"Math is Cool" Masters – 2018-19

#sponsor
#date
6th Grade 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.*

"Math is Cool" Masters -- 2018-19

School:_____Room # _____ Team #_____

Name: _____Proctor: _____

6th Grade <u>Mental Math</u> – 30 sec per question

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

"Math is Cool" Masters – 2018-19
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6th Grade – #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

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#	Problem
1	A runner can run three miles per day. How many total miles does the runner run in a week?
2	Andrew forgets to tie his shoes eighty percent of the time. How many days will Andrew forget to tie his shoes over a period of fifteen days?
3	What is the square root of forty-nine?
4	Julie wants to pull a black card out of standard fifty-two-card deck. What is the probability that she will draw a black card her first try? Answer as a reduced fraction.
5	What is the number of square feet in the area of a right triangle with legs of length sixteen and twelve feet?
6	What is the mean of the following set of numbers: fourteen, seven, twenty-one, and two?
7	If ninety-one X plus six equals twenty, what is the value of X as a reduced fraction?
8	A rectangle has four vertices. How many distinct sets of three vertices can be selected so that they can be used to form a triangle?

"Math is Cool" Masters -- 2018-19

School:_____Room # _____ Team #_____

Name: _____Proctor: _____

6th Grade <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	21 [miles]
2	12 [days]
3	7
4	1/2
5	96 [ft^2]
6	11
7	[x =] 2/13
8	4 [sets]

"Math is Cool" Masters – 2018-19

#date

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

Circle Math: **Pre-Algebra**   **Algebra 1**   **Geometry**   Team #: _____   Room #: _____

6th Grade 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				**Algebra**
12					27					42				
13					28					43				**Geom.**
14					29					44				**only**
15					30					45				
1 -15 Total					**16 – 30 Total**					**31 – 45 Total**				

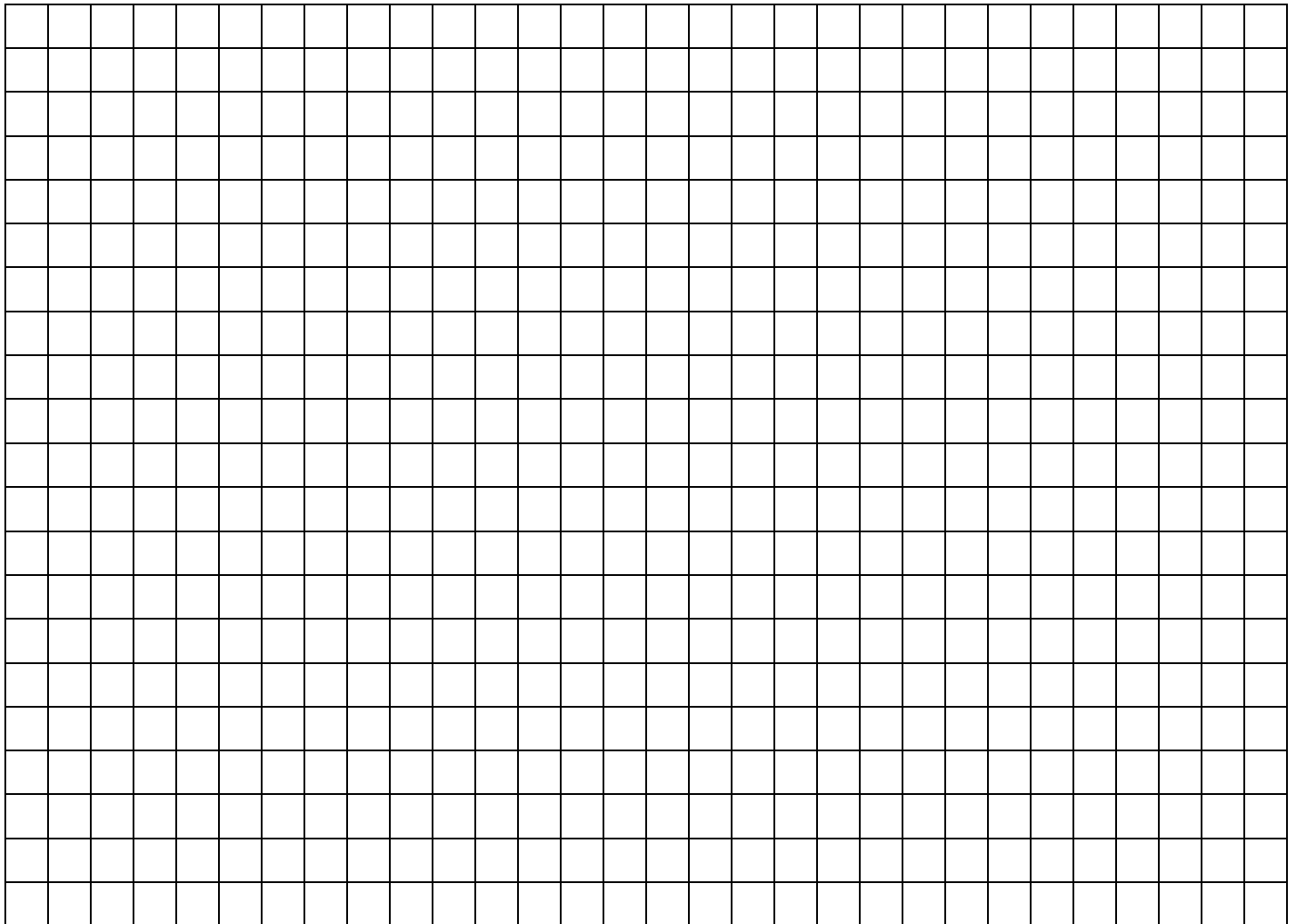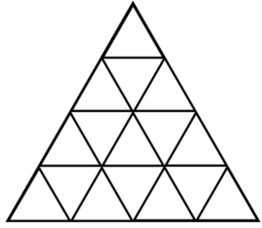# "Math is Cool" Masters – 2018-19

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#date

6th Grade 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 - 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.
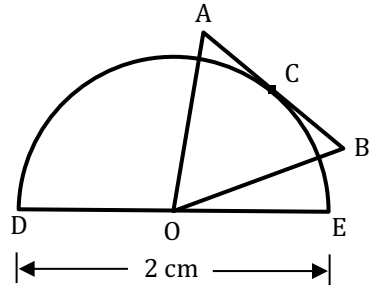
	Questions 1-30: 2 points each
1	What is the product of 76 and 58?
2	What is 8735207 – 7849374?
3	What is the square root of 36 minus the square root of 16?
4	What is 43690000 in scientific notation?
5	What is the number of square centimeters in the area of a triangle with a base of 12 cm and a height of 11 cm?
6	Frederick draws a card from shuffled standard 52-card deck, doesn't like it, and puts it back in the deck. He shuffles and draws another card which is different from the first card and doesn't like it either. He puts it back in the deck. He shuffles and draws a third card. As a common fraction, what is the probability that the third card is one of the cards that he drew on his first two draws?
7	How many distinct ways can five students sit in a row on a bench?
8	A lily pad doubles in size every day. After 10 days, the lily pad will cover the entire pond. After how many days will the lily pad cover half the pond?
9	How many ways can I have $18 using $1s, $5s, and/or $10s?
10	Evaluate and express your answer as a common fraction: $\frac{3}{5} + \frac{2}{3} - \frac{4}{7}$
11	If there are 7 blips in 3 blaps, and 5 blaps in 9 blops, then how many blips are in 81 blops?
12	As a common fraction, what is the slope of the line between the points (1, 1) and (-8, 7)?
13	Evaluate: $|3 - 4 \cdot 7|$
14	What is the number of inches in the length of the long leg of a right triangle with a short leg of length 7 inches and a hypotenuse of length 25 inches?
15	As a decimal, what is the value of x in the following equation: $3(2x + 7) - 4(3x - 5) = 8$
16	Brianna has 21 pencils. She finds 3 new pencils in the hallway every day. Her classmate Victoria breaks 2 of her pencils every other day. Biff and Eho each give her one pencil every 3rd day. How many pencils will she have after 12 days?
17	What is the number of degrees in the larger angle formed by the hands of an analog clock at nine AM?

18	Each letter stands for a single-digit number. List the letters from greatest to least, based on the numbers they represent. $\qquad$ 56A3 $\qquad$ + 7B6C $\qquad$ 1D145
19	How many triangles are in this figure? Hint: There are 4 different sizes
20	There are 150 people in a group. Fifty are scared of pickles. Twenty are scared of chocolate. Fifteen are scared of chocolate and pickles. How many are scared of neither chocolate nor pickles?
21	Biff and Eho live 1 mile away from each other. They both left their houses to walk to each other's houses. Biff averages 3 miles per hour and Eho averages 2 miles per hour. After Eho had walked for 4 minutes, he realized he'd forgotten his backpack, so he walked back home. Once he retrieved his backpack, which added 2 minutes to his overall walking time, he started walking to Biff's house again. When they met, they walked to Biff's house at Eho's average speed. How many minutes did it take Eho to get to Biff's house from the time he left his house the first time?
22	A group of 266 people consists of men, women, and children. There are four times as many men as children, and twice as many women as children. How many children are there?
23	Samantha has 125 cubes. She arranges them into one giant 5-by-5-by-5 cube. She then paints each exterior face of the giant cube red. How many of the little individual cubes have at least 2 faces that are painted red?
24	In golf the last couple of shots on any given hole are called putts and a round of golf consists of 18 holes. Felix sinks 18 out of 47 putts attempted during a round of golf. On 15 of the holes he attempts at least 2 putts, sinking one of them on each hole, and on the remaining 3 holes he sinks the one putt that he attempts. What is the smallest possible number of holes on which he could have attempted exactly 2 putts?
25	A drawer contains 3 green, 4 blue, 3 brown, and 5 black socks. As a common fraction, what is the probability that two randomly drawn socks make a match?
26	How many ways can a committee of four people be formed from a group of 9?
27	In the solution to the given system of equations, as a common fraction, what is the value of y? $$9x + 4y = 21$$ $$4x + 9y = -21$$
28	Mario can plumb a castle in 9 hours. His brother Luigi can plumb a castle in 7 hours. As a common fraction, what is the number of hours that it would take them to plumb a castle working together?
29	What is 123_4 + 567_8 in base 9?
30	What the number of centimeters in the radius of a cylinder whose height is 12 cm and whose volume is 108π cm^3?

Challenge Questions: 3 pts each

31	Nautilus buys Boots of Swiftness that allow him to get to the enemy nexus in one minute, which is an increase in his speed by 10%. In seconds, how long did it take him to get to the enemy nexus before he bought his Boots of Swiftness?
32	When rolling two standard dice, the probability of rolling a sum of x is $\frac{1}{9}$ and the probability of rolling a sum of y is also $\frac{1}{9}$. The probability of rolling a sum of x, y, or z is $\frac{11}{36}$. What is the largest possible value of x + y + z?
33	Caleb has nine envelopes, and each contains a distinct combination of $1, $5, and/or $10 bills which add up to $20. What is the total combined number of bills in all nine envelopes?
34	The median of a triangle is a segment which begins at a vertex of the triangle and ends at the midpoint of the side opposite that vertex. On a coordinate plane, the points A(-2, 6), B(3, 2), and C(7, 8) are the vertices of triangle ABC. If D is the midpoint of side $\overline{BC}$, in simplest radical form, what is the number of units in the length of median $\overline{AD}$?
35	If p is the product of three consecutive even integers and $p = q \cdot 13 \cdot 17$, then what is the smallest possible integer value of q?
36	If $\dfrac{x}{\frac{x}{\frac{x}{4}-\frac{x}{10}}+\frac{x}{\frac{x}{4}-\frac{x}{10}}} = \dfrac{9}{80}$, then, as a common fraction, what is the value of x?
37	In the card game of Pishpash, the deck consists of three each of cards numbered 1 through 8, two each of cards numbered 9 through 15, and one each of cards numbered 16 through 21. When three cards are dealt from the deck, as a common fraction, what is the probability that each card is a distinct multiple of 6?
38	The following times table can be used as a method for multiplying polynomials together. When multiplying the two 4th degree polynomials 5x⁴ + 4x³ + 3x² + 2x + 1 and 5y⁴ + 4y³ + 3y² + 2y + 1 together, the result has 25 terms. Let S equal the sum of the exponents of x and y in each term. For example, the term 5x⁴ has an S-value of 4 and the term 6xy² has an S-value of 3. The numerical coefficient of the term 25x⁴y⁴ is 25. Let C equal the sum of the numerical coefficients for all terms with a given S-value. For example, when S = 3, C = 20. What is the largest C-value in this table?

	5x⁴	**4x³**	**3x²**	**2x**	**1**
5y⁴	25x⁴y⁴				
4y³					4y³
3y²				6xy²	
2y			6x²y		
1	5x⁴	4x³			

39	Each of the two-digit integers from 10 to 99 is added to the two-digit integer that is created by reversing its digits. As a common fraction, what fraction of the sums that are created this way are <u>not</u> palindromes?
40	If $123_b = n^2 + 2$ and $321_b = (n + 6)^2 + 6$, for some b < 10, what is the value of n?

IF taking Algebra or Geometry, continue to questions 41 - 42

41	What is the sum of x, y, and z in the solution to the following system of equations? $$\begin{cases} -9x + 9y + 8z = 155 \\ -x - 2y + 5z = 83 \\ 2x - 5y + 5z = 74 \end{cases}$$
42	In the following equations a, b, c, and d, all represent positive integers. What is the sum of all possible values of d? $(ax - b)(ax - c) = dx^2 - dx + 8$ and $\dfrac{b}{a} + \dfrac{c}{a} = 1$

IF taking Geometry, continue to questions 43 - 45

43	In the construction of a house, one wall of height 12 ft and a second wall of height 9 ft are supported with braces as shown. The walls are parallel to each other and are 6 ft apart. As a common fraction, what is the number of feet in the height above the floor of the intersection of the two support braces?
44	The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$. The volume of a sphere is 2304π cm³. What is the number of centimeters in the side length of the largest cube, with integer side lengths, that can fit completely inside the sphere?
45	In the figure equilateral ΔAOB and a semicircle share point O, which is the center of the semicircle. Side $\overline{AB}$ of the triangle is tangent to semicircle O at C. Diameter $\overline{DE}$ has a length of 2 cm. A random point F is chosen from the perimeter of ΔAOB. In radical form and as a simplified fraction, what is the probability that ΔDFE is an obtuse triangle?

"Math is Cool" Masters – 2018-19

#date

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

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

6th Grade Individual Contest – Score Sheet
DO NOT WRITE IN SHADED REGIONS

	Answers
1	4408
2	885833
3	2
4	4.369×10^7
5	66 [cm²]
6	1/26
7	120 [ways]
8	9 [days]
9	6 [ways]
10	73/105
11	105 [blips]
12	-2/3
13	25
14	24 [inches]
15	[x =] 5.5

	Answers
16	53 [pencils]
17	270 [degrees]
18	ABDC
19	27 [triangles]
20	95 [people]
21	40 [minutes]
22	38 [children]
23	44 [cubes]
24	1 [hole]
25	22/105
26	126 [ways]
27	[y =] -21/5
28	63/16 [hours]
29	486[9]
30	3 [cm]

	Answers
31	66 [seconds]
32	24
33	83 [bills]
34	$5\sqrt{2}$ [units]
35	[q =] 4800
36	[x =] 3/2
37	3/6622
38	[C =] 46
39	37/90
40	[n =] 10
41	13
42	[d =] 117
43	36/7 [ft]
44	13 [cm]
45	$\sqrt{3}/3$ or $\frac{1}{\sqrt{3}}$

Math is Cool" Masters – 2018-19
6th Grade – #date

Final Score:

First Score

(out of 20)

Student Name _____

Proctor Name _____ Room # _____

SCHOOL NAME _____ **Team #_____**

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

This test is the only test where you will be penalized for incorrect responses. You will receive 2 points for a correct letter response, 0 points for leaving it blank and -1 point for an incorrect response. When you are prompted to begin, tear off the colored sheet, pass out a copy of the test to each team member, and begin testing. **Since this is a multiple choice test, ONLY a letter response should be listed as an answer on the answer sheet.**

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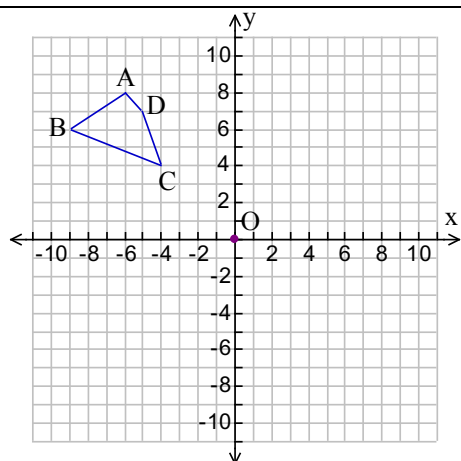|	Answer	-1, 0 or 2	-1, 0 or 2
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

"Math is Cool" Masters – 2018-19
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6th Grade – #date
Team Multiple-Choice Contest

Refer to the following diagram for problems 1 – 3. The vertices of the quadrilateral shown are: A(-6, 8), B(-9, 6), C(-4, 4), and D(-5, 7). Point O is at the origin, (0, 0).

1 Figure ABCD is reflected over the x-axis, resulting in the image A'B'C'D'. What is number of units in AA'?

A) 8   B) 10   C) 12   D) 14   E) 16

2 Figure ABCD is reflected over the y-axis and then translated down 6 units, resulting in the image A"B"C"D". What is the number of units in CC"?

A) 9   B) $6\sqrt{2}$ C) $\sqrt{12}$ D) 10   E) 14

3 Figure ABCD is translated to the right 7 units and down 10 units, resulting in the image A'''B'''C'''D'''. What is the number of square units in the area of the quadrilateral whose vertices are B, D, B''', and D'''?

A) 26   B) 43   C) 47   D) 60.5   E) $\sqrt{149} \cdot \sqrt{17}$
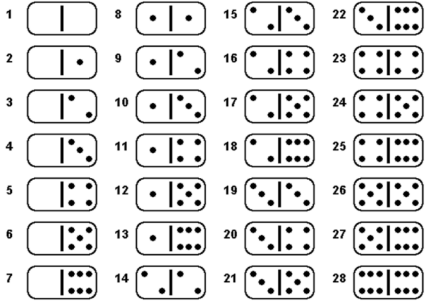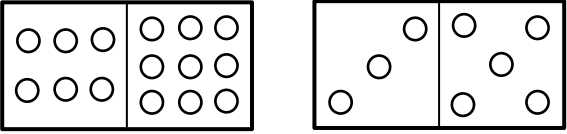
Use the following data for problems 4 – 6.

Source: www.internetlivestats.com/internet-users/

Year	Internet Users	World Population	Non-Users (Internetless)
2016	**3,424,971,237**	7,432,663,275	4,007,692,038
2013	**2,728,428,107**	7,181,715,139	4,453,287,032
2010	**2,023,202,974**	6,929,725,043	4,906,522,069
2007	**1,373,226,988**	6,681,607,320	5,308,380,332
2004	**913,327,771**	6,439,842,408	5,526,514,637
2001	**502,292,245**	6,204,310,739	5,702,018,494

4 What was the world population in 2010, expressed in scientific notation?

A) 4.91 x 10^9 B) 6.92 x 10^9 C) 6.93 x 10^9 D) 2.02 x 10^9 E) 2.02 x 10^{10}

5	For how many of the years shown in the table was the number of internet users a multiple of 3? A) 1 B) 2 C) 3 D) 4 E) 5
6	Let the exponential equation $y_1 = 539001102.7*1.132^x$, be a model for the data in the Internet Users column and let the exponential equation $y_2 = 6136530314*1.012^x$, be a model for the data in the World Population column, where x represents the number of years since 2001, y_1 represents the number of internet users, and y_2 represents the world population. According to these equations, how many times faster is the number of internet users increasing compared to the world population? A) 0.02 B) 11 C) 11.86 D) 5,597,529,211.3 E) Answer not given.

Use the following information for problems 7 – 10. In the game of dominoes, different-sized sets of tiles may be used. One type of complete set consists of the 28 tiles shown to the right. This includes all possible pairings of the numbers 0 through 6 on each half of a tile. This is known as a double-six set.

7	The dots on the tiles are known as pips. What is the probability of randomly drawing a tile that has the same number of pips on each side from a double-six set? A) 3/14 B) 1/4 C) 2/7 D) 5/14 E) 3/7
8	What is the total number of pips on all 28 tiles? A) 126 B) 147 C) 168 D) 170 E) 172
9	Another type of set of tiles includes all possible pairings of the numbers 0 through 9 on each half of a tile. This set is known as a double-nine set. How many tiles are in this set? A) 42 B) 55 C) 56 D) 60 E) 63
10	What is the probability that the two tiles shown are drawn at random from a double-twelve set, which includes all possible pairings of the numbers 0 through 12 on each half of a tile? A) 1/4095 B) 2/4095 C) 1/3080 D) 1/1540 E) 3/8190

Math is Cool" Masters – 2018-19
6th Grade – #date

Student Name _____

Proctor Name _____ Room # _____

SCHOOL NAME _____ **Team #_____**

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

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DO NOT WRITE IN SHADED REGIONS

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

"Math is Cool" Masters – 2018-19
6th Grade – #date

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			

1	It is 165 miles from Vancouver to Seattle and 175 miles from Seattle to Moses Lake. If I drive at an average rate of 55 miles per hour from Vancouver to Seattle, and at an average rate of 70 miles per hour from Seattle to Moses Lake, as a decimal, how many hours long is my trip?
2	How many prime numbers are between 20 and 70?
3	What number is halfway between $\frac{4}{7}$ and $\frac{9}{14}$?
4	Currently $\frac{5}{12}$ of the hummingbirds in a certain hummingbird farm are Ruby-Throated Hummingbirds and the rest are Bee Hummingbirds. There is a total of 228 hummingbirds in the farm. Assuming that no birds leave the farm and that no new Bee Hummingbirds are added to the farm, what is the number of new Ruby-Throated Hummingbirds that would need to be added to the farm so that Ruby-Throated Hummingbirds make up half of the hummingbirds on the farm?
5	What is the sum of the first 21 positive odd numbers?
6	I am trying to throw a ball into a bucket. My first throw lands too far to the left, 37 feet away from me and 13 feet from the bucket. My second throw lands too far to the right, 41 feet from me and 9 feet from the bucket. What is the number of feet in the greatest possible distance between the landing spot of my first throw and the landing spot of my second throw?
7	There are 11550 dogs in a giant dog-castle. Some of them leave to go to the park, where each of them makes friends with two more dogs. All the dogs who left the house return home with their friends, increasing the population of the castle by 52 %. How many dogs went to the park?
8	Raul bought an IPhone X online at a 35% discount for $974.87. In dollars and cents, what was the pre-discount price of the phone?
9	What is the product of $21_3 * 32_4 * 43_5$, written in base 6?

| 10 | The figure shown is divided into five regions, A, B, C, D, and E. What is the number of paths that can be drawn that begin at any region, move only to adjacent regions, and visit all five regions exactly once? | |
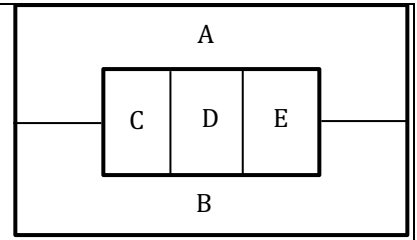
"Math is Cool" Masters – 2018-19
6th Grade – #date

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	5.5 [hours]
2	11 [prime numbers]
3	17/28
4	38 [Ruby-Throated Hummingbirds]
5	441
6	22 [feet]
7	3003 [dogs]
8	$1499.80 or 1499 dollars and 80 cents
9	14234[6]
10	72 [paths]

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6th Grade – #date

School:_____   Team #_____

Proctor: _____   Room #_____

RELAY #1

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

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6th Grade – #date

School:_____Team #_____

Proctor: _____ Room #_____

RELAY #2

Answer for question # 1	Answer for question # 2	Answer for question # 3	Answer for question # 4
1 or 0	1 or 0	1 or 0	2 or 0

Fill in your answer and pass back to the next person.

6th Grade	# Relay #1 – Person 1
Question 1	What is 20 times 5?

6th Grade	**Relay #1 – Person 2**
Question 1	What is 20 times 5?
Question 2	What is TNYWG squared?

6th Grade	# Relay #1 – Person 3
Question 2	What is TNYWG squared?
Question 3	What is the smallest six-digit positive whole number with the same number of zeros as TNYWG?

6th Grade	# Relay #1 – Person 4
Question 3	What is the smallest six-digit positive whole number with the same number of zeros as TNYWG?
Question 4	The perimeter of an equilateral triangle is TNYWG inches. As a decimal rounded to the nearest tenth, what is the number of inches in the length of each side of the triangle?

6th Grade	**Relay #2 – Person 1**
Question 1	A rectangle has a length of 15 cm and a width of 8 cm. What is the number of centimeters in the perimeter of the rectangle?

6th Grade	**Relay #2 – Person 2**
Question 1	A rectangle has a length of 15 cm and a width of 8 cm. What is the number of centimeters in the perimeter of the rectangle?
Question 2	TNYWG has 4 positive factors. What is the positive difference between the largest and the smallest of these factors?

6th Grade	**Relay #2 – Person 3**
Question 2	TNYWG has 4 positive factors. What is the positive difference between the largest and the smallest of these factors?
Question 3	The ratio 3.5 to 7.5 is equal to the ratio x to TNYWG. What is the value of x?

6th Grade	**Relay #2 – Person 4**
Question 3	The ratio 3.5 to 7.5 is equal to the ratio x to TNYWG. What is the value of x?
Question 4	TNYWG is equal to the sum of X consecutive positive whole numbers, where X > 1. How many possible values can X have?

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Robert Dirks' Relay Contest – Questions & Key

RELAYS - 5 minutes per relay – 15% of team score

*There is no talking during this event and you must always be facing forward. Person #1 will be given an answer sheet(s) and will need to fill out the top. The proctor will hand out a strip of paper to each person. These need to be face down on your desk until it is time for the relay to start. Once the relay begins, everyone may turn over their strip of paper and begin working. You may write on the strip of paper to come up with your answer. However, when person #1 figures out his/her problem, he/she will record **just his/her final answer** on the answer sheet and pass only the answer sheet back to the person behind. This continues until person #4 puts an answer on the answer sheet and gives it to the proctor. A correct answer from person #1, #2 and #3 is worth 1 point each. A correct answer from person #4 is worth 2 points making each relay worth 5 points. You will see the expression **TNYWG** [Proctor: write this on the board] which means: "the number you will get". This is where you put your teammate's answer that they pass back to you, and then you should be able to solve your question. Once the relay begins, turn over your strip of paper and **make sure you have the right person number.** Remember, no talking and remain facing forward to avoid being disqualified!*

	Relay #1	Answer
Person 1	What is 20 times 5?	100
Person 2	What is TNYWG squared?	10000
Person 3	What is the smallest six-digit positive whole number with the same number of zeros as TNYWG?	100001
Person 4	The perimeter of an equilateral triangle is TNYWG inches. As a decimal rounded to the nearest tenth, what is the number of inches in the length of each side of the triangle?	33333.7 [inches]
	Relay #2	Answer
Person 1	A rectangle has a length of 15 cm and a width of 8 cm. What is the number of centimeters in the perimeter of the rectangle?	46 [centimeters]
Person 2	TNYWG has 4 positive factors. What is the positive difference between the largest and the smallest of these factors?	45
Person 3	The ratio 3.5 to 7.5 is equal to the ratio x to TNYWG. What is the value of x?	[x =] 21
Person 4	TNYWG is equal to the sum of X consecutive positive whole numbers, where X > 1. How many possible values can X have?	3 [values]

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
100	**10000**	**100001**	**33333.7** **[inches]**
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 2

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
46 **[cm]**	**45**	**[x=] 21**	**3 [values]**
1 or 0	1 or 0	1 or 0	2 or 0

"Math is Cool" Masters -- 2018-19

6th Grade

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

6th Grade

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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6th Grade – #date

COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	Solve the following equation for X: Three X plus sixteen equals eighty-five	[x=] 23
2	There are three apples and two oranges in a hat. Abi randomly chooses two pieces of fruit from the hat with replacement. As a common fraction, what is the probability that he selects an orange both times?	4/25 or "4 over 25" or "4 out of 25"
3	What is the largest multiple of seven less than two hundred?	196
4	Caleb has three pennies, three nickels, and three dimes while Bian has nine dimes. How many cents more is the total value of Bian's coins than the total value of Caleb's coins?	42 [cents]
5	A triangle has a height of eight inches and a hypotenuse of seventeen inches. What is the number of square inches in its area?	60 [in^2]
6	Evaluate eight to the fifth power.	32768
7	What is the positive difference between the number of vertices in a nonagon and the number of edges on a tetrahedron?	3
8	Jeremiah finds one pen each day, but he also loses three pens each day. If he starts with eighteen pens how many days will it take for him to have zero pens?	9 [days]
9	How many cups are in two and a half gallons?	40 [cups]
10	Joy bought thirty-five pounds of apples for fourteen dollars. How many pounds of apples could she buy for eight dollars?	20 [lbs]

COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	A bag contains three red marbles, four white marbles, and three blue marbles. As a common fraction, what is the probability of drawing a blue marble out of the bag?	3/10 or "3 over 10" or "3 out of 10"
2	Zelda is facing north. If she turns ninety degrees counterclockwise seven times, which direction is she facing?	East
3	I have six pennies, five nickels, four dimes, and three quarters. How many cents do I have?	146 [cents]
4	How many distinct diagonals can be drawn inside a regular octagon?	20 [diagonals]
5	I have a pizza with a diameter of two feet, and I cut equal slices for all my friends. If each slice has an area of eight pi square inches, how many slices did I cut?	18 [slices]
6	If X plus Y equals fifty, and two X plus two equals Y, what is the value of X?	[x=] 16
7	What time is it two thousand minutes after eight PM? Remember to indicate AM or PM.	5:20 am
8	As a common fraction, what is the ratio of prime numbers to composite numbers between ten and thirty-nine, inclusive?	4/11 or "4 over 11" or "4 to 11"
9	How many even multiples of eleven are there from one to one hundred and eighty-seven?	8 [multiples]
10	As a percentage, what is seven-twelfths of six-twenty-fifths of five-fourteenths?	5 [%]

COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	The English alphabet has five vowels and twenty-one consonants. Assume one letter is drawn at random. As a decimal, how many times more likely is it that the letter is a consonant?	4.2 [times]
2	What is the positive difference between the smallest prime number and the largest two-digit prime number?	95
3	After three to the sixth power is evaluated, what is the sum of the digits?	18
4	A circular table has a radius of fifty inches. On average each person seated at the table needs a minimum of twenty-eight inches of space along the edge of the table. What is the maximum number of people who can be seated at the table?	11 [people]
5	If A times B equals one hundred and forty-seven and A is three times B, what is A minus B?	14
6	Samuel has read eighty-five pages of a certain book, which is twenty percent of the pages in the book. How many more pages will he need to read so that he has read forty-four percent of the book?	102 [pages]
7	Juneaux and Hailey are playing a game using a standard deck of cards. Juneaux wins if she draws a red face card. Hailey wins if she draws an Ace or a two of any color. As a common fraction, what is the probability that neither Juneaux nor Hailey wins on the first random draw?	19/26 or "19 out of 26" or "19 over 26"
8	What is the sum of the least common multiple and greatest common factor of sixty and one hundred fifty?	330
9	As a decimal, what is the positive difference between eleven-fifths and seven-fourths?	[0].45
10	Express two thousand sixteen over two thousand nineteen as a common fraction.	672/673 or "672 over 673"

COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	What is the remainder when six hundred and four is divided by eleven?	10
2	What is the sum of the integers three through twenty-one?	228
3	Solve the following equation for X: fifteen X minus eleven equals one hundred and fifty-four	[x =] 11
4	What percent of seven thousand is eight thousand and fifty?	115 [%]
5	If five to the Nth power is less than one thousand and N is a positive integer, what is the sum of the possible values of N?	10
6	How many positive factors does six hundred and forty-eight have?	20 [factors]
7	How many triangles have integer side lengths and a perimeter of eight centimeters?	1 [triangle]
8	The annual Math Olympiad competition in Sunnyvale is always scheduled for the fourth Thursday in February. What is the number of dates that could be the fourth Thursday in February?	7 [dates]
9	Seven-twelfths plus two-fifths equals a fraction, that in lowest terms is represented by A over B. What is the value of A plus B?	119
10	A palindrome is a number that reads the same forwards and backwards. What is the number of palindromes between twenty and two hundred and twenty?	20 [palindromes]

COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	Junior will be five times as old as he is now in twenty-four years. How many years old is he now?	6 [years old]
2	The heart rate of a horse is forty-four beats per minute. As a common fraction, what is the horse's heart rate in beats per second?	11/15 [beats per second] or "11 over 15"
3	Let A over B equal C over D. If B equals five times A and C is a two-digit number, what is the smallest possible value of D?	50
4	Kiah bought four packs of gum for two dollars and ninety-nine cents a pack. She paid with a fifty-dollar bill. How much, in dollars and cents, will she get in change?	$38.04 or 38 dollars and 4 cents or thirty-eight-oh-four
5	If one leg of a right triangle is fifty-six inches long and the hypotenuse is seventy inches long, then what is the number of inches in the length of the other leg?	42 [inches]
6	In the set of integers from one to forty, as a common fraction, what is the probability that a randomly chosen integer is a multiple of three, but not a multiple of five?	11/40 or "11 out of 40" or "11 over 40"
7	How many distinct prime factors does forty-six factorial have?	14 [prime factors]
8	If six bananas are worth ten apples and five apples are worth twelve oranges, how many oranges are four bananas worth?	16 [oranges]
9	How many ways can you make twenty cents with pennies, nickels, dimes or any combination of these coins?	9 [ways]
10	What is the smallest two-digit prime number having the property that when adding its digits together, the result is a prime number other than two?	23

COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	Solve the following equation for X: four hundred X minus six hundred equals two thousand two hundred	[x =] 7
2	Roni guesses on a four-question multiple choice test. Each question has three answer choices, only one of which is correct. As a common fraction, what is the probability that she guesses wrong on all four questions?	16/81
3	Maya has a jar of one hundred and forty M&Ms and there are six colors. If each color makes up a minimum of fifteen percent of the total candies, what is the largest possible number of M&Ms of any one color?	35 [M&Ms]
4	As a decimal, what is the mean of the first 5 prime numbers?	5.6
5	What is the sum of the base ten numbers eleven and twelve in base nine?	25[9]
6	It takes three giant anteaters five hours to eat eighteen thousand ants. How many hours does it take two giant anteaters to eat four thousand eight hundred ants?	2 [hours]
7	In terms of pi, what is the number of cubic centimeters in the volume of cylinder if the height is four centimeters and the radius is fourteen centimeters.	784π [cm^3]
8	Jaedin runs at an average rate of one hundred and fifty meters per minute. Jajaani runs at an average rate that is ninety percent of Jaedin's rate. How many minutes will it take Jajaani to run five hundred and forty meters?	4 [minutes]
9	As a common fraction, what is the probability of drawing a Jack or a Queen from a standard deck of cards?	2/13 or "2 out of 13" or "2 over 13"
10	The area of a triangle is thirty-six square centimeters. The length of the base of the triangle is two times its height. What is the number of centimeters in the base?	12 [centimeters]

COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	Solve the following equation for X: six X minus eleven equals four X plus thirty-seven	[x =] 24
2	What is the number of centimeters in the perimeter of a square whose area is one hundred and ninety-six square centimeters?	56 [centimeters]
3	Let A plus B equal fifty and let A and B both be positive integers. How many distinct ordered pairs can be made in the form A comma B, such that A is greater than B?	24 [ordered pairs]
4	As a common fraction, what is the slope of the line between the points with coordinates three comma six and negative nine comma negative five?	11/12
5	What is one hundred and ninety-nine squared?	39601
6	As a common fraction, what is the probability that a randomly chosen two-digit integer is divisible by four?	11/45

Extra