"Math is Cool" Championships -- 2021-22

4th Grade

Mental Math Solutions

	Answer	Solution
1	5 [sides]	How many sides does a pentagon have? **Definition of a pentagon.**
2	36	What is the product of four and nine. 4x9=36
3	24 [inches]	How many inches are in two feet? 2 feet x 12 inches/foot
4	35 [minutes]	Harper's piano lesson began at 2:45 PM and ended at 3:20 PM the same afternoon. How many minutes long was Harper's piano lesson? **30 minutes + 5 minutes more**
5	75	What is 50% of 150? **150/2 = 75**
6	44	The sum of two consecutive integers is 89. What is the smaller of the two integers? **44+45 = 89**
7	45 [balloon animals]	Eric can make 30 balloon animals in 20 minutes. Working at the same rate, how many balloon animals can Eric make in 30 minutes? **30/20 minutes = 15/10 minutes** **30 + 15 = 45**
8	450 [cents]	Shen has thirty-five dollars. He buys 5 books which each cost 6 dollars and 10 cents. How many CENTS does Shen have left over? **6.10 x 5 = 30.5** **35-30.5 = 4.50 = 450 cents**

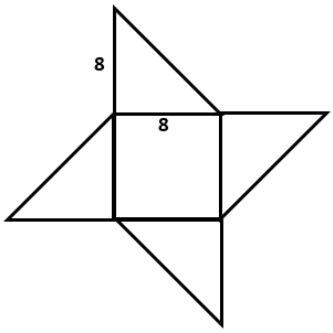
"Math is Cool" Championships -- 2021-22

4th Grade

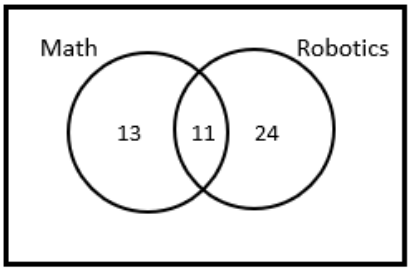
Individual Test Solutions

	Answer	Solution
1	9500	Round the following number to the nearest hundred: 9528 **Rounds down to 9500.**
2	5 [points]	Diego needs to earn 24 AR (Accelerated Reading) points by the end of the week, so he can participate in the class AR party. If Diego has earned 19 points so far, how many more AR points does he need to earn by the end of the week? **24-19 = 5**
3	20	What is the next number in this sequence: 4, 8, 12, 16, … ? **Add 4 each time.**
4	1305	Find the sum of 568 and 737. **568+737 = 1305**
5	4 [sides]	How many sides does a trapezoid have? **A trapezoid is a particular kind of quadrilateral.**
6	7 [times]	Seven penguins walk in a single file line. Every 5 minutes, the last penguin in line moves to the front of the line. How many times must this happen for the penguins to be in the same order they started in? **After 7 moves they will be back in their original order.**
7	1	What is the remainder when 921 is divided by 4? **921/4 = 230 R 1**
8	25 [A =]	The area of a circle with a radius of 5 centimeters can be written as $A\pi$ (A times π) square centimeters, where A is an integer. What is the value of A? **Area = $\pi r^2 = \pi(5^2) = 25\pi$ cm^2**
9	49 [quarters]	How many quarters are equal in value to $12.25 ? **12*4 + 1 = 48+1 = 49**

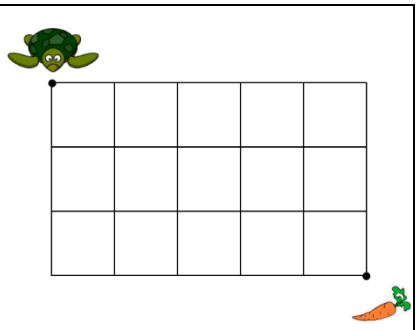
10	21	A 27-digit number is formed using a pattern of digits that begins as follows: 101101110… What is the sum of the digits in the 27-digit number? **101101110111101111101111110** **The digit '1' appears 1+2+3+4+5+6 times total**
11	5000	How many centimeters are in 50 meters? **50m*(100cm/m)=5000**
12	8	When the fraction $\frac{12}{20}$ is reduced to its simplest form, it gives a common fraction in the form of $\frac{A}{B}$, where A is the numerator and B is the denominator. What is the value of A + B ? **12/20 reduces to 3/5, so 3+5 = 8**
13	6 [cars]	The Mathzazzle Elementary School math team has 27 members. They will travel to the math competition in cars that can hold at most 5 team members. What is the fewest number of cars that will be needed to transport all of the team members? **27/5 = 5 reminder 2. A car is still needed for the extra 2 team members, so 6 cars are needed.**
14	28 [questions]	Armando completed one-third of his math assignment during class and needs to finish the rest at home. If the math assignment has 42 questions, how many questions will Armando need to do at home? **42/3 = 14 questions completed.** **42-14 = 28 questions left to finish**
15	13	What is the average of the following set of numbers? {2, 10, 15, 17, 21} **=(2+10+15+17+21)/5 = 65/5 = 13**
16	3 [factors]	How many distinct positive factors does 9 have? **Factors are 1, 3 and 9**
17	8 [units]	Biff graphs the point (3, 5) and (3, 13) on a coordinate plane. What is the length of the straight line connecting these two points? **13-5 = 8** **Both points have an x-coordinate of 3 so distance can be found by subtracting the y-coordinates.**

18	192 [square units]	Find the area in square units of the pinwheel shown here. The pinwheel is made up of a square with side length 8 units, and four equal isosceles right triangles.  **The area of the square = 8x8 = 64** **Two triangles form a square of the same size, so there are 3 total squares worth of area. 64 x 3 = 192.**
19	50 [%]	Dobby has a drawer with 7 red socks, 4 orange socks, and 3 purple socks. Dobby randomly selects one sock from the drawer. What is the probability, as a percentage, that Dobby selected a red sock? **7/14 = ½ = 50%**
20	24	What is 30% of 80? **10%=8 so 30% = 3*10% = 3*15 = 24**
21	96 [miles]	Liliana drove 8 miles to the store in 15 minutes. Driving at the same constant speed, how many miles could Liliana drive in three hours? **8*4 = 32 miles per hour.** **32 * 3 = 96**
22	1221	A palindrome is a number that reads the same forwards and backwards. (For example: 232) What is the smallest 4-digit palindrome that is divisible by 3? **For a number to be divisible by 3, its digits have to add up to a multiple of 3. 1001 is the smallest, but not divisible by 3. The next smallest is 1111, also not divisible. The next smallest is 1221, which is divisible by 3.**
23	189 [steps]	Ekta lives on the 8th floor of an apartment building and the elevator is broken. Any two adjacent floors are connected by a staircase with 27 steps. If Ekta enters the building on the ground (1^{st}) floor, how many total steps will she have to climb to get to her apartment on the 8^{th} floor? **To go from the 1^{st} floor to the 8^{th} floor, she will have to go up 7 flights of stairs, so 7*27 = 189.**

24	29	Two unknown numbers have a sum of 75 and a difference of 17. What is the smaller of the unknown numbers? **a + b = 75** **a – b = 17** **2a = 92** **a = 46, b = 29**
25	28	Biff and Eho start at the number 70 and count down. Biff is counting down by 7s (so 70, 63, and so on.) Eho is counting down by 6s (so 70, 64 and so on). What is the first number (not including 70) that Biff and Eho both say aloud (not necessarily at the same time)? **70 – 42 = 28** **6 and 7 have a common multiple of 42, so the first number they will both say is 42 less than 70.**
26	9	Leticia's homework problem said to divide by 3. Leticia misread the problem and instead subtracted 3 to get an incorrect answer of 24. What was the correct answer to the original problem? **24+3 = 27 returns to the original number.** **27/3 = 9 is the correct answer.**
27	350 [outfits]	Mikako's wardrobe consists of 10 shirts, 7 pairs of pants and 5 pairs of shoes. How many different outfits can Mikako make from her wardrobe if an outfit requires 1 shirt, 1 pair of pants, and one pair of shoes?
28	3 [colors]	Using as few colors as possible, color this figure so that no two regions next to each other (sharing a common border of some length) are the same color. What is the fewest number of distinct colors that are needed?  **Other configurations are possible, but none of them use fewer than 3 colors.**
29	24 [degrees]	One angle of an isosceles triangle measures 132°. What is the measure of one of the other two angles, in degrees? **180-132 = 48 degrees for the other two angles. 48/2 = 24 degrees for each of the other two angles.**
30	90	My counting number has two digits. When I multiply the two digits together, the product is less than 5. What is the largest possible value of my number? **9x0 = 0. Every number above 90 has a greater product.**

31	16 [cm]	Square "A" has one-fourth the area of square "B" which has a perimeter of 32 centimeters. What is the perimeter in centimeters of Square A? **If the square has ¼ the area then its sides are half the size. So square A would have a perimeter of 16 cm.**
32	11	There are 48 fourth graders at Arendelle Elementary. They all participate in one or both of the two extra-curricular activities: Math Team and Robotics Club. There are 24 students total who participate in Math Team, and 35 students total who participate in Robotics Club. How many students participate in both Math Team and Robotics Club? **24 + 35 = 59 participants** **59 – 48 = 11 kids in two activities** 
33	648,000 [cubic cm]	Yousef is preparing a tank to bring home a new pet turtle. The tank is 150 cm wide, 60 cm deep, and 80 cm tall. What is the volume of water in Yousef's tank in cubic centimeters if it is 90% filled with water? **150 x 60 x 80 = 720,000 cubic cm** **720,000 x 0.9 = 648000**
34	46 [days]	St. Patrick's Day is on March 17th which is a Thursday. National Hug-a-Gnome Day is in May on a Tuesday. What is the fewest number of possible days between St. Patrick's Day and National Hug-a-Gnome Day, not including St. Patrick's Day and National Hug-a-Gnome Day? **There are 14 days to the end of March.** **There are 30 days in April, for a total of 44 days so far. This is 6 weeks plus 2 days. April 30 is on a Saturday. The first Tuesday in May is May 3.** **44 + 2 = 46**

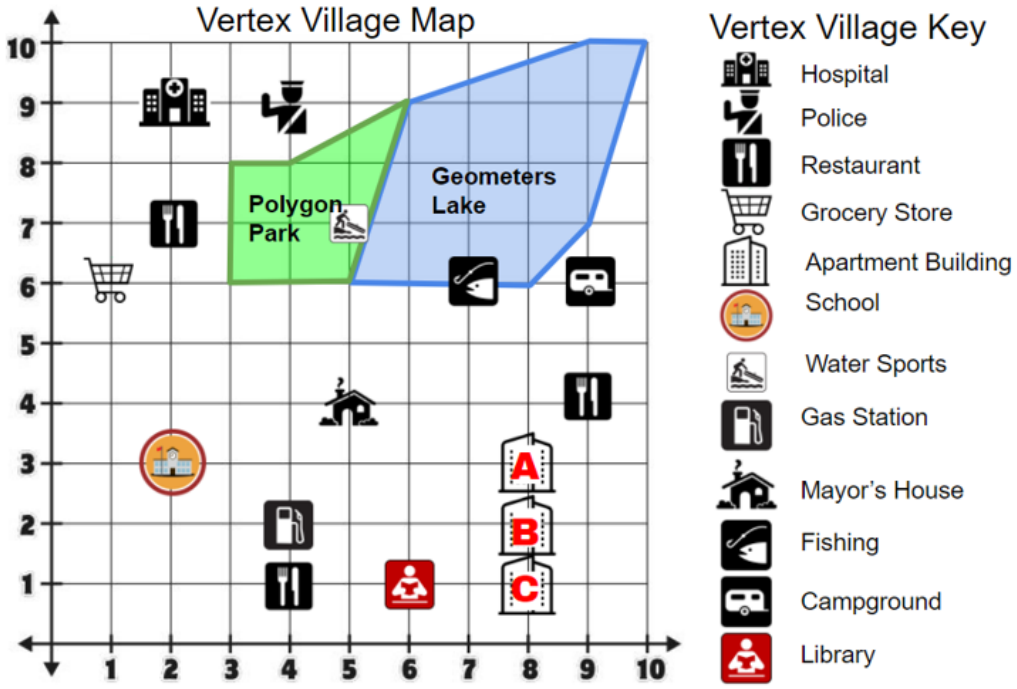
35	12 [years]	5 years ago from today, Biff was 3 times as old as Eho. In 2 years from today, Biff will be twice as old as Eho. How old is Eho today, in years? **Can solve by guess and check.** **B = Biff's age now, E = Eho's age now.** **B-5 = 3(E-5) and B+2=2(E+2)** **B = 3E -15 +5 and B = 2E+4-2** **B = 3E -10 and B = 2E+2** **3E-10 =2E +2** **E = 12**
36	11 [students]	Fifteen percent of the number of girls in Deepa's class is equal to 18% of the number of boys in her class. What is the smallest possible number of students that could be in the class? The 15% and 18% of the numbers are not necessarily whole numbers. **0.15G = 0.18B** **15G = 18B** **5G = 6B** **The smallest possible numbers to make this true are G = 6, B = 5, so 11 students total.**
37	7	The sum of three distinct numbers is equal to their product. Two of the numbers are $\frac{4}{3}$ and 1. What is the third number? **4/3 + 1 + x = 4/3 * 1 * x** **7/3 = 1/3x** **x = 7**
38	7 [gummy fish]	I have six gummy sharks, eight gummy pineapples, and some number of gummy fish in a bag. After removing one gummy fish from the bag and not replacing it, the probability that I randomly select a gummy fish from the bag is $\frac{3}{10}$. How many gummy fish were in the bag to begin with? **6 + 8 + F = total** **After one fish has been removed, the P(fish) = 3/10 = 6/20** **Therefore, there were 7 fish to start with.**

39	56 [paths]	Terry the turtle wants to eat his favorite snack, located diagonally across the grid from his starting point. From the point where he is located, he can only walk along the gridlines, and may only move downwards or to the right. How many different paths of any length can Terry take to reach his snack?  **Terry needs to go 5 units to the right, and 3 units down. In other words, RRRRRDDD.** **The number of different ways to do this is 8!/(5!3!) = 56.**
40	99 [minutes]	You have a watch that runs 1 minute fast for every half-hour that goes by. You set your watch to the correct time at 10:00 AM on Monday Feb. 14th. How many minutes ahead of the true time will your watch be when it reads 1:09 PM on Wednesday Feb. 16th? **Each day, your watch gains 24*2 = 48 minutes. So at 10 AM on Wed, it would read 11:36 AM. From here we can check the time each half hour, and add a minute to the reading every time.** **10:30 true = 12:07 watch reading** **11:00 true = 12:38 watch reading** **11:30 true = 1:09 watch reading = 1 hour and 39 minutes fast = 99 minutes fast**.

"Math is Cool" Championships -- 2021-22

4th Grade

Multiple Choice Solutions

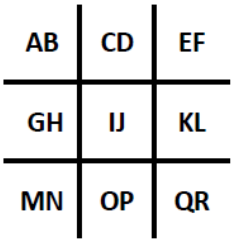
	Answer	Solution
USE THE FOLLOWING MAP AND KEY TO SOLVE PROBLEMS #1 THROUGH #4. Vertex Village is set up on a coordinate grid where each unit represents 1 mile, and therefore each unit square represents 1 square mile of area. Each site indicated in the Key is located at integer coordinates on the map. The icons for each site are centered over their coordinate point locations. For example, the Hospital in the upper left area of the map is located at coordinates (2, 9).  		
1	B	What are the coordinates of the campground? A) (6, 9) B) (9, 6) C) (4, 9) D) 9 units E) Answer not given.. **The campground icon is centered over the point (9, 6).**

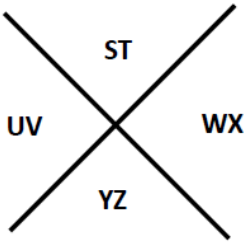
2	B	Which of the following best describes the shape of Polygon Park? A) Quadrilateral B) Pentagon C) Hexagon D) Trapezoid E) Answer not given. **Polygon Lake has 5 straight sides forming a closed figure, therefore it is a pentagon.**
3	C	The streets in Vertex Village are located on the grid lines, including the grid lines that border (touch) Polygon Park and Geometers Lake. There are no streets through Polygon Park or Geometers Lake, and the border between the park and the lake is not a street. All cars must drive on the streets. What is the shortest possible driving distance from the library to the police station? A) 10 miles B) 11 miles C) 12 miles D) 13.5 miles E) Answer not given. **Go 5 units up, 3 units left, 3 units up, 1 unit right.**
4	A	What is the area of Geometers Lake? A) 13 square miles B) $14\frac{1}{2}$ square miles C) $16\frac{1}{2}$ square miles D) 20 square miles E) Answer not given. **There are 8 full squares. There are 3 triangles with height = 3, length = 1, area = (1/2)(3)(1) = 3/2 * 3 = 9/2 There is one half-square with area $\frac{1}{2}$. 8 + 9/2 + $\frac{1}{2}$ = 13.**

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #5 THROUGH #7.

A secret code can be used to send a message, by using a shape to stand for each letter of the alphabet. The code works as follows. Each space stands for one of the letters that was in it. The first letter of the two letters in each space is shown by just the space; the second letter is shown by the space with a dot in it.

For example:



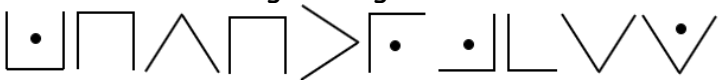


For the letter A you write: 

For the letter B you write: 

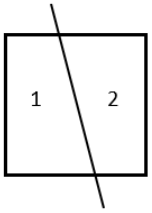
For the letter W you write: 

For the letter X you write: 

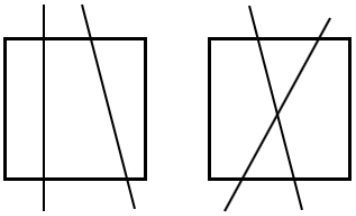
5	E	Which letter does the following symbol represent?  A) H B) I C) J D) K E) Answer not given. **It is the letter 'L'.**
6	C	Decode the following message.  A) Dont be late B) Do you get it C) Do your best D) Could we win E) Counting up **Follow the instructions to decode.**
7	B	When written using the code, how many MORE dots does the phrase 'Lowest Common Denominator' use compared to the phrase 'Acute Angle'. A) 3 B) 5 C) 8 D) 9 E) Answer not given. **Lowest Common Denominator has 8 dots, Acute Angle has 3 dots. 8-3 = 5.**

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #8 THROUGH #10.

One straight line can only divide a square into two regions, as shown.

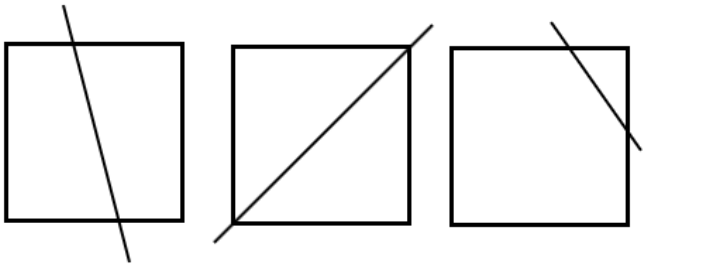


Two straight lines can divide a square into either three or four regions, as shown. Therefore, there are two different numbers of regions (3 and 4) that a square can be divided into using two straight lines.



Notice that the region outside the square is not being counted.

8	A	Into how many different numbers of regions can three straight lines divide a square? A) 4 B) 5 C) 6 D) 7 E) Answer not given. **It can be divided into 4, 5, 6 or 7 regions, therefore a total number of 4.**
9	B	Using four straight lines, what is the minimum number of regions that a square can be divided into? A) 4 B) 5 C) 6 D) 7 E) Answer not given. **If none of the lines intersect, they will divide the square into 5 regions.**

10	B	As shown here, a single line can divide a square into two regions, creating 2 quadrilaterals, 2 triangles, or 1 triangle and 1 pentagon. Therefore, there are 3 different-sided polygons that can be created, 3-sided, 4-sided or 5-sided.  2 Quadrilaterals 2 Triangles 1 Triangle + 1 Pentagon Using TWO straight lines to divide the square, how many different-sided polygons can be created? A) 3 B) 4 C) 5 D) 6 E) Answer not given. **All of the previous ones, plus a hexagon.**

"Math is Cool" Championships -- 2021-22

4th Grade

Team Test Solutions

	Answer	Solution
1	31	What comes next in the following number sequence? 59, 52, 45, 38, … **Pattern decreases by 7 each time.**
2	1250 [square meters]	An Olympic swimming pool measures 50 meters long and 25 meters wide. What is the area, in square meters, of an Olympic sized swimming pool? **50x25 = 1250 m^2**
3	163 [cents]	Emilio has 7 quarters, 5 dimes, 2 nickels and 7 pennies in his pocket. He uses this money to buy a candy bar that costs 79 cents. How many cents does Emilio have left over after buying the candy bar? **7Q + 5D + 2N + 7P =** **175 + 50 +10 + 7 = 242** **242-79 = 163**
4	15 [cm]	Human hair grows $1\frac{1}{4}$ centimeters per month, on average. How many centimeters does human hair grow in one year? **1 $\frac{1}{4}$ = 5/4** **5/4 x 12 = 60/4 or 15 cm**
5	22 [hours]	Vivek is driving at a speed of 55 miles per hour. Assuming he drives at a constant rate, how many hours will it take him to travel 1210 miles? **1210/55 = 22**

6	2 [students]	A teacher is looking at his classroom of 20 students. He said "All of the students in this classroom, except for 9 students, have brown hair". Then he added "All of the students in this classroom, except for 13 students, have blond hair". If each student only has one color of hair, how many students in the classroom do not have brown or blond hair? **11 brown hair** **7 blond hair** **20 – 11 – 7 = 2**
7	720 [ways]	How many ways are there to order the letters in the word "Dragon", spelled D-R-A-G-O-N? **6! = 720**
8	200 [beads]	Arya is creating an art project using plastic beads. Her pattern is 30% green beads, 10% purple beads, and the remainder are yellow beads. She determined that she needs a total of 60 green beads. How many total beads does she need to finish her project? **60 is 30% of the total.** **20 is 10% of the total.** **20x10 = 200 is the total**
9	5 [two digit numbers]	How many 2-digit prime numbers can be made using only non-prime digits? **11, 19, 41, 61, 89**
10	25 [cookies]	Kamal had a box of cookies. When the cookies were put into piles of 4, there was one cookie left over. When the cookies were put into piles of 11, there were 3 cookies left over. What is the smallest number of cookies that could be in Kamal's box? **Need a number that is one more than a multiple of 4, and three more than a multiple of 11. Test values that are 3 more than a multiple of 11: 14, 25.**

"Math is Cool" Championships -- 2021-22

4th Grade

Linda Moore Triple Jump Solutions

	Answer	Solution
1	1082341	Write the following number as an integer: One-million, eighty-two thousand, three hundred forty-one 1082341
2	5	Find the value of: 10 – 9 + 8 – 7 + 6 – 5 + 4 – 3 + 2 – 1 **Add and subtract.**
3	52 [minutes]	Raisa plays three consecutive games of chess without any breaks. The first game lasted 24 minutes, the second game lasted 49 minutes, and then she played the third game. If she started playing the first game of chess at 6:00 AM, and finished playing the last game at 8:05 AM the same morning, how many minutes did the third game last? **125 min = 2 hr 5 min after 6:00 am** **125 - 24- 49 = 52**
4	27	If the pattern shown here continues, moving left to right, what number will be in the third circle?  **Multiples of 3, the third circle will be the 9th one, which is 27.**
5	72 [feet]	Grace walks around the perimeter of her vegetable garden three times. If the garden is rectangular with side lengths of five and seven feet, how many feet did she walk? **(5+5+7+7)*3**

6	17 [books]	Brooke, Krish, Lucas and Riddesh have the same summer reading list. They are each reading through the books in order of the list. Riddesh is reading the book in the middle of the list. Krish is two books ahead of Riddesh. For example, IF Riddesh were reading the 1st book, then Krish would be reading the 3rd book. Lucas is 6 books behind Krish. Brooke is 12 books ahead of Lucas. Brooke is reading the last book on the list. How many books are on the list? **R = middle** **K = middle + 2** **L = middle + 2 – 6 = middle – 4** **B = middle – 4 + 12 = middle + 8 = last** **8 + 8 + 1 = 17**
7	7 [ways]	Using only quarters, dimes, and nickels, how many different ways are there to make 40 cents? **Casework:** **QDN** **QNNN** **DDDD** **DDDNN** **DDNNNN** **DNNNNNN** **NNNNNNNN**
8	10 [%]	A number is randomly chosen from 1 to 100, inclusive (including 1 and 100). As a percentage, what is the probability that the number is divisible by both 2 and 5? **A number divisible by 2 and 5 is divisible by 10. There are 10 such numbers, 10, 20, …, 100. 10/100 = 10%.**
9	20 [cats]	The ratio of dogs to cats at an animal shelter was 6:4. After 10 dogs were adopted, the ratio of dogs to cats was 1:1. How many cats are there at the animal shelter? **The ratio 6:4 multiplied by 5 becomes 30:20. Therefore, if 10 dogs are removed it becomes 20:20, or a ratio of 1:1.**
10	**50**	Find the value of the sum of the first 100 positive integers divided by 101, in other words: $$\frac{1+2+3+\cdots+98+99+100}{101}$$ **Each pair in the numerator (1 + 101, 2 + 99, …) = 101. There are 50 pairs total. Therefore,** $\frac{(50)(101)}{101} = 50$

"Math is Cool" Championships -- 2021-22

4th Grade

College Bowl Round #1 Solutions

	Answer	Solution
1	99	What is the product of 9 and 11? **9 x 11 = 99**
2	7 [coins]	Svetlana has an unlimited amount of dimes and quarters. What is the greatest number of coins that she can use to pay exactly for an item that costs 85 cents? **1 quarter + 6 dimes**
3	5 [zeros]	How many zeroes are in the number two-hundred-thousand? **200,000**
4	155 [minutes]	How many minutes after 11:30 AM is 2:05 PM on the same day? **30+2*(60) +5 = 30+120+5 = 155**
5	6 [ways]	In Anna's dance group there are 5 dancers. In how many ways can a group of 3 dancers be selected if Anna must be part of the group? **Five dancers ABCDE, A must be in the group:** **ABC, ABD, ABE, ACD, ACE, ADE**
6	20	How many multiples of 100 are between 1 and 2022? **100 * 1 = 100** **100 * 20 = 2000**
7	30 [pieces]	Julian has 12 pieces of string. He cuts half of the strings in half, and cuts the other half of the strings into thirds. How many pieces of string does he have now? **Cuts 6 into half ➔ 12** **Cuts 6 into thirds ➔ 18** **12+18=30**

8	5	What is the mean of the following data set? {2, 11, 4, 3} **2+11+4+3=20** **20/4 = 5**
9	24	What is the next number in the following sequence: 3, 4, 6, 9, 13, 18, … **The pattern is: +1, +2, +3, …** **18 + 6 = 24**
10	5 [hours]	Rashonda practices the piano for 30 minutes a day, 5 days a week. How many total hours has she practiced in two-week period? **2 ½ hours a week x 2 = 5 hours**

"Math is Cool" Championships -- 2021-22

4th Grade

College Bowl Round #2 Solutions

	Answer	Solution
1	36	What is the positive difference between 68 and 32? **68-32 = 36**
2	22 [students]	At Skyview Elementary School, Mr. Clark's third grade students line up in a straight row. Max is the fourteenth student in line counting from the front of the line, and is the ninth student counting from the back of the line. How many students are in the line? **14 + 9 – 1 = 22**
3	4	What whole number is equal to twelve-fifths plus eight-fifths? **12/5 +8/5 = 20/5 = 4**
4	120 [degrees]	How many degrees does the minute hand on an analog clock move from 7:15 PM to 7:35 PM on the same day? **Full clock is 360 degrees. 15 minutes is $\frac{1}{4}$ of the clock, so 90 degrees. 5 minutes is 1/3 of the quarter, so 30 degrees.**
5	16 [cups]	How many cups are in 4 quarts? **4 quarts * (4cups/quart) = 16 cups**
6	102 [minutes]	Manuel needs to cut a long steel rod into 35 equal pieces. It takes 3 minutes to make 1 cut. How many minutes will it take to complete all of the cuts? **34 cuts x 3 minutes = 102**
7	60 [penguins]	Two turtles are worth 5 monkeys. 1 monkey is worth 6 penguins. How many penguins are 4 turtles worth? **4 turtles = 10 monkeys** **10 monkeys * 6 = 60 penguins**
8	42 [sq. cm]	What is the area in square centimeters of a rectangle that measures 7 cm by 6 cm? **6*7 = 42 square cm**

9	13 [times]	A clock chimes once every hour on the hour, starting at 12 AM. How many times will it chime between 2:15 AM and 3:25 PM on the same day? **From 3 am – 3 pm.**
10	6	What is the greatest common factor of 12 and 6? **12 = 2*6** **6 = 1*6**

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4th Grade

College Bowl Round #3 Solutions

	Answer	Solution
1	16	What is "4-squared"? **4x4 = 16**
2	360 [degrees]	What is the sum in degrees of the interior angles of a rectangle? Four right angles = 360 degrees.
3	14	What is the range of the following data set? {5, 8, 2, 12, 4, 16}. **16-2 = 14**
4	6 [numbers]	How many different 3-digit numbers can be made using the digits 1, 5 and 7 ? A digit can only be used one time in each number. **3!** **157, 175, 517, 571, 715, 751**
5	15 [years old]	Ming-Na's little brother is one-third of her age. If her brother is 5 years old, how old is Ming-Na in years? **5*3 = 15**
6	4	How many prime numbers are between 20 and 40? **23, 29, 31, 37**
7	4 [boxes]	Your softball team pays $10 for a box containing 30 candy bars. You and your teammates sell the candy bars for $1 each. How many complete boxes of candy bars need to be sold in order earn a profit of 80 dollars? **30 – 10 = 20 profit for selling a whole box.** **80/20 = 4 boxes**
8	75 [%]	Kai has sixteen jellybeans in a bag, and four of them are yellow. If he randomly chooses one jellybean from the bag, what is the probability in percent that it is NOT yellow? **4/16 = $\frac{1}{4}$ = 25% yellow, therefore 75% NOT yellow**

9	40 [degrees]	Two of the three interior angles of a triangle have measures of 30 degrees and 110 degrees. What is the measure of the third angle, in degrees? **180 – (30 + 110)**
10	30	What is the least common multiple of 6 and 15? **6: 6, 12, 18, 24, 30** **15: 15, 30**

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College Bowl Round #4 Solutions

	Answer	Solution
1	68 [cents]	Jose buys a donut for 1 dollar and 32 cents and pays with a 2 dollar bill. How many cents will Jose get in change? **2-1.32 = 0.68 = 68 cents**
2	27 [in]	What is the perimeter in inches of an equilateral triangle with a side length of 9 inches? **3*9**
3	7	What is the square root of 49? **7*7=49**
4	250	The average of 3 numbers is 50. A 4^{th} number is added to the list. The new average of all 4 numbers is 100. What is the 4^{th} number? **The sum of the 1^{st} three numbers is 3x50=150.** **The sum of the 4 numbers is 4x100=400. 400-150=250**
5	10 [handshakes]	There are five people at a meeting. If each person shakes hands once with each other person, how many total handshakes take place? **4+3+2+1=10**
6	4 [zeros]	How many zeroes are in the whole number product of 2 times 4 times 5 times 5 times 5 times 10? **2 x 4 x 5 x 5 x 5 x 10 = 10,000**
7	8 [bags]	Monica bakes 4 dozen cookies. She packs them in bags of 6 cookies each. How many bags of cookies does she make? **4*12 = 48** **48/6 = 8**
8	72 [inches]	Biff and Eho are going swimming in a pool that is 6 feet deep throughout. How many inches deep is the swimming pool? **6*12 = 72 inches**

9	47	What is the next number in the following sequence? 3, 4, 7, 11, 18, 29, … **Each number is the sum of the previous two numbers.** **18 + 29 = 47**
10	12 [quarts]	How many quarts are in 3 gallons of water? **1 gallon = 4 quarts** **3 gallons = 12 quarts**

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College Bowl Round #5 Solutions

	Answer	Solution
1	6 [ways]	How many ways can you rearrange the letters in the word YES, spelled Y-E-S. **3 options for the first letter, 2 options for the 2nd, and only one option for the 3rd = 3*2*1**
2	36	What is the sum of the cubes of the first three counting numbers? **$1^3 + 2^3 + 3^3 = 1 + 8 + 27 = 36$**
3	162 (grains)	If Jin Lee eats three rice cakes, and each rice cake contains 54 grains of puffed rice, how many grains of puffed rice did Jin Lee eat? **54*3**
4	23	What is the largest prime factor of 92? **92 = 2*2*23**
5	80 [minutes]	It takes Antman 20 minutes to prune 3 bushes. At this rate, how many minutes will it take Antman to prune 12 bushes? **Needs to prune 4 times as many bushes, so 20*4 = 80 minutes**
6	450 [mm]	What is the perimeter in millimeters of a regular decagon with a side length of 45 millimeters? **45 x 10 = 450**
7	16 [pieces of gum]	Three Starbursts are worth 2 Tootsie Rolls. 1 Tootsie Roll is worth 4 pieces of gum. How many pieces of gum are 6 Starbursts worth? **6 Starbursts = 4 Tootsie rolls** **4 Tootsie rolls = 16 pieces of gum**
8	25 [%]	The letters in the word PENTAGON, spelled P-E-N-T-A-G-O-N are put into a bag. If one letter is randomly selected, what is the probability in percent that the letter is an 'N'? **2 Ns out of 8 , 2/8 = $\frac{1}{4}$ = 25%**

9	84	What is twice the product of 6 and 7? **2x6x7=84**
10	26	What number goes in the "blank" in the following number pattern: 6, 8, 12, 18, "blank", 36 **Pattern is: +2, +4, +6, +8, +10**

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College Bowl Round #6 Solutions

	Answer	Solution
1	50	What is 11 plus 12 plus 13 plus 14? **11+12+13+14 = 50**
2	15 [sevens]	Lily writes all of the numbers between 40 and 90 on a piece of paper. How many times has she written the digit 7 while writing this list? **47, 57, 67, 70,71, 72, 73, 74, 75, 76, 77, 78, 79, 87,** **14 number + 1 because 77 has two 7s.**
3	12 [inches]	What is the positive difference between 13 yards and 40 feet? Express your answer in inches. **13 yards = 39 feet** **Difference = 40-39 = 1 ft = 12 inches**
4	50 [inches]	The area of a rectangle is 100 square inches. One side length is 5 inches. How many inches are in the perimeter of the rectangle? **5x20=100, therefore the side lengths are 5 and 20.** **20+20+5+5=50**
5	4	What is one-half of one-third of 24? **24/3 = 8, 8/2 = 4**
6	197 [cents]	Olivia has 7 dimes, 3 quarters, 8 nickels and 12 pennies. How much money does she have in cents? **7*10 + 3*25 + 8*5 + 12 =** **70 + 75 + 40 + 12 = 197**
7	4 [ways]	In how many different orders can three friends sit on a park bench in a row, if two of the friends insist on sitting next to each other? **Friends ABC, AB must sit together.** **ABC, BAC, CAB, CBA**

8	89	What is the greatest possible whole-number of degrees in an acute angle? **89 is the largest whole number below 90**
9	22 [math problems]	Packard wrote 8 math problems, and Sterling wrote 6 more math problems than Packard. How many math problems did they write together? **8 + 14 = 22**
10	70	What is the smallest positive integer that is divisible by 2, 5 and 7? **2*5*7=70**

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College Bowl EXTRA

	Answer	Solution
1	56 [cubic inches]	What is the volume in cubic inches of a rectangular prism with a base of 4 inches, a height of 7 inches, and a width of 2 inches? **4 * 7 * 2**
2	20	What is one-third of 60% of 100? **60% of 100 = 60** **1/3 of 60 = 20**
3	7	What is the mode of the following data set? {7, 4, 3, 21, 9, 7} **Mode is the item that comes up most frequently.**
4	8 [days]	Eduardo drinks 4 cups of water a day. How many days will it take him to drink 2 gallons of water? **1 gallon = 16 cups** **2 gallons = 32 cups** **32/4 = 8 days**
5	49 [cm^2]	What is the area in square centimeters of a square with a perimeter of twenty eight cm? 28/4 = 7 cm per side 7 x 7 = 49
6	9	What is the quotient of 45 and 5? **45/5=9**
7	750	Walker multiplied 50 times 25. What number does he need to add to that product to get a total of two thousand? **50*25 = 1250** **1250+750=2000**

8	36 [flower pots]	A rectangular backyard patio is 10 meters long and 8 meters wide. Flower pots are placed around the pool, 1 meter apart center to center, including a flower pot in each corner. How many total flower pots are needed? **9 on each long side, 7 on each short side and 4 in the corners** **9*2+7*2+4=36**
9	7	Replace the word "blank" in the following statement with the largest possible positive whole number that makes the statement true: "blank" times 3 is less than 23. **7 * 3 = 21 < 23** **8 * 3 = 24 > 23**
10	53 [drumsticks]	Mr. Edwards had drumsticks to give out to his music class of 23 students. After giving each student 2 drumsticks, he had 7 left. How many drumsticks did Mr. Edwards have to begin with? **23*2+7 = 53**