"Math is Cool" Championships – 2018-19

STCU

February 15, 2019

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.*

Final Score:

(Out of 8)

"Math is Cool" Championships -- 2018-19

School:_____Room # _____ Team #_____

Name: _____Proctor: _____

6th Grade 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

6th Grade – February 15, 2019
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 smallest positive prime number?
2	What is the number of cubic meters in the volume of a rectangular prism with side lengths of five meters, four meters, and three meters?
3	What is the remainder when four hundred and fifty-three is divided by five?
4	What is the sum of the first six positive integers?
5	What it one-third of one-tenth of ninety?
6	Cardi G is a songwriter and aspiring recording artist. In the last year, she wrote forty-five songs, but only recorded sixty percent of those songs. How many songs did Cardi G record last year?
7	A field has only alpacas and ducklings. There are seven alpacas and a total of thirty-eight legs in the field. How many ducklings are in the field?
8	Andrew flips four coins. As a common fraction what is the probability that exactly three of the coins will turn up heads?

Final Score:

KEY

(Out of 8)

"Math is Cool" Championships -- 2018-19

School:_____ Room # _____ Team #_____

Name: _____ Proctor: _____

6th Grade 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		
2	60 [m^3]		
3	3		
4	21		
5	3		
6	27 [songs]		
7	5 [ducklings]		
8	1/4		

"Math is Cool" Championships – 2018-19

February 15, 2019

Total # Correct:

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

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

6th Grade 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
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
31-40 TOTAL:			

6th Grade

“Math is Cool” Championships – 2018-19

STCU

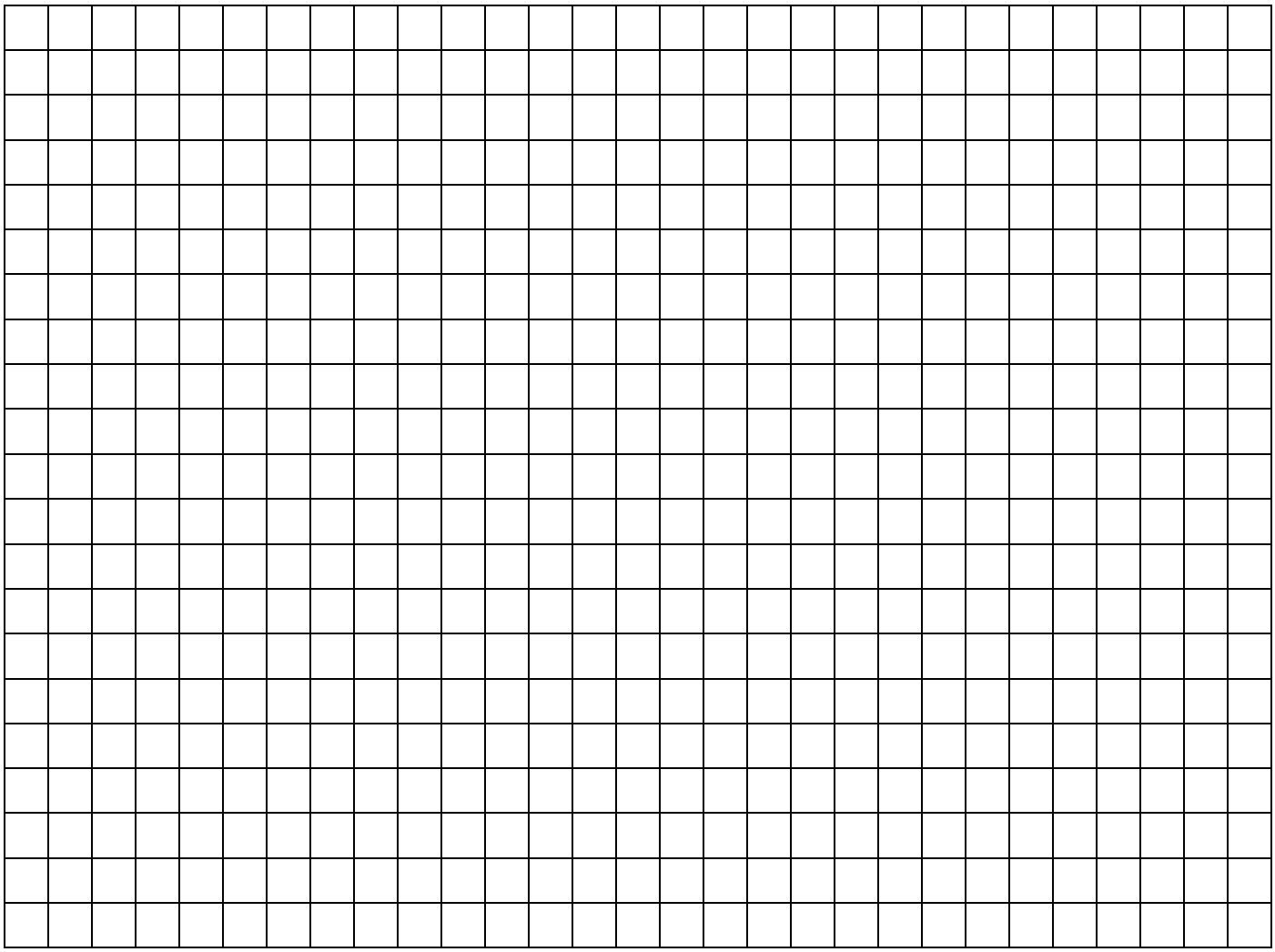
February 15, 2019

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.

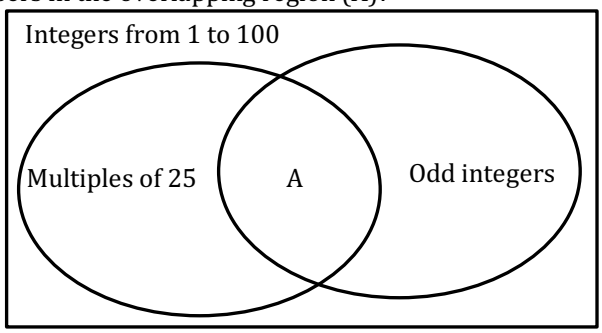


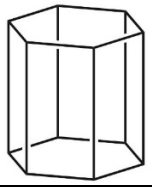
"Math is Cool" Championships – 2018-19

STCU

February 15, 2019

6th Grade Individual Contest

	Questions 1-30: 2 points each
1	What is 95% of 300?
2	What is the mean (average) of the set of numbers {10, 50, 100, 200, 500, 1000}?
3	A number is randomly selected from the list {2, 3, 4, 5, 7, 9, 11, 12, 13, 16, 18, 19, 20, 21}. As a common fraction, what is the probability that it is a multiple of 3?
4	Solve for x: $18x + 90 = -36$
5	Jill bought a case of 72 cans of tennis balls. Each can contains 3 tennis balls. How many total tennis balls are in the case?
6	Evaluate: $10^3 \div 2^2$
7	What is the number of inches in the height of a triangle whose area is 200 in^2 and whose base is 10 inches?
8	How many cups are in 3 quarts?
9	As a common fraction, what is $\frac{2}{3} \cdot \frac{9}{11}$?
10	Larry has a farm with 7 cows and 8 chickens. How many legs are on his farm?
11	Jeremy has $1.82 in change in his pocket. What is the greatest number of quarters that he could have in that pocket?
12	In a Fibonacci sequence, each term is the sum of the previous two terms. In this sequence, each term is the sum of the previous three terms. What is the missing number in this sequence: 1, 2, 3, 6, 11, 20, ____, 68?
13	What is the sum of the numbers in the overlapping region (A)? 
14	As a common fraction, what is $\frac{3}{10} + \frac{5}{12}$?

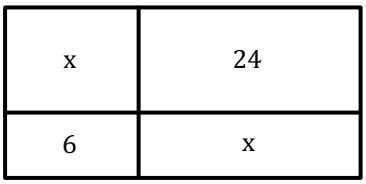
15	One pear is worth two apples, and one apple is worth 9 cherries. How many pears can be acquired from 486 cherries?
16	What is the units' digit of $2^3 \cdot 5^7$ when multiplied out?
17	If I can paint 7 sheds in 3 weeks, how many weeks will it take me to paint 28 sheds?
18	How many digits are in the product of 123 and 871?
19	For the 10-digit number 1592670843, let A be the largest sum of any three consecutive digits, and let B be the smallest sum of any three consecutive digits in the 10-digit number. What is the positive difference between A and B?
20	In an arithmetic sequence consecutive terms differ by the same amount. If 15 is the 3rd term and 29 is the 7th term of an arithmetic sequence, what is the 13th term?
21	Meg gives her brother exactly 20% and her sister exactly 15% of her crackers. She only gives her brother and sister whole crackers. After giving these crackers to her brother and sister, what is the minimum possible number of crackers that Meg could still have?
22	A library has 700 books on architecture, 2800 books on mathematics, and 4900 books on ancient history. If I randomly select a book, what is the probability, as a common fraction, that the book is not about mathematics?
23	A pen factory produces pens at a rate of 18 pens per minute. A competing factory produces pens at a rate of 16 pens per minute but has 4000 pens already produced. After how many minutes will the two pen factories have an equal number of pens?
24	Julian runs at an average rate of 8 miles per hour. How many seconds will it take him to run 3.5 miles?
25	Let A be the number of 2-digit prime numbers less than 50 where both digits are perfect squares. Let B be the number of 2-digit prime numbers less than 50 where exactly 1 digit is a perfect square. As a common fraction, what is $\frac{A}{B}$?
26	You have mold growing in your house. Right now, there are 5 milligrams of mold. This mold doubles in mass every month. How many milligrams of mold will you have a year from now?
27	What is the value of $(x + y)(x - y)$, if $x = 24$ and $y = 16$?
28	If I mix 40 gallons of a 20% acid solution with 60 gallons of a 30% acid solution, what percent of the resulting solution is acid?
29	In a polyhedron, a space diagonal connects two vertices that are not on the same face. A hexagonal prism has a total of 8 faces, including the two bases. How many space diagonals are in the hexagonal prism shown? 
30	When several thieves tried to divide money by giving 6 dollars to each person, one thief received nothing. When each thief takes 5 dollars, there is one dollar left over. What is the sum of the number of thieves and the number of dollars?

Challenge Questions: 3 pts each

31 Peter has 200 jolly ranchers. He gives three of his friends each a distinct prime number of jolly ranchers. If Peter still has a larger number of jolly ranchers than any one of his three friends, what is the smallest number of jolly ranchers that he can still have?

32 Each of the positive integers from 1 to 100 are written on 100 index cards with exactly one of the integers on each card. The cards with multiples of 3, multiples of 11, and multiples of 21 are removed. What is the sum of the integers on the remaining cards?

33 Each rectangular region in the figure has the area shown: the largest is 24 square inches, another is 6 square inches, and the other two regions have the same area of x square inches. All dimensions of each of the four rectangular regions are whole numbers. What is the number of inches in the difference between the greatest and least possible perimeters for the overall rectangle which consists of the 4 smaller rectangles? (Drawing not to scale)



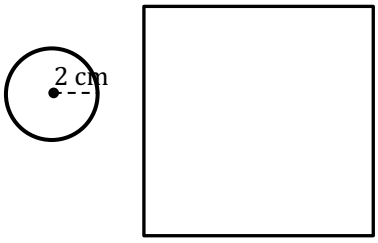
34 Every day, six turtles line up randomly on a sunlit log. Three of them are outwardly identical green turtles and three are outwardly identical orange turtles. What is the probability that they line up one day with the same pattern of colors as the previous day, but with each individual turtle in a new spot?

35 Express the repeating decimal $0.3\overline{484}$ as a common fraction.

36 Starting at home, Mickey walks one block north, two blocks east, three blocks south, four blocks west, and so on, each time turning 90 degrees to the right and walking one block further. After walking a total of 190 blocks, he turns and walks on a straight line back home. In simplest radical form, what is the number of blocks in the distance of his return walk to home?

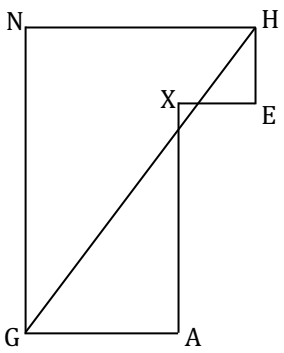
37 On a 40-question test, Tom can earn 5 points for a correct answer, 0 points for an incorrect answer, or 1 point for not answering. There are 6 scores less than 200 that are impossible to attain. What is the sum of the second lowest and the fourth lowest impossible score?

38 A square has area of 100 cm^2. How many complete circles with a radius of 2 cm can be drawn entirely inside the square, such that the circles do not overlap each other?



39 For how many integer values of n between 9 and 9 million are both n + 1 and n – 1 palindromes? Reminder: single digit numbers are palindromes.

40 In HEXAGN all adjacent sides are perpendicular, HE = 2 cm, EX = 2 cm, NG = 8 cm, and NH = 6 cm. As a common fraction, what part of the segment $\overline{GH}$ lies outside the hexagon?



"Math is Cool" Championships – 2018-19

February 15, 2019

Total # Correct:

KEY

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

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

6th Grade Individual Contest – Score Sheet

DO NOT WRITE IN SHADED REGIONS

	Answer	1 or 0	1 or 0
1	285		
2	310		
3	5/14		
4	[x =] -7		
5	216 [tennis balls]		
6	250		
7	40 [inches]		
8	12 [cups]		
9	6/11		
10	44 [legs]		
11	7 [quarters]		
12	37		
13	100		
14	43/60		
15	27 [pears]		
1-15 TOTAL:			

	Answer	1 or 0	1 or 0
16	0		
17	12 [weeks]		
18	6 [digits]		
19	5		
20	50		
21	13 [crackers]		
22	2/3		
23	2000 [minutes]		
24	1575 [seconds]		
25	1/2		
26	20480 [milligrams]		
27	320		
28	26 [%]		
29	18 [space diagonals]		
30	43 [thieves and dollars]		
16-30 TOTAL:			

	Answer	1 or 0	1 or 0
31	57 [jolly ranchers]		
32	3070		
33	12 [inches]		
34	1/9		
35	23/66		
36	$10\sqrt{2}$ [blocks]		
37	390		
38	5 [circles]		
39	6 [integer values]		
40	1/12		
31-40 TOTAL:			

6th Grade

Math is Cool" Championships – 2018-19

6th Grade – February 15, 2019

Final Score:

School Name _____Team #_____

Proctor Name _____Room # _____

First Score
(out of 20)

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.***

Correct responses are worth 2 points, incorrect responses are worth -1 point and no response is 0 points.

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

STCU

6th Grade – February 15, 2019

Team Multiple Choice Contest

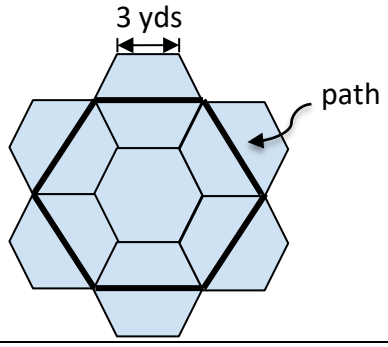
In the year 2050, according to one prediction, people will travel using three methods of transportation: a hoverboard, a hydrocar, or a hypertrain. It is estimated that hoverboards will cost $20, hydrocars will cost $150, and hypertrains will cost $3,500.

Average operating cost per 10 miles and maximum capacity of each vehicle		
HOVERBOARD	HYDROCAR	HYPERTRAIN
$2.40/10 miles	$14.00/10 miles	$480.00/10 miles
1 person max	6 people max	200 people max

Some imaginable scenarios are presented in questions 1-3.

1	Which transportation option(s) has/have the least expensive average operating cost per person? A) Hoverboard B) Hydrocar C) Hypertrain D) Hoverboard and Hypertrain E) Same cost for all 3 options
2	A group of 3 friends wants to go on a road trip. Collectively, they have $250 saved up and they need to purchase hoverboards. Rounded to the nearest 10 miles, how many miles would they be able to travel with their new hoverboards before they run out of money? A) 260 B) 270 C) 780 D) 810 E) 840
3	A hoverboard will have the capacity to molecularly compress things so that you can still bring stuff with you when you travel with one. Its compressor will be able to quickly convert a 1-cubic-foot object into a smaller, geometrically similar version with a volume of 1 cubic inch and back again. Within the body of the hoverboard there will be a storage section with dimensions 2 inches by 3 inches by 8 inches. A typical suitcase has the shape of a rectangular prism and has dimensions 30 inches by 18 inches by 10 inches. What is the maximum number of compressed versions of these suitcases that could fit in the storage space on the hoverboard? A) 10 B) 12 C) 13 D) 14 E) 15

The figure below represents the design for a garden that is about to be constructed and is used for problems 4 - 7. In the design, there are 7 congruent regular hexagons whose edge lengths are all 3 yards and a hexagonal path around the interior of the garden. Each side of the hexagonal path divides one of the exterior hexagons exactly in half.



4	What is the number of yards in the perimeter of the garden? A) 18 B) 27 C) 36 D) 45 E) 54
5	What is the ratio of the area of the garden outside the hexagonal path to the area of the garden inside the path? A) 2:3 B) 2:5 C) 3:4 D) 3:7 E) 8:6
6	The garden will have three identical benches and three identical garden gnomes, which will be distributed among the 6 trapezoids inside the path. In how many ways can these objects be distributed among the 6 trapezoids, if each trapezoid has exactly one object? A) 6 B) 20 C) 36 D) 120 E) 400
7	The landscape architect who designed the garden originally wanted to include a circle of rocks tangent to the garden at all twelve of the outer vertices. What is the number of yards in the circumference of this circle? A) $3\pi\sqrt{10}$ B) $3\pi\sqrt{37}$ C) $6\pi\sqrt{7}$ D) 54π E) 63π
Use the following scenario for problems 8 – 10. A rising pop singer named Gra-Sia will put on a concert for her fans. Ticket prices are $25 for seniors, $40 for adults, $30 for teenagers, and $20 for children.	
8	Gra-Sia wants to perform only her favorite 7 songs at the concert. In how many orders can she perform the 7 songs, if her most popular song must be last. A) 120 B) 240 C) 720 D) 1440 E) 5040
9	Gra-Sia writes the names of 7 songs on slips of paper, including her two most popular songs. She then pulls two at random out of a hat without replacement. What is the probability that she pulls out one or the other or both of her two most popular songs? A) 2/21 B) 5/21 C) 6/21 D) 11/21 E) 11/42
10	If 89 tickets were sold for the concert and income from ticket sales was exactly $3440, what is the greatest number of adults who could have purchased tickets? A) 83 B) 84 C) 85 D) 86 E) Answer not given

Math is Cool" Championships – 2018-19

6th Grade – February 15, 2019

Final Score: KEY

First Score

(out of 20)

School Name _____ Team #_____

Proctor Name _____ Room # _____

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.***

Correct responses are worth 2 points, incorrect responses are worth -1 point and no response is 0 points.

DO NOT WRITE IN SHADED REGIONS

Answer		-1, 0 or 2	-1, 0 or 2
1	B		
2	A		
3	B		
4	E		
5	C		
6	B		
7	C		
8	C		
9	D		
10	A		

"Math is Cool" Championships – 2018-19

6th Grade – February 15, 2019

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" Championships – 2018-19

STCU

6th Grade – February 15, 2019

Team Contest

1	What is the sum of all positive whole numbers from 1 to 19?
2	Evaluate and give your answer as a common fraction: $\frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$
3	Moises has an average pulse of 60 beats per minute. Cassidy has an average pulse of 72 beats per minute. How many more times does Moises' heart beat in one 24-hour period than Cassidy's heart beats?
4	The operation • is defined as a • b = (a - 13)(12 + b) - 7. What is 16 • 5?
5	The difference of two numbers is 15 and their product is 76. What is the sum of the two numbers?
6	The prime factorization of 17017 is in the form $a \cdot b \cdot c \cdot$ d. What is the value of a + b + c + d?
7	Albert, Beth, Callie, Dean, and Erin all sit in one row of a movie theater that has 7 seats. In how many different ways can they occupy five of the seven seats?
8	Evaluate: $\left(25^{1/2} \cdot \left(\frac{1}{2}\right)^{25}\right) / \left(\left(\frac{1}{4}\right)^{12} \cdot 4^2\right) \cdot \left(\frac{7^{12}}{7^{10}}\right)$. The answer is a mixed number and when it is simplified it has the form $A\frac{B}{C}$. What is the value of A + B + C?
9	Bob's ice cream parlor has 4 types of cones and 5 different ice cream flavors. When you order an ice cream cone you can have one, two, or three scoops. Whether you order one, two, or three scoops, each of the scoops may be any of the five flavors. What is the total number of distinct ice cream cones that can be made? Assume that a waffle cone with a scoop of strawberry on top of a scoop of vanilla is considered different than a waffle cone with a scoop of vanilla on top of a scoop of strawberry and that this assumption applies to all types of cone and all ice cream flavors.
10	A palindrome is a number that reads the same forward as backward, such as 12321. When the first ten base 4 palindromes with two or more digits are added together, what is their sum in base 10?

"Math is Cool" Championships – 2018-19

6th Grade – February 15, 2019

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 or 0	1 or 0
1	190		
2	1/720		
3	17280 [times]		
4	44		
5	23		
6	48		
7	2520 [ways]		
8	60		
9	620 [ice cream cones]		
10	$236_{[10]}$		

“Math is Cool” Championships -- 2018-19

6th Grade – February 15, 2019

School:_____Team #_____

Proctor: _____ Room #_____

PRACTICE RELAY

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.

“Math is Cool” Championships -- 2018-19

6th Grade – February 15, 2019

School:_____Team #_____

Proctor: _____ Room #_____

PRACTICE RELAY

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.

"Math is Cool" Championships -- 2018-19

6th Grade – February 15, 2019

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.

"Math is Cool" Championships -- 2018-19

6th Grade – February 15, 2019

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.

“Math is Cool” Championships -- 2018-19

6th Grade – February 15, 2019

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.

“Math is Cool” Championships -- 2018-19

6th Grade – February 15, 2019

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	Practice Relay – Person 1
Question 1	What is 8 times 4?

6th Grade	Practice Relay – Person 1
Question 1	What is 8 times 4?

6th Grade	Practice Relay – Person 2
Question 1	What is 8 times 4?
Question 2	What is TNYWG divided by 2?

6th Grade	Practice Relay – Person 2
Question 1	What is 8 times 4?
Question 2	What is TNYWG divided by 2?

6th Grade	Practice Relay – Person 3
Question 2	What is TNYWG divided by 2?
Question 3	What is the square root of TNYWG?

6th Grade	Practice Relay – Person 3
Question 2	What is TNYWG divided by 2?
Question 3	What is the square root of TNYWG?

6th Grade	Practice Relay – Person 4
Question 3	What is the square root of TNYWG?
Question 4	What is TNYWG plus 24?

6th Grade	Practice Relay – Person 4
Question 3	What is the square root of TNYWG?
Question 4	What is TNYWG plus 24?

6th Grade	Relay #1 – Person 1
Question 1	What is 90% of 200?

6th Grade	Relay #1 – Person 1
Question 1	What is 90% of 200?

6th Grade	**Relay #1 – Person 2**
Question 1	What is 90% of 200?
Question 2	What is TNYWG divided by 15?

6th Grade	**Relay #1 – Person 2**
Question 1	What is 90% of 200?
Question 2	What is TNYWG divided by 15?

6th Grade	Relay #1 – Person 3
Question 2	What is TNYWG divided by 15?
Question 3	What is the sum of the positive whole number factors of TNYWG?

6th Grade	Relay #1 – Person 3
Question 2	What is TNYWG divided by 15?
Question 3	What is the sum of the positive whole number factors of TNYWG?

6th Grade	Relay #1 – Person 4
Question 3	What is the sum of the positive whole number factors of TNYWG?
Question 4	TNYWG has a prime factorization in the form $a^2 \times b^1$ where a and b are distinct prime numbers. What is the next number larger than TNYWG to have a prime factorization that can be written this way?

6th Grade	Relay #1 – Person 4
Question 3	What is the sum of the positive whole number factors of TNYWG?
Question 4	TNYWG has a prime factorization in the form $a^2 \times b^1$ where a and b are distinct prime numbers. What is the next number larger than TNYWG to have a prime factorization that can be written this way?

6th Grade	Relay #2 – Person 1
Question 1	What is the sum of the digits in the number 12,345,678?

6th Grade	Relay #2 – Person 1
Question 1	What is the sum of the digits in the number 12,345,678?

6th Grade	Relay #2 – Person 2
Question 1	What is the sum of the digits in the number 12,345,678?
Question 2	What is TNYWG times 3?

6th Grade	Relay #2 – Person 2
Question 1	What is the sum of the digits in the number 12,345,678?
Question 2	What is TNYWG times 3?

6th Grade	Relay #2 – Person 3
Question 2	What is TNYWG times 3?
Question 3	As a decimal to the nearest tenth, what is TNYWG divided by 24?

6th Grade	Relay #2 – Person 3
Question 2	What is TNYWG times 3?
Question 3	As a decimal to the nearest tenth, what is TNYWG divided by 24?

6th Grade	Relay #2 – Person 4
Question 3	As a decimal to the nearest tenth, what is TNYWG divided by 24?
Question 4	On a certain trapezoid the length of the longer base divided by the length of the shorter base is TNYWG. The area of the trapezoid is 165 square centimeters and its height is a whole number of centimeters. What is the smallest possible number of centimeters in the height of the trapezoid?

6th Grade	Relay #2 – Person 4
Question 3	As a decimal to the nearest tenth, what is TNYWG divided by 24?
Question 4	On a certain trapezoid the length of the longer base divided by the length of the shorter base is TNYWG. The area of the trapezoid is 165 square centimeters and its height is a whole number of centimeters. What is the smallest possible number of centimeters in the height of the trapezoid?

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6th Grade – February 15, 2019

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!*

	Practice Relay	Answer
Person 1	What is 8 times 4?	32
Person 2	What is TNYWG divided by 2?	16
Person 3	What is the square root of TNYWG?	4
Person 4	What is TNYWG plus 24?	28
	Relay #1	Answer
Person 1	What is 90% of 200?	180
Person 2	What is TNYWG divided by 15?	12
Person 3	What is the sum of the positive whole number factors of TNYWG?	28
Person 4	TNYWG has a prime factorization in the form $a^2 \times b^1$ where a and b are distinct prime numbers. What is the next number larger than TNYWG to have a prime factorization that can be written this way?	44
	Relay #2	Answer
Person 1	What is the sum of the digits in the number 12,345,678?	36
Person 2	What is TNYWG times 3?	108
Person 3	As a decimal to the nearest tenth, what is TNYWG divided by 24?	4.5
Person 4	On a certain trapezoid the length of the longer base divided by the length of the shorter base is TNYWG. The area of the trapezoid is 165 square centimeters and its height is a whole number of centimeters. What is the smallest possible number of centimeters in the height of the trapezoid?	1 [centimeter]

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6th Grade – February 15, 2019

KEY

PRACTICE RELAY

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
32	**16**	**4**	**28**
1 or 0	1 or 0	1 or 0	2 or 0

RELAY # 1

Answer for person # 1	Answer for person # 2	Answer for person # 3	Answer for person # 4
180	**12**	**28**	**44**
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
36	**108**	**4.5**	**1 [cm]**
1 or 0	1 or 0	1 or 0	2 or 0

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

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6th Grade – February 15, 2019

COLLEGE KNOWLEDGE BOWL ROUND #1 – SET 1

#	Problem	Answer
1	Brian and Stewie are thinking of two whole numbers whose sum is twenty. What is the largest possible product of the two numbers?	100
2	Gregg's tractor takes one point five minutes to make a bale of hay and he needs to make one hundred and thirty bales of hay. As a decimal to the nearest hundredth, how many hours will it take?	3.25 [hours]
3	Gina's favorite number is five. She squares it, then she subtracts ten and adds three, then she multiplies by zero point five. What is the result?	9
4	Skittles are produced at an average rate of thirty per second and a child eats skittles at an average rate of thirty-six per minute. How many skittles would remain after ten seconds with the one child eating skittles?	294 [skittles]
5	What is the median of the integers between seven and thirty-one?	19
6	Isabella randomly draws three cards from a standard fifty-two-card deck without replacement. As a common fraction, what is the probability that they are all threes?	1/5525 or "1 over 5525" or "1 out of 5525"
7	A square has a diagonal of length ten inches. How many square inches are in the area of the square?	50 [in^2]
8	A right triangle has two sides of nine inches and one side that is unknown. As a decimal, what is the number of square inches in the area of the triangle?	40.5 [in^2]
9	A baker can decorate five cupcakes in three minutes. How many cupcakes can two bakers decorate in nine minutes?	30 [cupcakes]
10	As a common fraction, what is the probability of rolling the same number two times in a row when rolling a fair twenty-sided die twice?	1/20 or "1 over 20" or "1 out of 20"

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COLLEGE KNOWLEDGE BOWL ROUND #2 – SET 2

#	Problem	Answer
1	What is six hundred and fifteen divided by five?	123
2	Megan flips three coins. What is the probability that exactly two of them turn up heads?	3/8 or "3 over 8" or "3 out of 8"
3	A set of six tests has a mean of exactly seventy-five percent. Five of the scores are forty-three, sixty-nine, seventy-three, eighty-six, and ninety-eight percent. What is the percent score of the sixth test?	81 [%]
4	Greg tells two of his friends a secret. Ten seconds later, both of his friends tell two of their friends the secret. Ten seconds later, each friend who just heard the secret tells it to two more friends. This pattern continues. How many people, including Greg, will know the secret after thirty-five seconds?	31 [people]
5	A trapezoid has an area of sixty-five square centimeters and its bases are twelve and fourteen centimeters long. What is the number of centimeters in the height of the trapezoid?	5 [cm]
6	As a common fraction, what is the probability of drawing either a red card or a face card from a standard fifty-two-card deck?	8/13 or "8 over 13" or "8 out of 13"
7	Bian orders a fifteen-dollar meal at a restaurant. She will pay nine percent tax on the price of the meal and leave a twenty percent tip based on the price of the meal, not including tax. In dollars and cents, how much total does she spend in the end?	[$}19.35 or "19 dollars and 35 cents" or "nineteen thirty-five"
8	What is the remainder when two hundred seventy-four is divided by nine?	4
9	It takes Mai two days and twelve hours to drive from Seattle to New York. How long does this drive take, in minutes?	3600 [min]
10	Twenty-two-fourths plus thirteen-thirds equals the common fraction A over B. What is the value of A + B?	65

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COLLEGE KNOWLEDGE BOWL ROUND #3 – SET 3

#	Problem	Answer
1	Three divided by eight is the same as what number divided by one hundred sixty-eight?	63
2	A semicircle has a radius of two-point-five inches. What is the number of inches in the length of the semicircle?	2.5π [inches] or 5π/2 or "five-halves pi" or "5 pi over 2"
3	As a decimal rounded to the nearest tenth, what is zero point seven zero five multiplied by eleven?	7.8
4	What is the sum of the digits of the decimal equivalent of the fraction five sixteenths?	11
5	As a common fraction, what is the mean of one-half, one-fourth, and one-sixth?	11/36 or "11 over 36" or "11 out of 36"
6	How many ways are there for Dylan to rearrange seven books on his shelf, if his two favorite books must always be next to each other?	1440 [ways]
7	What is the value of X, if three to the power of the quantity "four X minus ten" is equal to seven hundred twenty-nine?	[x =] 4
8	On average there are three blue M&Ms in a fun-size bag. How many blue M&Ms are there in total in ninety-seven fun-size bags?	291 [blue M&Ms]
9	What is four cubed times fifteen squared?	14400
10	A circular dart board has a radius of five inches and a bullseye painted in the center with radius one inch. What percent of the area of the board is covered by the bullseye?	4[%]

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COLLEGE KNOWLEDGE BOWL ROUND #4 – SET 4

#	Problem	Answer
1	On average, a certain type of lizard eats one cricket every twenty minutes. There are sixteen crickets and two of this type of lizard in a terrarium. In how many minutes will the crickets all be eaten?	160 [mins]
2	Abby has a box of crackers. She gives a quarter of the crackers in the box to Bob, a third of what remains to Calvin, and then shares the last few crackers evenly with Debbie. If Abby gives Debbie five crackers, how many were in the box to begin with?	20 [crackers]
3	I am thinking of a positive integer N. When I square N, multiply the result by two, and add five, I get one hundred three. What is the value of N?	7
4	A yard has llamas and ostriches in it. There are forty-four feet and seventeen heads in the yard. How many ostriches are there?	12 [ostriches]
5	The numbers five-point-three times ten to the thirteenth and two-point-four times ten to the negative thirteenth are both in scientific notation. As a decimal to the nearest hundredth and not in scientific notation, what is the product of these two numbers.	12.72
6	Joe, Jenny, Jeff, and Julie sit on a bench. In how many ways can they sit so that they are alternating boy, girl, boy, girl, or girl, boy, girl, boy?	8 [ways]
7	The lengths of the legs of a right triangle are five centimeters and thirteen centimeters. In simplest radical form, what is the number of centimeters in the length of the hypotenuse?	$\sqrt{194}$ [cm] or "radical 194" or "root 194"
8	As a common fraction, what is one-third divided by twelve-fifths?	5/36 or "5 over 36" or "5 out of 36"
9	What is the greatest prime factor of one hundred fifty-six?	13
10	What is forty-five percent of sixty.	27

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COLLEGE KNOWLEDGE BOWL ROUND #5 – SET 5

#	Problem	Answer
1	The ratio of pens to pencils produced is six pens to eight pencils. If forty-two pens are produced, then what is the combined total of the two types of writing utensils that are produced?	98 [writing utensils]
2	What is the product of twenty-seven and six?	162
3	What is the remainder when the eighth smallest positive prime number is divided by the square root of sixteen?	3
4	What is the product of four-thirteenths times ninety-one-twenty-eighths?	1
5	As a decimal, what is the number of degrees in the acute angle formed by the minute hand and the hour hand of an analog clock at seven-forty-five PM?	37.5 [degrees]
6	An arithmetic expression begins with one minus two plus three minus four plus five. What is the value of this expression when it consists of the first ninety-nine positive whole numbers being alternately subtracted and added in this way?	50
7	I have a deck of fifty cards labeled with the numbers one through fifty and I randomly draw one card. As a common fraction, what is the probability that the card is either a multiple of three or a multiple of five?	23/50 or "23 over 50" or "23 out of 50"
8	Spiderman shoots a web from the ground to the top of a fifteen-meter tall building. He is eight meters away from the base of the building, and the building forms a right angle with the ground. What is the number of meters in the length of his web?	17 [meters]
9	I have a laundry basket full of clean socks. There are green, white, and pink socks. If I pull socks out one at a time at random, after how many socks could I be sure I had a matching pair?	4 [socks]
10	When I square X, then multiply the result by three and then subtract five, I get two hundred thirty-eight. What is the positive value of X?	[x =] 9

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COLLEGE KNOWLEDGE BOWL ROUND #6 – SET 6

#	Problem	Answer
1	On average, a garbage truck takes on thirty-five pounds per stop. If one truck currently weighs six thousand and fifty pounds, how many stops will it take for the truck to weigh seven thousand one hundred pounds?	30 (stops)
2	Sonya was born on August ninth, two thousand and three. On July ninth, two thousand and eighteen, how old is she in months?	179 [months]
3	As a decimal, what is eighty-one times one-fourth plus twenty-seven point five?	47.75
4	What is two to the eighth power?	256
5	When you square the quantity X plus two, and then add nineteen, you get one hundred forty. What is the positive value of X?	[x =] 9
6	In a certain geometric sequence, the terms are doubled from one term to the next. If one term in this sequence is seven and another term is four hundred and forty-eight, how many terms are there in the sequence that are between these two terms?	5 [terms]
7	Twelve jurors are sitting in two rows of six in the jury box. How many ways are there to rearrange the jurors, if nobody changes rows?	518400 [ways]
8	Solve the equation for X: three X plus eighty-seven equals ten X minus four	[x =] 13
9	What is the sum of the distinct positive prime factors of six hundred and twelve?	22
10	There are one hundred and twenty kids and fifteen parents going on a field trip. A fifty-four-passenger bus costs fifty dollars and a fourteen-passenger van costs twenty dollars. In dollars, what is the cost of the least expensive option to rent vehicles for the trip.	[$] 140

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COLLEGE KNOWLEDGE BOWL ROUND – EXTRA

#	Problem	Answer
1	What is the remainder when two thousand and nineteen is divided by nine?	3
2	As a common fraction, what is the median of the following data set: four-fifths, two-sevenths, one-third, one-half	5/12 or "5 over 12" or "5 out of 12"
3	I draw two cards from a standard fifty-two-card deck without replacement. As a common fraction, what is the probability that they are both the same suit?	4/17 or "4 over 17" or "4 out of 17"
4	What is ten to the fifth power times two to the third power?	800,000
5	What is the number of inches in the perimeter of a square whose area is forty-nine square inches?	28 [in]
6	Solve the following equation for X: five X minus two equals two X plus twenty-two.	[x =] 8