"Math is Cool" Championships -- 2021-22

5th Grade

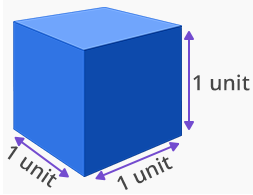
Mental Math Solutions

	Answer	Solution
1	900 [cartons]	Jackson stacks 200 cartons an hour. If he stacks cartons for 4 and one-half hours, how many cartons has he stacked? 200*4.5 = 900
2	15 [students]	If 5% of the 300 students at Springfield Elementary School are on the math team, how many students are on the math team? 1% of 300 = 3, therefore 5% = 15
3	64 [square feet]	If the perimeter of a square is 32 feet, what is the area of the square in square feet? 32/4=8 feet side length, 8*8=64 square feet area
4	7	What number is half-way between 3 and 11 on a number line? (3+11)/2
5	16	What is the next number in the geometric series that begins: $\frac{1}{2}$, 1, 2, 4, 8, …? Multiply by 2 each time, 8*2 = 16
6	36	If three fourths of my number is 27, what is my number? 27*4/3=36
7	8 [coins]	Seth has 7 quarters and his friend Gage has some dimes and nickels. What is the least number of coins that Gage must have for them to have at least $2.50 (two dollars and fifty cents) in total? 7 quarters = $1.75. If Gage has 8 dimes they will have $1.75 + 0.80 = $2.55. Or, if Gage has 7 dimes and 1 nickel they will have $1.75 + 0.75 = $2.50.
8	5 [integers]	How many 2-digit positive integers have digits that differ by 7? 70, 81, 92, 18, 29

"Math is Cool" Championships -- 2021-22

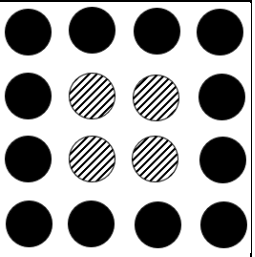
5th Grade

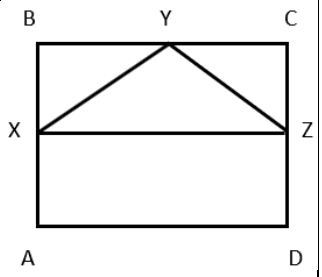
Individual Test Solutions

	Answer	Solution
1	11	Evaluate: 2 + 4 – 1 + 11 – 5 **Add and subtract.**
2	6	What digit is in the hundredths place of this number: 395.261 **Hundredths is the second place to the right of the decimal.**
3	44 [sq cm]	What is the area, in square centimeters, of a rectangle with side lengths 4 cm and 11 cm? **4*11 = 44**
4	7	How many integers between 20 and 40 are divisible by 3? **21, 24, 27, 30, 33, 36, 39**
5	2	What is the remainder when 2022 is divided by 5? **2022 / 5 = 404 r 2**
6	42 [$]	Each day, Pratyay spends $6.00 on boba tea. How much money will Pratyay spend on boba tea in one week, in dollars? **6 * 7 = 42**
7	82 [minutes]	Niki wakes up at 7:30 am to start getting ready for school. She finishes getting ready at 8:52 a.m. How long does it take for Niki to get ready, in minutes? **82 min = 1 hr 22 min** **7:30 + 1 hr 22 min → 8:52**
8	8 [cubes]	What is the fewest number of these unit cubes that you would need to put together to make a larger solid cube composed of unit cubes?  **Eight unit cubes to make a 2x2x2 cube**
9	112 [cups]	How many cups are in seven gallons? **16 * 7 = 112**

10	15,600 [words]	Hannah can type 130 words in one minute. Assuming she types continually at this rate, how many words can she type in 2 hours? **130 * 60 * 2 = 15600**
11	69	Evaluate the expression: 17x + 18 when x = 3. **17 * 3 + 18 = 69**
12	21 [coins]	In her piggy bank, Anvita has two dollars worth of quarters, 40 cents worth of nickels, and five pennies. How many total coins does she have in her piggy bank? **8 quarters, 8 nickels, 5 pennies**
13	4	What is the median of the following set of numbers? {1, 11, 4, 3, 11} **Put in order: {1, 3, 4, 11, 11}**
14	31	Find the next number in the sequence: 1, 5, 10, 16, 23, ___ **Pattern is: +4, +5, +6, …**
15	343	What is 7 cubed? **7x7x7**
16	13 [inches]	Pinocchio's nose is four inches long. Every time he tells a lie it doubles in length. Every time he does a good deed it shrinks by 3 inches. How many inches long is his nose after telling two lies in a row followed by doing one good deed? **4x2 = 8** **8x2 = 16** **16-3 = 13**
17	30 [%]	Out of 10 students on a math team, three students are randomly chosen to present their team award to the principal. What is the probability, in percent, that Jackson will be one of the three team members who is selected? **3 ways to be selected out of 10, 3/10 * 100 = 30%**
18	89	Packard takes three tests and receives scores of 82, 97, and 88. What is the mean of Packard's three test scores? **(82 + 97 + 88) / 3 = 89**

19	54 [sq units]	The side lengths of a right triangle are 9 units, 12 units, and 15 units. What is the area of the triangle in square units? **9 * 12 * ½ = 54**
20	14	If the following numbers are arranged from smallest to biggest, what number is in the middle? 1, 49, 36, 13, 27.4, 14, $\frac{5}{2}$ **1, 5/2, 13, 14, 27.4, 36, 49**
21	267 [feet]	How many feet are there in 89 yards? **89*3=267**
22	16 [whole wheat bagels]	Jade is supplying her homemade bagels to a local restaurant. Of the 96 total bagels, half of them are poppy-seed, a third of them are pumpkin spice, and the rest of them are whole wheat. How many whole wheat bagels are there? **96/2 = 48 poppy-seed** **96/3 = 32 pumpkin spice** **96-48-32=16 whole wheat**
23	3 [=A+B]	Hanyi rolls a single 6-sided die. The probability that the number showing on the die is less than 4 can be written as a reduced common fraction with the form A/B. What is A + B? **3/6 = ½**
24	6 [digits]	How many of the digits 0 through 9 will make this a true statement, if the question mark is replaced with a single digit in the following number statement? $5{,}435{,}746 > 5{,}43?{,}046$ **If you replace the ? with the digits 0 through 5, the statement will be true.**
25	1080 [twips]	If 20 twips make a point, 6 points make a poppyseed, and 4 poppyseeds make a barleycorn, how many twips do I need to make one barleycorn and 5 poppyseeds? **4*6*20*2+6*20**
26	4000 [gallons]	A swimming pool contains 20,000 gallons of water. On Monday, 40% of the water is drained out. On Tuesday, 2/3 of the remaining water is drained out. How many gallons of water are left in the pool? **20000*0.6=12000 gallons left after Monday.** **12000*1/3=4000 gallons left after Tuesday.**

27	11 [=A+B]	Violet has a bag containing 5 red jellybeans, 3 orange jellybeans and 2 blue jellybeans. She reaches in and randomly selects one jellybean. Without replacing the first jellybean, she reaches in again and randomly selects another jellybean. The probability that both of the jellybeans she selected are red can be written as a reduced common fraction A/B. What is A + B? **(5/10)*(4/9) = 2/9**
28	137 [degrees]	In degrees, what is the sum of the other two angles in a triangle that contains a 43 degree angle? 180 – 43 = 137
29	24 [feet]	A 60 foot board is cut into two pieces. One piece is 12 feet longer than the other piece. How many feet long is the shorter piece? x + (x + 12) = 60 x = 24 Or, use trial and error.
30	7 [hours]	Mario and Toad are racing towards each other on a straight road. Mario is going 7 mph, and Toad is going 4 mph. If they started at a distance of 77 miles apart, how many hours will it take until they meet? Closing speed is 11 mph. 77 miles/11 mph = 7 hours
31	20 [dots]	This square array contains 16 dots arranged in 4 rows and 4 columns, with the solid colored dots on the outside edges of the array. If you use 36 dots to form a square array, how many dots will be on the outside edges of the array?  **36 dots would equal a 6x6 array, with 4 dots in the corners, and an additional 4 dots on each edge. 4x4 + 4 = 20 dots.**
32	48	The 5th term of an arithmetic sequence is 18, and the 9th term is 30. What is the 15th term of the sequence? The common difference is 3. Add 3 six more times, 30 + 18 = 48.

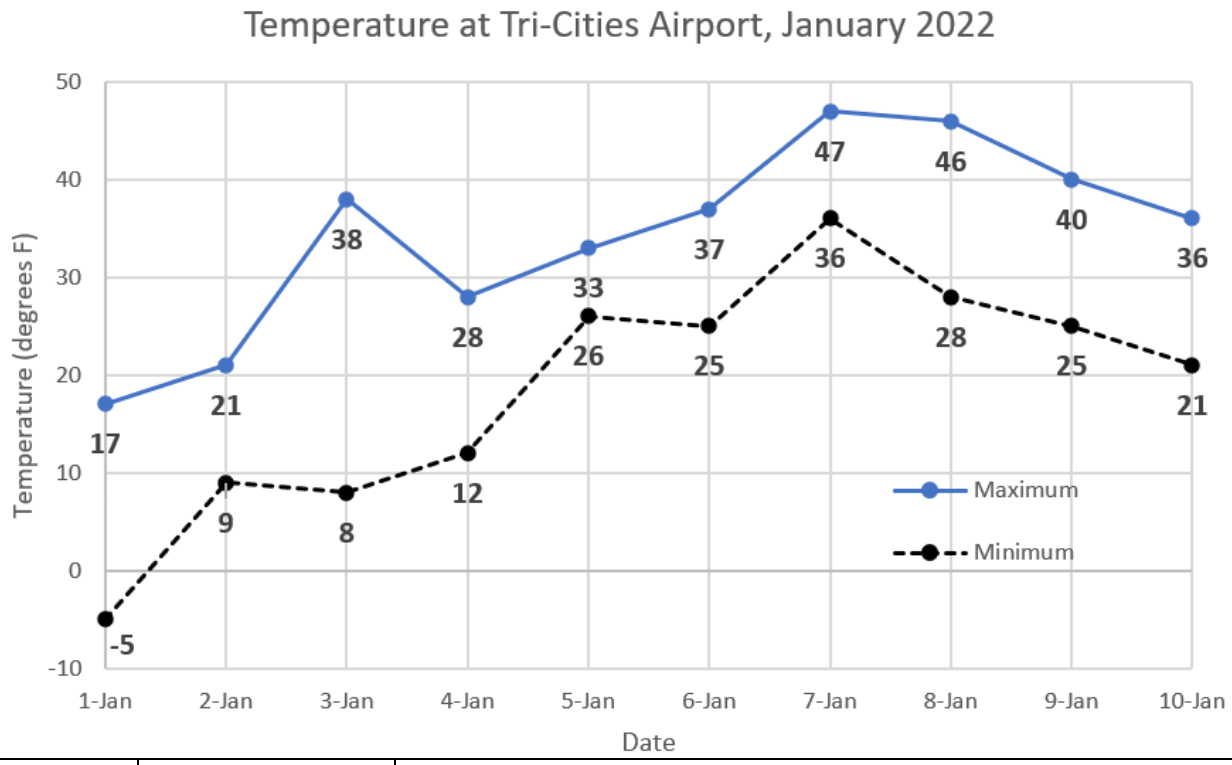
33	72 [numbers]	A standard six-sided die is rolled three times and the results are recorded in order to create a three-digit number. How many different numbers greater than 500 can be created? The first roll must be a 5 or 6. The second roll can be any number 1-6. 2x6x6 = 72
34	9 [cm^2]	ABCD is a rectangle with area of 36 square cm. Points X, Y and Z are midpoints of the sides on which they are located. What is the area of triangle XZY in square cm?  Line XZ splits the rectangle in half, so each half rectangle has area 36/2 = 18. Since Y is the midpoint, triangle XYZ will be half the area of the upper rectangle, or 18/2 = 9.
35	351 [conversations]	Angela's classmates talk a lot. If she has 26 classmates in addition to herself, and each classmate including Angela talks to each other classmate one time, how many total conversations will occur? **n(n-1)/2 = 27*26/2 =351**
36	12 [=A+B+C]	Each letter in the multiplication problem shown here represents a different digit. What is the value of A + B + C? 345 x 3 = 1035 3+4+5 = 12 **ABC** **x A** **10AC**
37	120 [bags]	Mr. Gooddad brought home a Costco-sized box of Goldfish crackers, packaged in individual serving bags. Over the weekend, his five kids together ate 2/3 of the bags of Goldfish. On Monday, his kids ate ½ of the remaining number of bags of Goldfish. On Tuesday, each of his five kids put 3 bags of Goldfish into their lunch boxes and told Mr. Gooddad that he could have the rest. There were five bags of Goldfish left for Mr. Gooddad. How many bags were there initially, before any of them were eaten? **Work backwards. There are 5 left. On Tuesday the kids took 5x3 = 15 bags, so 5+15 = 20. On Monday, they ate half of them, so 20x2 = 40. Over the weekend they ate 2/3, so 40 bags is 1/3. 40x3 = 120.**

38	24 [cm]	A regular polygon has interior angles measuring 135 degrees, and a side length of 3 cm. What is the perimeter of the polygon, in centimeters? A regular octagon has interior angles of 135°. 3x8 = 24
39	5	What is the units digit of $(1 + 2 + 3 + \ldots + 29 + 30)^2$? The sum of the integers 1 through 30 is (30)(31)/2 = 15*31 which ends in a 5. That number squared will also end in a 5.
40	985	Ishaan's favorite number has 3 digits. One digit is a prime number, one digit is a square number, and the third digit is neither prime nor square. Ishaan's favorite number is not divisible by 3. What is the greatest possible value of Ishaan's favorite number? 9 is square, 8 is neither, 7 is prime, but 987 is divisible by 3. The next largest value is 985, where 5 is prime.

"Math is Cool" Championships -- 2021-22

5th Grade

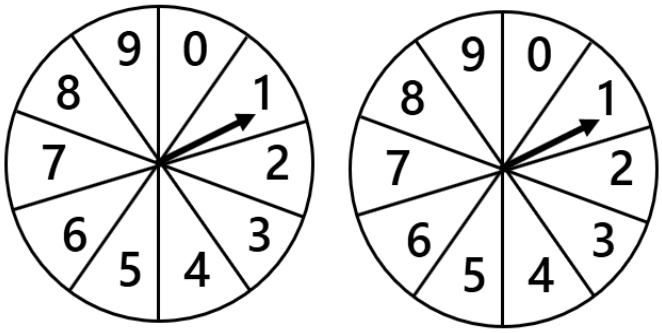
Multiple Choice Solutions

	Answer	Solution
USE THE FOLLOWING GRAPH TO SOLVE PROBLEMS #1 THROUGH #3. The graph shows the daily temperatures in degrees Fahrenheit recorded at the Tri-Cities WA Airport weather station from January 1, 2022 through January 10, 2022. There are two values shown for each day, the maximum temperature, and the minimum temperature. Each data value in degrees Fahrenheit is indicated below the dot on the graph.  		
1	*C*	How many degrees Fahrenheit did the temperature rise on January 1, 2022, from the minimum temperature to the maximum temperature? A) 5 °F B) 17 °F C) 22 °F D) 27 °F E) Answer not given. **It rose from -5 to 17, an increase of 22 degrees.**

2	D	What percent of the days shown in the graph had a maximum temperature greater than the freezing level of 32 degrees Fahrenheit? A) 10 % B) 20 % C) 60 % D) 70 % E) Answer not given. **Seven of the 10 days had a maximum temperature greater than 32. 7/10 = 70%.**
3	B	What was the percent increase in the maximum temperature from January 6th to January 7th? Round your answer to the nearest percent. A) 21 % B) 27 % C) 37 % D) 39 % E) Answer not given. **Percent increase = (new value – old value)/old value * 100** **(47 – 37)/37 = 10/37 = 27%**

USE THE FOLLOWING INFORMATION FOR QUESTIONS 4 THROUGH 7.

There are two circular spinners shown here, each of which has sections numbered 0 through 9, where the circle has been divided equally into 10 sections. Each spinner will be spun once, and the indicator arrow will randomly land on one section of the circle for each spinner. The two numbers showing on each spinner will be added to find the sum of the two values. For example, the sum shown on these two spinners is 1 + 1 = 2.



4	C	What is the maximum sum possible when the two spinners are spun and the two numbers are added? A) 10 B) 16 C) 18 D) 20 E) Answer not given. **If each spinner lands on 9, 9+9 = 18**

5	B	How many distinct (different) sums are possible when the two spinners are spun, and their numbers are added? For example, the spinners in the figure have a sum of 2, which is one possible sum. A) 18 B) 19 C) 20 D) 21 E) Answer not given. **Possible sums are 0 through 18, which is a total of 19 values.**
6	A	Out of the possible sums that can occur when the two spinners are spun, and the resulting numbers are added, which sum is most likely to occur? A) 9 B) 10 C) 11 D) 12 E) Answer not given. **There are 100 total outcomes for the sums, if you make a 10x10 table of the possible values. Out of those, 10 of the outcomes have a sum of 9, which is the most frequent result.**
7	D	When both spinners are spun, and the resulting numbers are added, what is the probability of getting a sum of 2? A) 0 % B) 2% C) 2.5% D) 3% E) Answer not given. **There are three ways to get a sum of 2: 0/2, 2/0, or 1/1. There are 100 total outcomes. 3/100 = 3%.**
USE THE FOLLOWING INFORMATION FOR QUESTIONS 8 THROUGH 10. The standard unit of liquid measurement in the metric system is the liter. In many countries of the world, liquids such as milk and juice are sold in liter containers. There are 1000 cubic centimeters in a liter. Therefore, a cubic carton that is 10 cm tall, 10 cm wide and 10 cm deep would hold a volume of 1000 cubic centimeters or 1 liter of liquid.		
8	D	Consuela buys 2 liters of orange juice and 3 liters of whole milk. How many total cubic centimeters of liquid has she purchased? A) 5 B) 50 C) 500 D) 5000 E) Answer not given. **Total = 5 liters. 1 liter = 1000 cubic centimeters, therefore 5 liters = 5000 cubic centimeters.**

9	**A**	For a carton that has dimensions 10 cm tall, 10 cm wide and 10 cm deep, what is the total surface area of the carton in centimeters squared? A) 600 cm^2 B) 1000 cm^2 C) 1200 cm^2 D) 2000 cm^2 E) Answer not given. **There are 6 sides. Each side has surface area 10x10 = 100 cm^2. 6x100 = 600 cm^2 total surface area.**
10	C	Which of the following carton dimensions will also result in a total volume of 1 liter? A) 5 cm long, 4 cm wide, 25 cm tall B) 1 cm long, 2 cm wide, 100 cm tall C) 4 cm long, 5 cm wide, 50 cm tall D) 2 cm long, 5 cm wide, 50 cm tall E) Answer not given. **The product of the 3 dimensions must equal 1000 cm^3. 4x5x50 = 1000 cm^3.**

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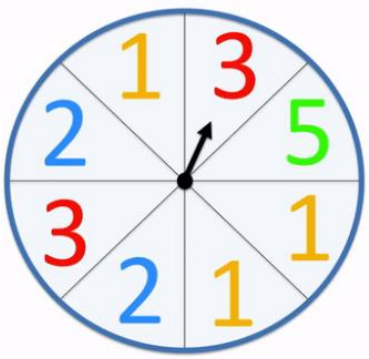
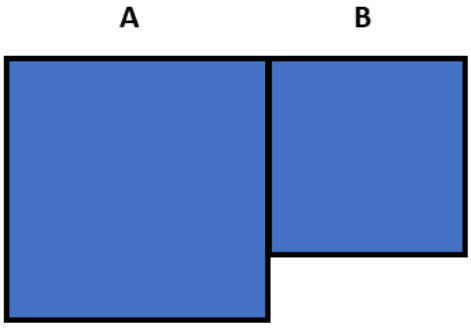
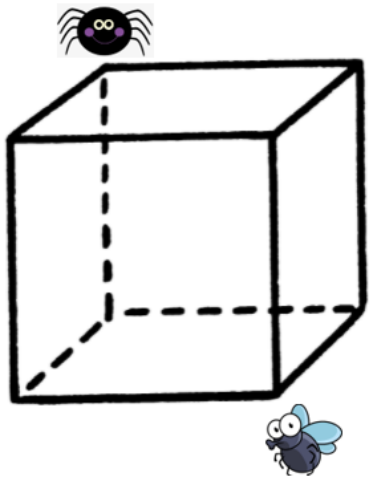
5th Grade

Team Test Solutions

	Answer	Solution
1	20 [questions]	Aditya can review one math question in 30 seconds. How many questions can he review in 10 minutes? **2 questions per minute * 10 minutes**
2	25 [%]	The number spinner shown here is separated into eight sections of equal size. When the spinner is spun one time, what is the probability as a percent that it will land on a section containing the number 2? **There are two sections containing the number 2, which equals $\frac{1}{4}$ of the circle, or 25%.** 
3	12000 [lbs]	Gregg sold three loads of hay that weighed 4025 pounds, 3800 pounds and 4175 pounds, respectively. How many total pounds of hay did Gregg sell? **4025 + 3800 + 4175 = 12000 lbs**
4	22 [units]	Square A has a side length of 4 units, and Square B has a side length of 3 units. After the squares have been glued together as shown to form a straight line across the top of the new figure, with no overlap of the squares, how many units is the perimeter of the new figure?  **4+4+4+1+3+3+3 = 22**
5	98	What is the largest 2-digit positive integer that is divisible by 7? **98/7 = 14**

6	100	A number pattern begins as shown in the figure and continues in the same manner for each row. What is the sum of the numbers in Row 10 of the pattern? **Row 1** 1 **Row 2** 1 2 1 **Row 3** 1 2 3 2 1 **Row 4** 1 2 3 4 3 2 1 **Row 10 will contain: 1,2,…,9,10,9,…,2,1**
7	6 [paths]	Spidey the spider is located on one corner of a cube. He wants to travel to the opposite corner of the cube, to have lunch with his friend Fly McFly. He can only walk along the edges of the cube. He will walk along exactly three edges of the cube to get there. How many different paths can Spidey take on his journey to meet up with Fly?  **He can go down first, then either left or right (2 paths). He can go left first, then either down or across (2 paths). He can go right first, then either down or across (2 paths).**
8	58	Consecutive numbers are whole numbers that follow in order such as 7, 8, 9. Find the three consecutive numbers such that the sum of the first and third number is 118. What is the smallest of the three numbers? **118/2 = 59, therefore the three numbers are 58, 59, 60.**
9	10 [minutes]	Eleanor can mow 600 square yards of grass in 1 $\frac{1}{2}$ hours. Working at this same rate, how many minutes would it take her to mow 600 square feet of grass? **600 sq. yards/1.5 hours = 540 sq. feet/90 minutes = 60 sq. feet/1 minute** **Therefore it will take 10 minutes to mow 60*10 = 600 sq. feet**

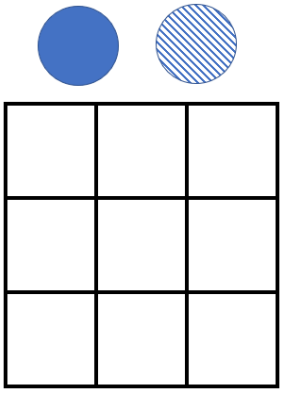
10	24	Nathan is performing calculations on his calculator, but he doesn't know that it is broken. If the digit in the tens place of the output is odd, the calculator will replace it with a "6" For example, 6 + 9 = 15, but when he does this calculation on his calculator, it will output a 65, because it replaces the '1' with a '6'. Suppose Nathan adds two numbers AB and C on his calculator. A and C can represent any digit from 1 – 9, and B can be any digit from 0 - 9. If the calculator outputs "66", what is the largest possible sum of A, B, and C? **You could do this in a number of different ways, but here's one way:** **A=8, B=9, C=7** **89+7=96, but since 9 is odd, the calculator will show 66, and 8+9+7=24**

"Math is Cool" Championships -- 2021-22

5th Grade

Linda Moore Triple Jump Solutions

	Answer	Solution
1	8 [sticks]	If 89 sticks of gum are divided equally among 9 people, how many sticks of gum will be left over? **89/9 = 9r8**
2	63 [inches]	Yulia was 4 feet 7 inches tall at the beginning of 5th grade. She grew 2 inches per year for the next four years, until she reached her current height. How many inches tall is she now? **4 feet = 48 inches + 7, so she started at 55 inches, then grew 8 more: 55 + 8 = 63.**
3	6 [mph]	Samvedha can walk one mile in 10 minutes. What is Samvedha's walking speed in miles per hour? **One mile in 10 minutes means six miles in 1 hour. Speed = 6 miles/hour**
4	95 [%]	Descartes Elementary School has 600 students. Out of these students, 30 of them are left-handed. The remaining students are right-handed. What percent of the students are right-handed? **10% of 600 is 60, so 5% of the students are left-handed.**
5	31	An infinite sequence of numbers begins as follows: 1, 4, 3, 6, 5, 8, 7, … What is the sum of the next three numbers in the sequence? **The pattern is: +3, -1 Therefore, the next three numbers will be: 10, 9, 12. 10+9+12 = 31**
6	20 [%]	Greta has a bag of gumdrops. There are 12 green gumdrops, 6 red gumdrops, 4 yellow gumdrops and 8 blue gumdrops. If she reaches into the bag and randomly selects one gumdrop, what is the probability in percent that she will get a red gumdrop? **30 gumdrops total. 6/30 = 0.2 * 100 = 20%**

7	3 [square units]	A rectangle, which is not a square, has a perimeter of 8 units. If its side lengths are whole numbers, what is its area, in square units? **The side lengths must be 1 and 3, to give a perimeter of 8. Side lengths of 2 and 2 are not possible, because that forms a square. Therefore the area is 3x1 = 3.**
8	18 [ways]	You have a gameboard consisting of nine squares, as shown here. Along with the board there are two discs, one solid and one striped. Each disc must be placed in its own square on the gameboard. How many different ways are there to place them in squares so that the striped disc is in the row right above the row containing the solid disc (but not necessarily in the same column)?  **The solid disc can be in 3 locations in rows 2 or 3, so 6 total. For each of those, the striped disc can be in 3 locations in the row above. 6x3 = 18.**
9	130	Biff counts by 2s from 98 down to 0, and Eho counts by 5s from 0 up to 245. They start at the same time, with Biff saying '98' and Eho saying '0', and continue to say one number at exactly the same time. When Biff says '46', what number does Eho say? **It takes 26 steps of 2 to get from 98 to 46. Therefore, 26 steps of 5 = 26*5 = 130.**
10	7 [sweet tooth combo packs]	Lily sells fresh baked goods at the local farmer's market to earn money for college. She sells two different kinds of "combo packs". The "Sweet Tooth Combo Pack" includes 5 cookies and 1 pie. The "Family Size Combo Pack" includes 6 cookies and 2 pies. On Monday, she sold a total of 11 "combo packs", and nothing else. In total, she sold 59 cookies and 15 pies. How many "Sweet Tooth" combo packs did she sell on Monday? $S + F = 11$ $S + 2F = 15$ ➔ $F = 4, S = 7$

"Math is Cool" Championships -- 2021-22

5th Grade

College Bowl Round #1 Solutions

	Answer	Solution
1	2	What is the remainder when ninety-two is divided by five? **92/5 = 18r2**
2	152 [photos]	On a four-day trip, Diane and Mindy together took four hundred and fifty-six photos. If Diane took exactly one-third of the photos, how many photos did Diane take? **456/3 = 152**
3	[A =] 36	A circle has a diameter of 12 centimeters. The area of this circle is A times pi square centimeters. What is the value of A? **$A = 6^2\pi = 36\pi$, so A = 36**
4	4 [miles]	Gregg's dog runs away from home at an average rate of three miles per hour. If he runs away from the house in a straight line for 80 minutes before he stops, how many miles away from the house has he traveled? **3 miles per hour = 1 mile per 20 minutes** **80/20 = 4 miles**
5	1800 [seconds]	How many seconds are there in one-half hour? **60 seconds/minute * 30 minutes**
6	4 [$]	Juan had $5.00 when he entered a toy store. He spent 20% of his money on a toy truck and had exactly enough money left to buy a toy car. How much did he spend on the toy car in dollars? **10% of 5 is 0.5, therefore 80% = 4**
7	7 [q=]	Solve for q in the following equation: 7q – 31 = 18 (seven times q minus thirty-one equals 18) **7q = 49, q = 7**

8	11 [marbles]	A bag contains 3 red marbles, 6 blue marbles and 4 green marbles. Without looking in the bag, what is the least number of marbles that Sanjay needs to take out in order to ensure that he has at least 1 red marble? **Worst case, he gets all of the blue and green marbles first. Then the 11^{th} marbles will definitely be red.**
9	64 [cm]	What is the perimeter in centimeters of a regular octagon with side length 8 centimeters? **8x8 = 64**
10	8	Evaluate: twelve plus seven minus eleven. **12 + 7 + -11 = 19 – 11 = 8**

"Math is Cool" Championships -- 2021-22

5th grade

College Bowl Round #2 Solutions

	Answer	Solution
1	5 [slices]	If ten pizzas are shared equally among twelve people, and each pizza has 6 slices, how many slices does each person get? **10*6/12 = 5**
2	15 [minutes]	It takes Lizzy one hour to travel 60 miles. How many minutes does it take Lizzy to travel 15 miles? **60 miles/hour = 60 miles/60 minutes = 1 mile/minute**
3	10	What is the mean of the first four positive multiples of four? **The first 4 multiples of 4 are: 4,8,12,16** **The mean will be 40/4 = 10**
4	8 [units]	The area of a square is 36 square units. If an equilateral triangle has the same perimeter as the square, what is the side length in units of the equilateral triangle? **Side length of square = 6, so perimeter is 6*4 = 24. Side length of triangle = 24/3 = 8.**
5	5 [$]	If one newspaper and two comic books cost $8 together, and two newspapers and one comic book cost $7 together, how much does one newspaper and one comic book cost together, in dollars? **N + 2C = 8** **2N + C = 7** **N = 2, C = 3**
6	500 [ft^3]	A road is ten feet wide, and the pavement is six inches deep. How many cubic feet of pavement are in a one-hundred-foot length of this road? **10*(1/2)*100 = 500**
7	20 [%]	A bag of gummy worms contains 3 yellow worms, 4 blue worms and 8 red worms. If one worm is randomly selected, what is the probability in percent of getting a yellow worm? **3/15 = 0.2 = 20%**

8	1350 [$]	One Algebra book costs $45. Each carton contains 6 Algebra books. If there are 5 cartons of Algebra books, what is the total cost of these books in dollars? **45x6x5 = 1350**
9	19	In the arithmetic sequence that begins: 1, 4, 7, 10, … what is the value of the 7^{th} term? **+3 each term**
10	32 [Pop-Tarts]	Fiona has seven boxes of Pop-Tarts, each of which contain eight Pop-Tarts. If she gives away three of the boxes, how many Pop-Tarts does she have left? **(7 – 3)*8 = 32**

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College Bowl Round #3 Solutions

	Answer	Solution
1	185	What is the sum of eight squared and eleven squared? **$8^2 + 11^2 = 65 + 121 = 185$**
2	24 [square feet]	A cube has a side length of 2 feet. What is the total surface area of the cube in square feet? **Each side area is $2x2 = 4$ ft^2 x 6 sides = 24**
3	195 [minutes]	Alice's cat sleeps from two-thirty PM to five-forty-five PM on Monday. How many minutes does Alice's cat sleep during this time? **3 hours + 15 minutes**
4	83	The hit video game Among Them received a review score of eighty-four from Metacritic, seventy-five from Rotten Tomatoes, and ninety from IGN. What is the mean review score of the video game from these three sources? **$(84 + 75 + 90)/3 = 83$**
5	36 [boys]	The ratio of boys to girls in an after school club is 4:5. If there are 45 girls in the club, how many boys are there in the club? **4b/5g = ?b/45g** **45*4/5 = 36**
6	42 [$]	At Sam's Spaghetti Store, the employees get a discount of thirty percent. If Samantha, who is an employee, wants to buy three cartons of spaghetti that usually cost 20 dollars each, how much will she have to pay in dollars after her discount is applied? **20*3 = $60** **10% = $6, 30% = $18** **60 – 18 = 42**
7	7 [squares]	There are ten squares in a bar of chocolate. If each person in a group of three people gets a different whole number of squares, what is the maximum number of squares any one person could get? **1 + 2 + 7 = 10**

8	210	What is the product of all positive prime numbers less than ten? **2*3*5*7 = 210**
9	240 [minutes]	The Math is Cool problem writing team has four hours left to write the questions before the contest begins. How many minutes does the team have left? **4*60 = 240**
10	81	What is the sum of the first nine odd counting numbers? **1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 = 81, or 9^2 = 81**

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College Bowl Round #4 Solutions

	Answer	Solution
1	9	How many zeros are in the number thirty-four billion? **34,000,000,000**
2	45 [pumpkins]	Mrs. Casto's kindergarten class goes to a pumpkin patch. PJ notices that 15% of the pumpkins are rotten. How many pumpkins are rotten if there are 300 total pumpkins? **10% = 30, 5% = 15, 15% = 45**
3	15 [months]	My pet dog Hershey is three-fourths of a year plus 6 months old. How many months old is my pet dog Hershey? **¾ of a year = 9 months** **9+6 = 15**
4	360	How many ways are there to order the letters in the word 'School', spelled S-C-H-O-O-L? **6!/2!**
5	7 [hours]	Over the past 7 nights, Nathan slept for 8, 7, 8, 5, 6, 7, and 9 hours each night. What was the MEDIAN number of hours that Nathan slept over the past 7 nights? **5, 6, 7, 7, 8, 8, 9** **7 is in the middle**
6	70 [outfits]	Gilbert has five t-shirts, seven pairs of pants, and two pairs of shoes. If one outfit consists of one t-shirt, one pair of pants, and one pair of shoes, how many different outfits can Gilbert make? **5*7*2 = 70**
7	8 [hours]	Webster the cat sleeps for two-thirds of the day, where a day is 24 hours. Webster spends one-half of his sleeping time in the living room. How many hours per day does Webster spend sleeping in the living room? **(2/3)*24 = 16 hours sleeping** **(1/2)*16 = 8 hours sleeping in living room**

8	37 [degrees]	What is the measure in degrees of the angle that is complementary to an angle with a measure of 53 degrees? **90 – 53 = 37**
9	70 [years]	Grandpa Shark is twice as old as Mommy Shark. Mommy Shark is three times as old as Baby Shark. If Mommy Shark is 30 years old, what is the sum of Grandpa Shark and Baby Shark's ages in years? **Grandpa = 30*2 = 60** **Baby = 30/3 = 10** **60 + 10 = 70**
10	0	What is six times four times 10 times 7 times 2 times 0 times 3 divided by 4? **Anything times 0 = 0**

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College Bowl Round #5 Solutions

	Answer	Solution
1	9 [odd numbers]	How many odd integers are between eight and twenty-six? **9, 11, 13, 15, 17, 19, 21, 23, 25 makes 9 odd numbers**
2	326	The sum of two numbers is six hundred and forty-seven. If one of the numbers is three hundred and twenty-one, what is the other number? **647 – 321 = 326**
3	5	What is the next number in this sequence? 30, 29, 26, 21, 14, … **Pattern is: -1, -3, -5, -7, -9, …**
4	[A + B =] 13	One marble is chosen at random from a bag that has three red and five blue marbles. As a common reduced fraction, the probability that a red marble is NOT chosen equals A over B. What is the value of A plus B? **P(NOT red) = 5/8**
5	125 [cm]	A square has a perimeter of one hundred centimeters. What is the number of centimeters in the perimeter of a regular pentagon with the same side length as the square? **100/4 = 25** **25*5 = 125**
6	6 [coins]	Alice has exactly fifty cents. What is the smallest number of coins she could have, assuming she does not have any quarters, and she has more than one type of coin? **4 dimes, 2 nickels**
7	83	If 'x' equals the number of days in the month of June, then what is three times 'x' (pause) minus 7? **3*30 – 7 = 83**
8	65	What is the Least Common Multiple of 5 and 13? **They are both prime, so LCM = 5x13**

9	25 [seconds]	Henry the cat loves roasted chicken. When he smells roasted chicken, he runs toward it at a rate of 4 meters per second. If Henry smells chicken, and the chicken is 100 meters away, how many seconds will it take him to get to the chicken? **100 m / 4 m/s = 25 sec**
10	30	What is one-half of 60% of 100? **60% of 100 = 60** **(1/2)(60)=30**

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College Bowl Round #6 Solutions

	Answer	Solution
1	5	What is the product of fifteen and one-third? **15* 1/3 = 5**
2	276 [hours]	Micah plays Minecraft all ninety-two days of summer for three hours each day. How many hours of Minecraft does he play throughout the summer? **92*3 = 276**
3	102	What is the range of the following set of numbers: {31, 22, 99, 58, 124} **124 – 22 = 102**
4	18 [gloves]	There are 8 green gloves, 3 yellow gloves, 5 blue gloves and 4 grey gloves in a box. If the gloves are pulled out of the box randomly one at a time, what is the least number of gloves that need to be pulled out to guarantee that at least two grey gloves have been pulled out? **Worst case: pull out 8 green, 3 yellow, 5 blue, then 2 grey.** **8+3+5+2 = 18.**
5	18 [ways]	Brayden wants to arrange the letters in the word NOPE, spelled N-O-P-E. However, he doesn't like words that start with the letter E. In how many ways can he arrange the letters N-O-P-E so that the letter E does not come first? **Total ways = 4! = 24** **Ways that start with E = 3! = 6** **Ways without starting with E = 24 – 6 = 18**
6	76 [eggs]	There are six chickens in a chicken coop. Every day, one-third of the chickens each lay ten eggs, and the remaining chickens each lay 14 eggs. How many total eggs do the six chickens lay in one day? **1/3 of 6 = 2. 2*10 = 20** **4*14 = 56** **20+56 = 76**

7	987	What is the largest three digit integer that does not have any repeated digits? **No way to get another 3-digit number larger without repeating digits.**
8	125 [inches]	If a tree is 2 yards, 4 feet and 5 inches tall, how tall is the tree in inches? **2 yds * 36 inches/yd + 4 ft * 12 inches/ft + 5 = 125**
9	16 [days]	Alice's cat eats one cup of food each day. How many days would it take Alice's cat to eat a gallon of food? **16 cups in a gallon, 16 days.**
10	70 [dimes]	How many dimes have the same value as twenty-eight quarters? **28 quarters = $7** **$1 = 10 dimes, $7 = 70 dimes**

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College Bowl EXTRA

	Answer	Solution
1	6 [cards]	Joe has 23 cards. After he gives some away, he only has 17 cards left. How many cards did he give away? **23 – 17 = 6**
2	26	The number seven and two-thirds can be expressed as an improper fraction A over B. What is A + B? **7 2/3 = 23/3** **23+3=26**
3	4 [feet]	A triangle has two sides of length 8 feet and 11 feet. The length of the third side is a counting number when measured in feet. What is the shortest length, in feet, that the third side could be? **Triangle inequality, it can't be 3 feet because 8+3 = 11, therefore it must be 4 feet.**
4	20 [%]	What is the probability in percent of drawing one white marble from a bag that contains 16 black marbles and 4 white marbles? **4/20 = 1/5 = 20%**
5	9 [balloons]	If it takes 13 seconds to fill a balloon with helium, how many balloons can be completely filled in 2 minutes? **2 minutes = 120 sec** **120/13 = 9 r 3, therefore only 9 balloons can be completely filled.**
6	101	A palindrome is a number whose digits read the same forwards and backwards. What is the smallest three digit palindrome? **Must start with 1, therefore must be 101.**