are rolled into 3 hats labeled A, B, and C – 3 dice into A, 4 dice into B, and 5 dice into C. Will reaches into a random hat, takes two dice, and rolls them back into one of the hats at random. What is the expected value of the sum of the face-up values on the dice in hat B?
37	I stand 5m from a flat, mirrored wall, and at eye level in the mirror I see the reflection of an electrical outlet at a 30-degree angle (from the mirror). If the outlet is 10m from the mirrored wall, how far is the outlet from me?
38	The sequence 5, 5, 1, -7, -19, … is described by a polynomial function f(x). Given f(3) = 1, find the explicit rule for the sequence.
39	Let N be a 3-digit number with distinct digits, and let m be the sum of the digits of N. What is the smallest possible value of $\frac{N}{m}$?
40	16 candies are distributed among 12 people. Let p be the reduced form of the probability that each person received at least one candy. What is the sum of the distinct prime factors in the denominator of p?

"Math is Cool" Championships – 2018-19

#date

Total # Correct:

KEY

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

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

High School Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answers
1	[x =] 7
2	2/9
3	6 [lines] [lines of symmetry]
4	24/7
5	13 [units]
6	20 [posts]
7	(0,1)
8	360
9	35
10	120
11	18π [square units]
12	8/11
13	25
14	3/8
15	1/2

	Answers
16	1072
17	135 [degrees]
18	8
19	211
20	$405_{[10]}$
21	[$] 1.71
22	$2^{24} * 3$
23	60
24	3
25	4 [hours]
26	400[Bales]
27	$3\sqrt{3}$
28	-64
29	1.005
30	16/81

	Answers
31	4
32	$2\sqrt{13}$
33	180
34	224π [square units]
35	2
36	14
37	$10\sqrt{7}$ [m]
38	$[f(x) =] -2x^2 + 6x + 1$
39	21/2
40	62
41	
42	
43	
44	
45	

"Math is Cool" Championships – 2018-19

9th-10th Grade – #date

Final Score:

First Score

(out of 20)

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" Championships – 2018-19

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9th-10th Grade – #date

Individual Multiple-Choice Contest

1	What is the maximum number of nonintersecting diagonals that can be drawn in a 40-sided polygon? A) 19 B) 37 C) 40 D) 740 E) Answer not given.
2	What is the least common multiple of 42 and 9? A) 3 B) 42 C) 126 D) 378 E) Answer not given.
3	What is the expected sum of the results of rolling four fair eight-sided dice? A) 4.5 B) 14 C) 18 D) 20 E) Answer not given.
4	The expression $x^2 - 36$ is the equivalent to which of the following expressions? A) $(x-6)^2$ B) $(x+6)^2$ C) $(x-6)(x+6)$ D) $(2x-6)(2x+6)$ E) Answer not given.
5	What is the remainder when 2018 is divided by 67? A) 0 B) 8 C) 41 D) 42 E) Answer not given.
6	A company bought some compact cars that cost \$15,000 each, and some full-sized cars, that cost \$23,000 each. A total of 20 cars were bought, for \$372,000. How many compact cars did the business buy? A) 0 B) 4 C) 11 D) 24 E) Answer not given.

7

The number of bags of coffee left at WA Café throughout the winter is shown in the table.

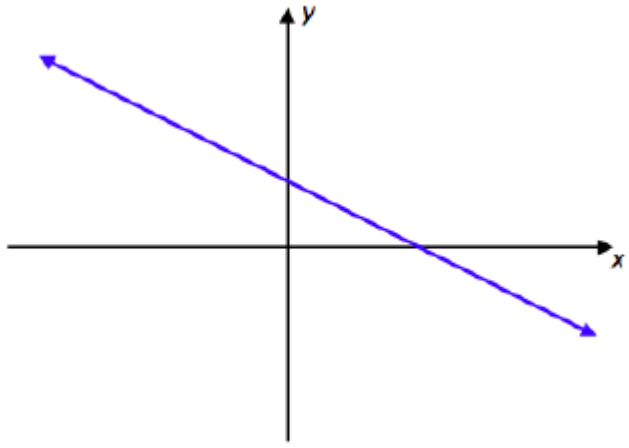
Days into winter	0	5	10	15	20
Coffee bags left	160	80	40	20	10

Select the most appropriate function and reasoning to model this situation.

A. An absolute value function could model the data as the number of bags will absolutely go to zero.
B. A quadratic function could model the data since there will be a minimum number of bags.
C. A linear function could model the data since the number of bags decreases at a constant rate every 5 days.
D. An exponential function could model the data as the number of bags decreases by the same percent every 5 days.

8

Dash and Violet are trying to match equations to their graphs. Select the equation that *could* represent the linear function shown in the graph even though the scale is not known.



A) $y = \frac{1}{2}(x + 2)$ C) 4x+8y = -32

B) $y = -\frac{1}{2}(x + 2)$ D) 4x+8y = 32

E) Answer not given.

9

What is the 17th term in the sequence below?

1,1,3,4,5,9,7,16, …

A) 17 B) 19 C) 64 D) 81

E) Answer not given.

10

An angle is drawn with its vertex on a circle such that it intersects a 90° sector. The distances from the vertex to the points where it intersects the circle are 6 and 7. What is the square of the distance between the points of intersection?

A) $85 - 42\sqrt{2}$ B) $85 - 21\sqrt{2}$ C) $139 - 42\sqrt{2}$

D) $139 - 21\sqrt{2}$ E) Answer not given.

"Math is Cool" Championships – 2018-19

9th-10th Grade – #date

Final Score:

KEY

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

"Math is Cool" Championships – 2018-19

9th-10th Grade – #date

Final Score:

SCHOOL NAME _____ **Team #** _____

First Score
(out of 10)

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

“Math is Cool” Championships – 2018-19

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9th-10th Grade – #date

Team Contest

1	How many distinct handshakes can a group of seven people perform?
2	An isosceles triangle has one side measuring 7 meters and perimeter 15 meters. What is the product of the lengths of the three sides?
3	What is the sum of the first 11 odd numbers?
4	In how many ways can I arrange the letters of the word PROCTOR if the two O’s cannot be adjacent?
5	What is the digit in the ten-thousandths place of the decimal representation of eighteen over ninety-nine?
6	On an analog clock 12:00 is denoted as point A, 6:00 is denoted as point B and 11:00 is denoted as point C. What is the measure, in degrees, of angle ABC?
7	If they share no sides, what is the maximum number of times a hexagon can intersect an icosagon? (An icosagon has 20 sides; shapes may be irregular)
8	A square pyramid has base edges of length 5 and other edges of length 10. What is the pyramid’s height, as a reduced fraction with a rational denominator?
9	35% of a bunch of blackberries are tart, and the rest are sweet. Nirya the picky wood turtle will turn down 100% of tart blackberries and 15% of sweet ones. If Nirya turns down a blackberry, what is the probability that it is tart?
10	In an infinite forest of Saech trees, most leaves have 5 points. However, mutations can cause leaves to have additional points, always an odd number. 90% of leaves have 5 points, 9% have 7, 0.9% have 9, 0.09% have 11, and so on. What is the average number of points per leaf in this forest?

"Math is Cool" Championships – 2018-19

9th-10th Grade – #date

Final Score:
KEY

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	21 [handshakes]
2	112
3	121
4	900
5	8
6	15[°]
7	120 [intersections]
8	$\frac{5\sqrt{14}}{2}$ [units]
9	$\frac{140}{179}$
10	$\frac{47}{9}$ [points per leaf]

“Math is Cool” Championships -- 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” Championships -- 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” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #1

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #1

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #2

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 9th-10th

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #2

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #3

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #3

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #4

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #4

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #5

Answer for Question # _____ Answer: _____

“Math is Cool” Championships -- 2018-19

9th-10th Grade

School: _____ Team #_____

Proctor: _____ Room #_____

Pressure Round #5

Answer for Question # _____ Answer: _____

"Math is Cool" Championships – 2018-19

#sponsor

9th-10th Grade – #date

Pressure Round Contest

1	On a test Johnny missed 40% of the questions and got 30 questions correct. On the same test, if Sally got 70% of her questions correct, how many did she get correct?
2	Let $y = 3x - 5 + c$. If I determine c randomly by rolling a fair, twelve-sided die, what is the probability that the line crosses Quadrant II?
3	The distance between (1,3) and (x, y) is 5 and x and y are integers. What is the sum of all x and y that make the above statement true?
4	What is the coefficient of the x^2 term of the parabola defined by the points (0,2), (2, −4), and (4,2)?
5	Given that 15, x, y, z, w, and 49 are six consecutive terms in an arithmetic sequence, what is $y + z$?

"Math is Cool" Championships – 2018-19

9th & 10th Grade – #date

Final Score:
KEY

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	35 [questions]
2	7/12
3	48
4	3/2
5	64

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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” Championships -- 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.

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COLLEGE BOWL – SET 1

#	Problem	Answer
1	A calculator used to cost two hundred dollars and is on sale for one hundred sixty dollars. What percent has the calculator's price been reduced?	20 [%]
2	What is the sum, in degrees, of the exterior angles of a rectangle?	360[^{0}]
3	What is the cube root of the product of seventy-five and forty-five?	15
4	What is the sum of the mean, median, and mode of the data set: four, eight, eleven, two, eleven, six, three, eleven?	25
5	What is the difference between the seventh terms of the arithmetic and the geometric sequences that start with the terms two and then four?	114
6	What is the area of a square with a diagonal of fourteen units?	98 [square units]
7	How many common factors do one hundred forty-four and one hundred sixty-eight have?	8 [factors]
8	In hours, what is the half-life of a substance that only has one-thirty-second of its original mass left in ten hours? (Substances lose half their mass over the course of a half-life)	2 [hours]
9	How many cubic yards are in two hundred sixteen cubic feet?	8 [cubic yards]
10	Julie is putting in new floors. Each box of flooring covers seventy-two square feet. If Julie's house is one thousand six hundred forty-five square feet, how many square feet of extra flooring will Julie have if she orders two dozen boxes?	83 [square feet]

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COLLEGE BOWL – SET 2

#	Problem	Answer
1	What is two-thirds of seventy percent of four hundred twenty?	196
2	What is the sum of the interior angles of an octagon?	1080 [degrees]
3	If a price is reduced by twenty percent, what percent must the reduced price be increased by to get back to the original price?	25 [%]
4	What is the second smallest prime number whose digits add up to ten?	37
5	What are the coordinates of the vertex of the parabola described by the equation x equals y squared minus six y plus seventeen	(8,3)
6	How many ways can you rearrange the letters in the word "PEPPERONI", spelled P-E-P-P-E-R-O-N-I	30240 [ways]
7	I can score five points for answering an easy question, or eleven points for answering a hard question. What is the largest possible number of points that I cannot get?	39 [points]
8	As a reduced fraction, what is the square root of point two five?	1/2
9	What is the positive difference between the number of seconds in an hour and the number of feet in a mile?	1680
10	The measures of the angles in a quadrilateral are in a ratio of one to two to three to four. What is the measure of the largest angle in degrees?	144[°]

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COLLEGE BOWL – SET 3

#	Problem	Answer
1	What is the area, in square feet, of a kite with diagonals of length eight feet and twelve feet?	48 [sq. feet]
2	What is the area of a thirty sixty ninety triangle with a hypotenuse of length ten?	$\frac{25\sqrt{3}}{2}$ [square units]
3	What is the lowest common multiple of eighteen, twelve, and fifteen?	180
4	Dana summed the first forty-two counting numbers, skipping two consecutive numbers, and got a total of eight hundred sixty-six. What is the smaller of the two numbers that Dana skipped?	18
5	What is the distance between the x and y intercepts of the line given by the equation three x plus four y equals twenty-four?	10 [units]
6	What is the point produced by reflecting three comma negative four across the y-axis and then across the line y equals x?	(-4, -3)
7	What is the thirteenth pentagonal number?	247
8	How many factors does ninety-eight have?	6[factors]
9	Two sides of a triangle are four and eleven. How many different whole number lengths could the third side be?	7
10	What is the geometric mean of eight and thirty-two?	16

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COLLEGE BOWL – SET 4

#	Problem	Answer
1	If twelve boxes of cereal cost fifteen dollars, how much in dollars would seven boxes of cereal cost?	[$]8.75
2	What is the perimeter, in feet, of a rhombus with diagonals of length six feet and eight feet?	20 [feet]
3	The measure of the angles in a triangle are: three-x plus two, [Pause] five-x plus eight, [Pause] and two-x minus twenty. What is the measure of the smallest angle in degrees?	18[^{o}]
4	Joe and his friends are getting burgers. A burger costs four dollars and fifty-nine cents and a serving of fries costs two dollars and eighteen cents. If Joe and his four friends evenly split the cost, then how much will Joe pay, in dollars, if they order seven burgers and nine servings of fries?	10.35
5	How many factors of one thousand nine hundred fourty-four are perfect cubes?	4
6	Find the sum of the first two hundred nineteen even positive integers.	48180
7	A rectangle that has perpendicular diagonals has a perimeter twenty-four centimeters. What is its area?	36 [sq. cm]
8	What is the determinant of the two by two matrix with the top left number of seven, the top right number of nine, the bottom left number of thirteen, and the bottom right number of negative six?	-159
9	What is the greatest common factor of ten, twenty, and sixty-five?	5
10	What is the product of all real values of x at which the following function is undefined? f-of-x equals the quantity x plus four [Pause] divided by the quantity x squared minus twenty-five.	-25

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COLLEGE BOWL – SET 5

#	Problem	Answer
1	Farmer Bob had seven cows with an average weight of 800 pounds and five cows with an average weight of 500 pounds. What is the average weight of all twelve cows?	675 [pounds]
2	A box that is five inches by eight inches by seven inches is made up of one-inch cubes. If the outside of the box is painted, how many cubes are painted on exactly one side?	126 [cubes]
3	If the numbers four, six, and five all divide n, what is the minimum possible positive integer that n could be?	60
4	At what point do the lines three x plus four y equals ten and six x minus y equals 11 intersect?	(2,1)
5	What is the hypotenuse of a forty-five forty-five ninety triangle with an area of eighteen square inches?	$6\sqrt{2}$ [units]
6	If I write down the set of the first eleven factorials, not including zero, how many times will I write the digit 1?	3
7	What is the largest four-digit base five number, expressed in base twelve?	440
8	The distance between the points one comma three and X comma fifteen is thirteen. State all possible values of X.	6, -4 (Order not important)
9	What is the surface area of a cube with a side length of three centimeters?	54 [sq. cm]
10	The arithmetic mean between three numbers is sixteen. If two of the numbers are nine and twenty-four, what is the third number?	15

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COLLEGE BOWL – SET 6

#	Problem	Answer
1	What is the measure of each exterior angle of a regular octagon?	45[degrees]
2	A class of thirty students includes a set of twins. If two students are chosen at random to represent the class, what is the probability the two twins are chosen?	1/435
3	What is the seventeenth digit after the decimal point in the decimal form of five sevenths?	8
4	What integer value is the square root of one thousand three hundred sixty-eight closest to?	37
5	A circle has a circumference of sixteen pi. What is the area of a hexagon with a side length equal to the radius of the circle?	$96\sqrt{3}$ [square units]
6	I can type one seventh of a paper in one hour. My friend Jim can type one sixth of a paper in one hour. How many hours will it take us to write 13 papers?	42 [hours]
7	What is the sum of the largest and smallest prime factors of two thousand nineteen?	676
8	Find the product of all of the roots of the polynomial x to the fourth power [Pause] minus eighteen times x squared [Pause] plus eighty-one.	81
9	Nathan has an average of ninety-eight percent on his first 3 tests. On his 4^{th} test he got a ninety percent. What is his new average?	96[%]
10	What is the sum of the digits of six to the sixth power?	27

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COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	All clubs are removed from a standard deck and shuffled. How many of those clubs must you draw to guarantee drawing a club that has an odd number? (The Ace is not an odd number)	10
2	What is the unit's digit of thirteen to the third power?	7
3	What is the area of three-quarters of a circle that has a radius of 8 meters?	48 pi [meters squared]
4	What is the positive difference between the squares of twenty-seven and thirteen?	560
5	How many negative integers divide twenty-eight?	6 [factors]
6	Find the sum of the median and range of the following set of integers: two, three, negative four, four, one, negative one, zero, negative one, five, one, three.	10