"Math is Cool" Championships -- 2024-25

4th grade

Mental Math Solutions

	Answer	Solution
1	9	What is one plus two plus six? 1 + 2 + 6 = 9
2	11	What is the fifth prime number? The first five prime numbers are as follows: 2, 3, 5, 7, 11
3	88 [keys]	A piano has thirty-six black keys and fifty-two white keys. How many total keys are on a piano? 36 + 52 = 88
4	20 [boys]	The ratio of boys to girls in a math class is two to one. If there are thirty total students in the class, how many are boys? (2/3)(30) = 20
5	24	What is twenty percent of one hundred twenty? (0.2)(120) = 24
6	5 [minutes]	How many minutes are in one third of one quarter of an hour? (1/3)(1/4)(60) = 5
7	30 [inches]	In inches, what is the perimeter of a right triangle with leg lengths five inches and twelve inches? This is a 5-12-13 triangle, and 5 + 12 + 13 = 30
8	120 [yards]	A football field consists of a playing area that is one hundred yards long with a thirty-foot long endzone on each end of the field. How many total yards long is a football field? 100 + (2)(30)/(3) = 120

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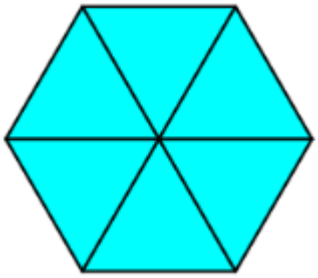
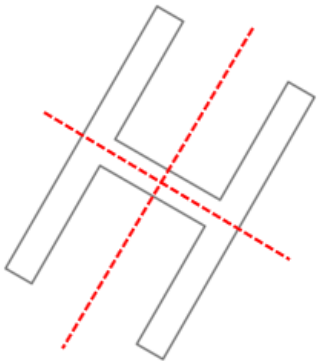
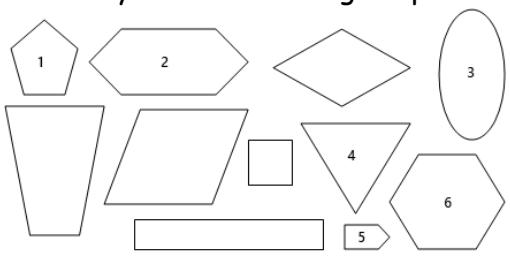
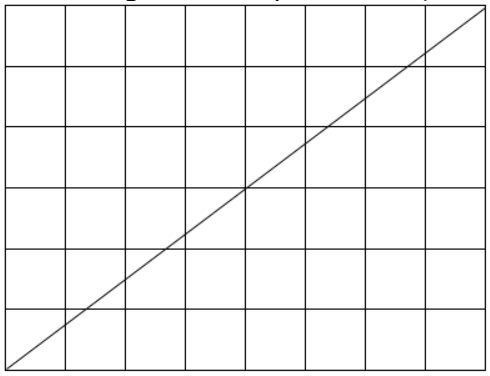
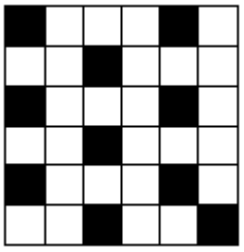
4th grade

Individual Test Solutions

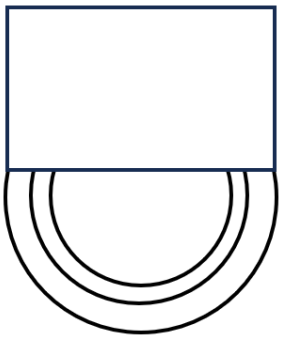
	Answer	Solution
1	66000	Round the following number to the nearest thousand: 65624 Round up to 66000
2	14	What is the 5th number in an arithmetic sequence that begins with 2, 5, 8, …? Pattern is +3 2, 5, 8, 11, 14
3	10 [combinations]	Kavya has 5 suits and 2 pairs of shoes. How many different combinations of 1 suit and 1 pair of shoes could she wear to a job interview? 5*2=10
4	67	Evaluate: $17 + (5 \times 10)$ 17 + 50 = 67
5	20	What is 10% of 200? (1/10)(200) = 20
6	6 [times]	A regular hexagon and an equilateral triangle have the same side length. How many times greater is the area of the hexagon than that of the triangle? 
7	8 [times]	How many times does the letter "f" appear in the following quote? "Finishing problems as soon as they find you is one of fifteen habits that can help a forgetful fellow."
8	18 [sq inches]	What is the area in square inches of a right triangle with leg lengths 3 inches and 12 inches? Since this is a right triangle, (1/2)(12)(3) = 18
9	131 [sq. inches]	A gameboard is made up of two non-overlapping squares that are connected at one edge, one with an area of 10 square inches, and another with a side length of 11 inches. What is the total area of the game board, in square inches? 11^2 + 10 = 131

10	30 [%]	Maddie randomly picks one of the following letters. What is the probability in percent that she picks a vowel? A, B, C, D, E, F, G, H, I, J 10 letters total, 3 are vowels. 3/10 = 30%
11	1101 [= mode]	What is the mode of the following set? {11, 10, 101, 1101, 1011, 1101, 1110, 111, 100} 1101 appears twice, more than any other number in the set
12	6 [numbers]	How many of the first 25 counting numbers are divisible by 4? 4, 8, 12, 16, 20, 24
13	2 [lines of symmetry]	How many lines of symmetry does the following shape have? 
14	130 [minutes]	Ella is driving down the highway. If she drives for 120 miles at a constant speed of 60 miles per hour, and stops in the middle for 10 minutes to get gas, how many total minutes did her trip take? It will take 2 hours = 120 minutes + 10 minute break = 130 minutes.
15	40 [boxes]	Aurora is collecting food donations for a holiday drive. Every box contains enough food for 6 people. What is the minimum number of full boxes needed for 237 people? 237/6 = 39.5, 39 is not enough, need 40 boxes.
16	3 [ways]	Zayn, Hank and Niko are all on the starting lineup of their basketball team. There are 3 other members on the team. In how many ways can the other 2 players on the starting lineup be chosen? Already have Z, H, N. Need 2 others out of the 3 remaining, call them A, B, C. AB, AC or BC
17	50 [years]	Nate is two years older than three times his daughter, Alora's, age. If Alora is 16 years old, how old is Nate, in years? 3(16)+2 = 50
18	7 [counting numbers]	How many counting numbers 'x' make the following inequality true? $1 < x < 9$ 2, 3, 4, 5, 6, 7, 8 all make it true, 7 total.

19	6 [are not quadrilaterals]	How many of the following shapes are not quadrilaterals? 
20	4 [are divisible by 8]	How many of the following numbers are divisible by 8? 8, 25, 100, 512, 24, 64, 802 8, 512, 24 and 64 are divisible by 8.
21	13 [$]	Rohit has $74 and Sahed has $100. How many dollars would Sahed need to give Rohit so that they both have the same amount of money? If Sahed gives Rohit $13, they will both have $87.
22	10 [inches]	What is the length in inches of the diagonal line in the following figure, given that the grid is composed of squares with side length 1 inch?  6^2 + 8^2 = 10^2
23	20 [ice cream orders]	Summer opens an ice cream stand. She offers 5 flavors, where customers have to get two scoops, each one a different flavor. She also has two choices of cones available. How many possible ice cream orders does Summer offer? The order of the scoops does not matter. 5C2 * 2 = 20
24	75 [%]	Juniper eats 1/8 of a pie, while Madeline eats 2/16 of it. What percentage of the pie is left after Juniper and Madeline have eaten their portions? 1/8 + 2/16 = 1/8 + 1/8 = 2/8 = ¼. They have eaten ¼ of the pie, so ¾, or 75% remains.
25	16 [more white squares]	In the grid of unit squares shown here, how many more white squares are there than black squares?  There are a total of 36 squares, 10 are black and 26 are white, 26 – 10 = 16 more white squares.
26	399	What is the value of $4^5 - 5^4$? 1024 – 625 = 399

27	6 [times]	Sahil has 4 keys and 4 locks in his desk drawer, and each key opens exactly one lock. What is the maximum number of times he must try a key in a lock in order to match all 4 keys to their locks? Assume he tries 3 keys in the first lock. If none of them work, the 4th key is a match, no need to try it. Try 2 keys in the second lock, if they don't work, the 3rd key is a match. Try 1 key in the third lock. A total of 6 tries.
28	11 [coins]	Using at least one each of pennies, nickels, dimes, and quarters, what is the fewest number of coins needed to equal the value of one dollar, using only pennies, nickels, dimes, and quarters? You are required to use 1 penny, 1 nickel, 1 dime, and 1 quarter, which is 41 cents. With two quarters, you have 91 cents. An additional 1 nickel and 4 pennies puts you at one dollar. In total, this is 11 coins.
29	1524 [cm]	There are 2.54 centimeters in 1 inch. How many centimeters are in 50 feet? 2.54 cm/in * 12 in/ft = 30.48 cm/ft * 50 feet = 1524
30	66795 [math problems]	On the day he was born, Ethan solved one math problem. On each following day, he solved one more math problem than he did the previous day. Assuming no leap years, how many math problems did he solve before he turned 1? 1+2+3+…+364+365 = (n)(n + 1)/2 (365)(366)/2 =66795
31	16	What comes next in the following sequence: 11, 34, 17, 52, 26, 13, 40, 20, 10, 5, … If a number is even, the next term is half the number, if a number is odd, the next term is one more than three times the number. 5*3 + 1 = 16
32	20 [%]	A random integer 'x' is picked from the following set. What is the probability that x% of 20 is an integer, as a percentage? {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} x has to be divisible by 5, and there are 2 integers from 1 to 10 that are divisible by 5. 2/10 = 20%
33	36 [shoes]	Liana has 5 identical pairs of red shoes, 12 identical pairs of white shoes, and 3 identical pairs of brown shoes. Each pair consists of one left shoe and one right shoe. If she takes individual shoes out of her shoe rack randomly and without replacement, how many shoes does she have to take out to be sure that she has taken out a pair of red shoes? 12+12+3+3+5+1 = 36 All of the white shoes (24), all of the brown shoes (6), and worst case scenario is that she gets 5 left or 5 right red shoes, then one more will give her a pair.

34	150 [minutes]	Alexander has to complete his math homework, his English homework, and his social studies homework all over one weekend, each of which will take two hours to do. On Saturday, he finishes half of his English homework, two-thirds of his math homework, and 70 minutes of his social studies homework. How many minutes of homework does he have to do on Sunday? English: 120 – (1/2)(120) = 60 Math: (1/3)(120) = 40 Social Studies: 120 – 70 = 50 40 + 50 + 60 = 150
35	-27	Two consecutive integers have a product greater than 100 but less than 200. What is the smallest possible sum of these two integers? -13*-14 = 182 -14*-15 = 210 So, -13 and -14 are the smallest numbers that satisfy the conditions, -13 + -14 = -27
36	39	The mean of three numbers is 20. If two of the numbers are 8 and 13, what is the third number? $20 \cdot 3 = 60$ and $60 - 8 - 13 = 39$
37	68 [°]	An isosceles triangle has at least one angle that measures 56 degrees. What is the largest possible angle, in degrees, that could be in the triangle? If 56 is a base angle, then the other base angle has to be **56**, and the vertex angle has to be **68**. If 56 is a vertex angle, then both base angles are **62**. The largest is 68.

38	48 [ways]	How many ways are there to color the following diagram choosing from red, blue, green and yellow, such that each section is colored a solid color, and no two neighboring sections have the same color? A neighboring section is one that shares a boundary with another section.  The rectangle cannot be the same color as any of the partial circles, and you can choose its color 4 ways. Then, you can choose the outer circle's color 3 ways, the middle circle's color 2 ways, and the inner circle's color 2 ways. 4*3*2*2 = 48
39	854917632	Garfield writes the words representing the integers 1 through 9 in alphabetical order. Then he replaces each word with the number it represents to form a 9-digit number. What is this 9-digit number? eight, five, four, nine, one, seven, six, three, two becomes 854917632

40	44	When a certain positive integer is divided by 24, the remainder of that division has a remainder of 2 when divided by 6. What is the sum of all possible values of this integer that are less than 25? The values that satisfy all the given conditions are: 2, 8, 14, 20 The sum is 44.

N	r =mod(N,24)	mod(r,6)
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	0
7	7	1
8	8	2
9	9	3
10	10	4
11	11	5
12	12	0
13	13	1
14	14	2
15	15	3
16	16	4
17	17	5
18	18	0
19	19	1
20	20	2
21	21	3
22	22	4
23	23	5
24	0	0

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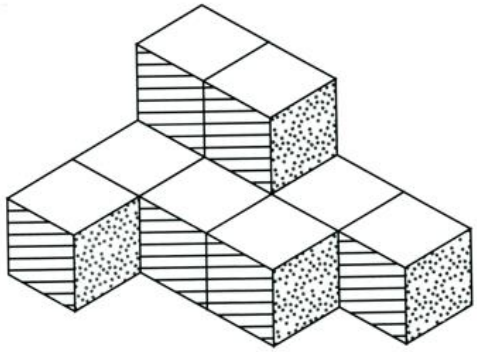
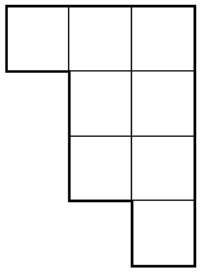
4th grade

Multiple Choice Solutions

	Answer	Solution
USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #1 THROUGH #4. The following figure is made up of unit cubes glued together. Each cube has side lengths of 1 unit. The back sides of the figure are smooth, there are no missing blocks. 		
1	*C*	How many total unit cubes are in the figure? A) 8 B) 9 C) 10 D) 11 E) Answer not given. There are 10 cubes
2	*A*	The base of the figure is the bottom side that it is sitting on. What is the perimeter around the base of the figure? A) 14 units B) 16 units C) 17 units D) 19 units E) Answer not given. The footprint of the base looks like this: 

3	**B**	What is the surface area of the figure, including all sides and the base? A) 32 square units B) 36 square units C) 40 square units D) 44 square units E) Answer not given. There are 8 sides on the base, 8 top sides, and 6 (top level) + 14 (bottom level) "side" sides. That is 36 total x 1 unit^2 each = 36 unit^2.
4	**B**	What is the minimum number of unit blocks that would have to be added to the figure to make a larger figure that is a cube? A) 52 B) 54 C) 68 D) 72 E) Answer not given. The longest dimension on the base is 4 units. Therefore, the smallest larger cube would be 4x4x4 = 64 blocks. 64 – 10 already = 54 blocks need to be added.

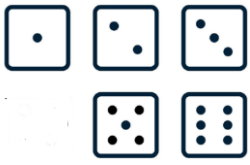
USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #5 THROUGH #8.

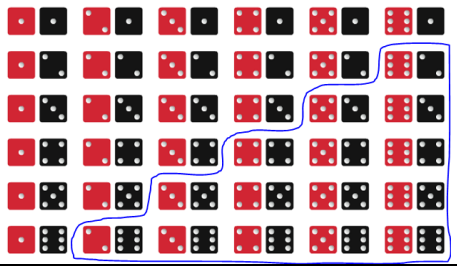
Yahtzee is a dice game played with 5 dice. When a player begins their turn, they throw all 5 dice. The player can choose to keep any, all, or none of the 5 dice, pick up the ones they don't want to keep, and throw them again. They get to repeat this one more time, for a total of three throws per turn.

The player is trying to complete various categories on the scorecard to earn points. The scorecard is split into 2 sections: upper and lower. In the Upper Section, players complete six categories, trying to get as many of each number as they can.

UPPER SECTION	HOW TO SCORE
Aces = 1	Count and Add Only Aces
Twos = 2	Count and Add Only Twos
Threes = 3	Count and Add Only Threes
Fours = 4	Count and Add Only Fours
Fives = 5	Count and Add Only Fives
Sixes = 6	Count and Add Only Sixes
TOTAL SCORE	→
BONUS If total score is 63 or over	SCORE 35
TOTAL Of Upper Section	→

For example, if they end their turn with three 4s, the score in that category would be 4 + 4 + 4 = 12. Or if they end their turn with four 1s, the score in that category would be 1 + 1 + 1 + 1 = 4.

5	**B**	 On Katya's third and final roll, she ends up with the following numbers showing on the top of the dice. She decides to take 'Chance' on the Lower Section, which is the sum of all 5 dice. What is her score for 'Chance'? A) 16 B) 17 C) 18 D) 20 E) Answer not given. 1 + 2 + 3 + 5 + 6 = 17

6	D	In the Upper Section, if players get a TOTAL SCORE of 63 or more, they get a bonus of 35 points. Amara currently has recorded scores for two 1s, three 2s, three 3s, three 4s, and two 5s. What is the minimum number of 6s that she must score in order to get her 35 bonus points? A) 1 B) 2 C) 3 D) 4 E) Answer not given. Current score is: 2*1 + 3*2 + 3*3 + 3*4 + 2*5 = 39. She needs 63 – 39 = 24 more points, which means she needs four 6s.
7	D	After two rolls, Amara has the following numbers on her dice: 2, 3, 5, 5, 6. She keeps the 5, 5, and 6, and picks up the other two dice to throw them again. After that final throw, what is the probability that she has a sum on the five dice of at least 24, to take as her 'Chance' score? A) 1/6 B) 5/36 C) 50% D) 15/36 E) Answer not given. She is starting with 5 5 6 which equals 16. To get 24 or more total, you need a sum on the two remaining dice of 8 or more. There are 15 total outcomes that will give you a sum of 8 or more. P = 15/36 
8	B	Amara ends up with a final score of 241, and Katya ends up with a final score of 197. How many more points did Amara earn than Katya? A) 34B) 44 C) 47 D) 52 E) Answer not given. 241 – 197 = 44

9	E [5]	For each of the number pairs shown here, fill in the blank between the two numbers with a "more than" (>), "less than" (<) or "equal to" (=) symbol. How many "more than" symbols are there in total? 433 ☐ 423 551 ☐ 515 765 ☐ 785 898 ☐ 868 117 ☐ 117 569 ☐ 596 929 ☐ 992 863 ☐ 863 178 ☐ 173 383 ☐ 833 255 ☐ 246 627 ☐ 726 A) 6 B) 7 C) 8 D) 9 E) Answer not given. 433 > 423 551 > 515 765 < 785 898 > 868 117 = 117 569 < 596 929 < 992 863 = 863 178 > 173 383 < 833 255 > 246 627 < 726

10	*C*	Here is a fun mathemagical trick you can play on your friends! Have a friend choose a whole number. Then have them take the following steps, one at a time in order: 1. Add 6 to their number. 2. Triple that value. 3. Decrease that value by 3. 4. Divide that value by 3. 5. This is the "final result". If your friend tells you their "final result", you will be able to tell them what number they started with! Which of the following statements is true, comparing the "final result" to the original number that they started with? A) The final result is the same as the original number. B) The final result is always 2 less than the original number. C) The final result is always 5 more than the original number. D) The final result is always 5 more than the original number if the original number is odd, and is always 6 more than the original number if the original number is even. E) Answer not given. A little trial and error will show that the final result is always 5 more. Algebraically, let x = original number. Result = $[(x + 6)(3) – 3]/3 = (3x + 15)/3 = x + 5$

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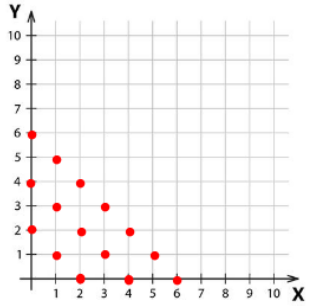
4th grade

Team Test Solutions

	Answer	Solution
1	14 [hours]	Neal practices the violin for 3 hours a day, while Asher practices for 5 hours a day. How many more hours does Asher practice than Neal in one week? 5 – 3 = 2 2 * 7 = 14
2	696 [$]	Vaani's kitchen is 5.8 meters long and 4 meters wide. New vinyl for the floor costs $30 per square meter. How much will it cost, in dollars, to buy enough vinyl to cover the floor? 5.8x4x30 = 696
3	16 [more girls]	Vista Elementary has four 3rd grade classes. The following chart shows the breakdown into boys and girls per class. How many more girls than boys are there in the 3rd grade at Vista Elementary? (12+14+8+14)=48 boys (8+13+29+14)=64 girls So 64-48=16
4	50 [dimes]	What is the maximum number of dimes that you could receive as change if you pay for a $4.95 Frappuccino with a 10-dollar bill? Five dollars in dimes = 50 dimes.
5	12 [fence posts]	Santiago is building a horizontal fence that is 176 feet long. If he wants to place a fence post every 16 feet, including at the beginning and end of the fence, how many fence posts will he need? 176/16=11 But needs 1 more as needs one at 0 feet so 12 fence posts

3rd Grade Class	Boys	Girls
Ms. Smith	12	8
Mr. Jones	14	13
Ms. Williams	8	29
Ms. Melton	14	14

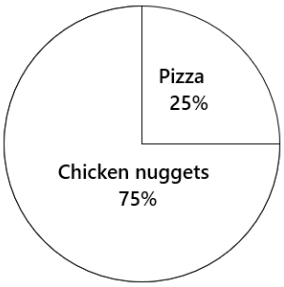
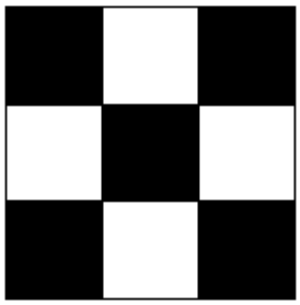
6	10 [hours]	A colony of bacteria starts with one bacterium at time 0, then doubles every hour. For example, at 1 hour there will be 2 bacteria, and at 2 hours there will be 4 bacteria. What is the smallest whole number of hours such that the colony will have over 1,000 bacteria? $2^{10} = 1024$
7	15 [points]	Alphonse is going to plot points with coordinates (x, y) on the following grid. The points will follow these rules: 1. x and y are integers 2. x + y is a positive even value 3. x + y is less than 7 How many total points will Alphonse plot? 
8	35 [rectangles]	How many different rectangles can be constructed that have integer side lengths, and that have an area of 20 square units or less? The orientation of the rectangle does not matter, for example a 1x5 rectangle is the same as a 5x1 rectangle. 1x1 through 1x20 = 20. 2x2 through 2x10 = 9. 3x3 through 3x6 = 4. 4x4 through 4x5 = 2. 20 + 9 + 4 + 2 = 35
9	5 [palindromic dates]	When the date is written in Month/Day/Year format, with no leading zeros in front of the month or day, the date is called a palindromic date if the number reads the same forwards and backwards. For example, January 10th, 2011 is written as 1/10/2011, or 1102011, which reads the same in either direction. How many palindromic dates are there between January 1, 2025, and January 1, 2030? Palindromic dates are: 5/20/2025 6/20/2026 7/20/2027 8/20/2028 9/20/2029

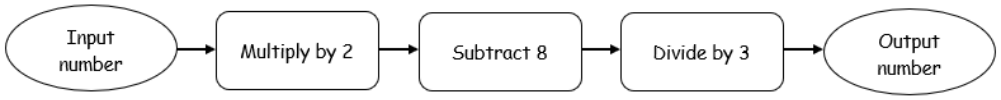
10	500 [gummy worms]	A bag contains 75 blue gummy worms, some green gummy worms, and some orange gummy worms. If one gummy worm is randomly selected, the probability that it is green is 35%, and the probability that it is orange is 50%. How many total gummy worms are in the bag? The probability of it being blue must be 100 – 35 – 50 = 15%. Blue:Orange:Green 15:50:35 Multiply everything by 5, because we know there are 75 blue. 75:250:175 75 + 250 + 175 = 500 total

"Math is Cool" Championships -- 2024-25

4th grade

Linda Moore Triple Jump Solutions

	Answer	Solution
1	24	Put two numbers from the list into the boxes, to complete the division problem. Which number goes in the box with the question mark? 2, 3, 12, 24, 30, 40, 54, 77  24/3 = 8
2	18 [students]	Mrs. Yockey's students took a survey to see if their favorite cafeteria lunch was pizza or chicken nuggets. The results are shown in the graph. If Mrs. Yockey has 24 students, how many of them prefer chicken nuggets? 75% of 24 = 18 
3	42 [inches]	How many inches are in $3\frac{1}{2}$ feet? 1 ft = 12 inches 3 ft = 36 inches 36 + 6 = 42 inches
4	36 [sq cm]	A large square is divided into nine identical smaller squares. The total area of the five small black squares is 20 square centimeters. In square centimeters, what is the total area of the large square? 20/5 = 4 sq cm per small square. 4 x 9 = 36 sq cm total 
5	15 [laps]	Athena and Manuel are running laps around their track at Bridgeport Elementary School. For every lap Manuel runs, Athena runs two laps. If Manuel ran five laps, what is the combined number of laps that they ran? M = 5 A = 5x2 = 10 Total = 5 + 10 = 15

6	108 [apples]	Kylee is collecting apples from the 5 trees in her backyard. Each tree contains the number of apples shown in the figure. Kylee can only carry a maximum of 11 apples per trip, and she can only visit one tree per trip. What is the maximum number of apples that Kylee can collect in 10 trips?  Visit the 36 apple tree 3 times, 3x11 = 33. Visit the 29 apple tree 2 times, 2x11 = 22. Visit the 24 apple tree 2 times, 2x11 = 22. Visit the 31 apple tree 3 times, 2x11 = 22 + 9 more on last trip = 31. Total = 33 + 22 + 22 + 31 = 108
7	19	A function machine takes an input number and does the following mathematical operations in the order shown. If the output number is 10, what was the input number? Work backwards: 10 x 3 = 30 30 + 8 = 38 38/2 = 19 
8	12	What is the smallest counting number whose positive integer factors sum to more than twice the number itself? 1 + 2 + 3 + 4 + 6 + 12 = 28 > 24
9	27 [days]	Rhoda is reading *Bag of Bones* by Stephen King, which has 732 pages. She reads 2 pages on the first day, 4 the second, 6 the third, and so on, each day reading 2 more pages than the day before, until she finishes the book. How many days will it take her to finish the book? Pages read = 2+4+6+… = 2(1+2+3+…) This is just 2 * (the sum from 1 to n, where n is the number of days) Since the sum of the numbers from 1 to 27, multiplied by 2, is the first that is over 732, it will take her 27 days

10	7 [zero-sum sets]	When the sum of a set of integers equals zero, we call that set a zero-sum set. For example, the integers 7, -3 and -4 form a zero-sum set, because 7 + (-3) + (-4) = 0. Out of the following set of integers, how many different zero-sum sets can be made? A number can only be used one time per zero-sum set, but each number can be used in multiple different zero-sum sets. 10, -3, -11, 2, -8, 6, 5, -1 The zero-sum sets are: -8, 6, 2 -11, 6, 5 5, 10, -11, -3, -1 -8, -3, -1, 10, 2 10, 5, 6, 2, -11, -8, -3, -1 5, 6, -3, -8 2, 10, -1, -11

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College Bowl Round #1 Solutions

	Answer	Solution
1	45	What is the sum of twenty and twenty-five? 20 + 25 = 45
2	3 [zeroes]	How many digits are zeros in the product of one hundred twenty-five and eight? 125 * 8 = 1000
3	17	What is the next number in the following sequence: one, five, nine, thirteen, and so on? Pattern is +4, 13 + 4 = 17
4	150 [°]	What is the measure of the smaller angle in degrees between the two hands of an analog clock at five o'clock PM? Between each 2 consecutive numbers on the clock face is 30°. 30x5 = 150°. 
5	4 [hours]	Rya is twenty miles ahead of Oakley while walking at four miles per hour. Oakley is biking at nine miles per hour in the same direction. How many hours will it take for Oakley to catch up to Rya? Oakley is catching up by 5 miles per hour. 20 miles to make up / 5 miles per hour = 4 hours.
6	4 [= median]	What is the median of the following data set: three, seven, five, five, two, one (3+5)/2 = 4
7	3 [inches}	There are approximately two point five four centimeters in one inch. As an integer, how many full inches are in ten centimeters? 2.54 *3 = 7.62 2.54 * 4 = 10.16
8	10 [meters]	What is the perimeter in meters of a square with side length two point five meters? 4x2.5 = 10

9	6 [ways]	How many ways are there for Kali, spelled K-A-L-I, to rearrange the letters in her name, as long as the K stays in the first position? K_ _ _ Basically how many ways to rearrange 3 letters, = 3! = 6
10	60 [penguins]	Two turtles are worth five monkeys. One monkey is worth six penguins. How many penguins are four turtles worth? 4 turtles = 10 monkeys 10 monkeys * 6 = 60 penguins

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College Bowl Round #2 Solutions

	Answer	Solution
1	44 [people]	There are twelve people behind Jalisa in line, and thirty-one ahead of her. How many people are in the line? 12 + 31 + 1 = 44
2	15 [ways]	On silly sock day, Jingchu chooses two different colored socks. He has pairs of socks in six different colors. In how many ways can he pick two different colored socks? Red, Blue, Green, Yellow, Orange, Purple: RB RG RY RO RP BG BY BO BP GY GO GP YO YP OP
3	16 [cups]	How many cups are in four quarts? 4 quarts * (4cups/quart) = 16 cups
4	120 [degrees]	How many degrees does the minute hand on an analog clock move from seven fifteen PM to seven thirty-five 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	27 [unit cubes]	How many unit cubes are needed to create a larger cube with edge length three units? 3x3x3 = 27
6	102 [minutes]	Rayden needs to cut a long steel rod into thirty-five equal pieces. It takes three minutes to make one cut. How many minutes will it take to complete all of the cuts? 34 cuts x 3 minutes = 102
7	31	What is the next term in the sequence that begins with: one, three, seven, thirteen, twenty-one, and so on? 1, 3, 7, 13, 21, Pattern is: +2, +4, +6, +8, … 21 + 10 = 31
8	42 [sq. cm]	What is the area in square centimeters of a rectangle that measures seven centimeters by six centimeters? 6*7 = 42 square cm

9	13 [times]	A clock chimes once every hour on the hour, starting at twelve AM. How many times will it chime between two fifteen AM and three twenty-five PM on the same day? From 3 am – 3 pm.
10	6 [= GCF]	What is the greatest common factor of twelve and six? 12 = 2*6 6 = 1*6

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College Bowl Round #3 Solutions

	Answer	Solution
1	0	A student finds the sum of a number and its additive inverse. What is the result? This is just adding a number to its negative
2	730 [cents]	Ty has a five-dollar and a two-dollar bill, along with three dimes. What is the total amount of money he has, in cents? 500 + 200 + 30 = 730
3	4 [times]	How many times larger is the area of a square with side length four units than one with side length two units? (4/2)^2 = 4
4	19 [positive integers]	How many positive integers less than one hundred contain the digit two? 2, 12, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 42, 52, 62, 72, 82, 92
5	8 [= GCF]	What is the greatest common factor of twenty-four and thirty-two? GCF(24, 32) = 8
6	2 [= y]	If X minus Y equals five, and X equals seven, what does Y equal? x-y=5 7-y=5 7-2=5
7	75 [%]	If the probability that Della has a ham sandwich today for lunch is one-fourth, expressed as a fraction, what is the probability that she does not have a ham sandwich for lunch today, expressed as a percent? $\frac{1}{4}$ = 25% 100 – 25 = 75%
8	80 [degrees]	Two of the three interior angles of an isosceles triangle have measures of eighty degrees and twenty degrees. What is the measure of the third angle, in degrees? 80 + 80 + 20 = 180
9	0 [integers]	How many integers from one to one hundred are divisible by three, five, and seven? None, the first is 3*5*7 = 105

10	25 [fireworks]	Oona is lighting fireworks on New Years Eve. If she lights five per hour, how many can she light by midnight, if she starts at seven PM? 5 * (12 – 7) = 25

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College Bowl Round #4 Solutions

	Answer	Solution
1	255 [cents]	Bjorn buys Swedish meatballs for two dollars and forty-five cents while paying with a five dollar bill. How many cents does he receive in change? 500 – 255 =245
2	12	What is the sum of the cube root and the square root of sixty-four? 8 + 4 = 12
3	67 [inches]	A smoot is a unit of measurement that is five feet and seven inches long. How many inches are in a smoot? 5(12) + 7 = 67
4	600 [grams]	Hector is baking cookies, and uses a recipe that calls for two hundred grams of sugar, and twice as many grams of flour. How many total grams of sugar and flour are needed? Sugar = 200 grams Flour = 400 grams Total = 600 grams
5	37	What is the largest prime factor of one hundred eleven? 37 * 3 = 111
6	60 [= sum]	What is the sum of the first five terms in the arithmetic sequence that begins as follows: two, seven, twelve, and so on. 2 + 7 + 12 + 17 + 22 = 60
7	3 [inches]	What is the radius in inches of the largest circle that can be inscribed in a square with side length six inches? The circle's diameter will be the same length as the side of the square
8	48	What is the value of six plus sixteen plus twenty-six? 6+16+26 = 48
9	0	What digit is in the tens place of twenty-five times eight? 25*8 = 200, which has a 0 in the tens place.
10	3	Dahlia guesses on a ten question short answer math test and writes the number one for all of her answers. What is the sum of the mean, mode, and median of her answers? 1 + 1 + 1 + 0 = 3

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College Bowl Round #5 Solutions

	Answer	Solution
1	252	What is the product of twelve and twenty-one? 12*21 = 252
2	100,000 [one hundred thousand]	How many centimeters are in one kilometer? 1 km = 1000 m 1 m = 100 cm 1000 * 100 = 10000
3	18 [units]	What is the perimeter in units of a triangle with side lengths seven, eight and three units? 7 + 8 + 3 = 18
4	160 [ants]	An army of three hundred and sixty ants is marching down the sidewalk. One-third of them stop at a dropped cookie. One-third of the remaining ants turn back. How many ants are left to continue marching down the sidewalk? 360(1/3) = 120 ants at cookie, 240 left. 240(1/3) = 80 turn back 240 – 80 = 160 continue on
5	7 [numbers of baby carrots]	If Jasper must eat at least four baby carrots and at most ten baby carrots at dinner, how many different numbers of baby carrots can he eat? 4, 5, 6, 7, 8, 9, 10 – 7 different numbers
6	56 [square units]	A rectangle has a perimeter of thirty-six square units and a width of four units. What is the area of the rectangle in square units? 36/2 = 18 18 – 4 = 14 14 * 4 = 56
7	77 [points]	On his last five math tests, Hanzo scored seventy-seven, sixty-five, eighty, eighty-one and sixty-five points. What is Hanzo's median test score in points? 65, 65, 77, 80, 81 77 is the middle score
8	4 [= B]	If A plus B plus C equals ten, and A equals C equals three, what is the value of B? A + B + C = 10 3 + B + 3 = 10 B = 4

9	3 [= remainder]	What is the remainder when eight hundred ninety-three is divided by 5? 893/5 = 178 r 3
10	0 [right angles]	How many right angles does an equilateral triangle have? An equilateral triangle has three 60° angles.

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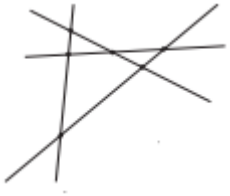
College Bowl Round #6 Solutions

	Answer	Solution
1	91 [degrees]	What is the smallest possible integer degree measure of an obtuse angle? Obtuse is > 90 degrees.
2	3 [alligators]	A metric ton is one thousand kilograms. An alligator weighs around three hundred sixty kilograms. What is the smallest whole number of alligators that would weigh more than a metric ton? 360 * 3 = 1080 360 * 2 = 720
3	20 [cents]	Sawyer buys a candy bar for two dollars, excluding tax. If the sales tax is ten percent, how much does he pay in tax, in cents? It costs 200 cents, 10% = 20 cents.
4	18 [= average]	What is the average of the following numbers? Fourteen, seventeen, eighteen, nineteen, twenty-two. 14 + 17 + 18 + 19 + 22 = 90 90/5 = 18
5	32,500 [thirty-two thousand five hundred]	What is three point two five times ten thousand? 3.25 * 10000 = 32,500
6	100 [cents]	A hamburger and a large drink cost five dollars together. The hamburger costs three dollars more than the drink. How many cents does the drink cost? H + D = 5 4 + 1 = 5, so that hamburger costs 3 dollars more. D = 1 dollar = 100 cents
7	6 [intersections]	What is the maximum number of intersections that four lines can have? 

8	33	The Fibonacci sequence is a sequence in which each term is the sum of the previous two terms. The first five Fibonacci numbers are zero, one, one, two, three. What is the sum of the first eight Fibonacci numbers? 0+1+1+2+3+5+8+13=54
9	5 [= units digit]	What is the units digit of five raised to the fourth power? All positive integer powers of 5 end in 5
10	30 [children]	There are five children for every two adults in a park. If there are twelve adults in the park, how many children are there? 5*(12/2) = 30

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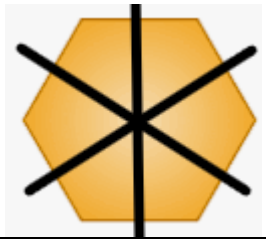
College Bowl EXTRA

	Answer	Solution
1	40 [square inches]	What is the area in square inches of a trapezoid with base lengths three inches and seven inches, and height of eight inches? (3 + 7)/2 = 5 5 * 8 = 40
2	192 [hours]	How many hours are in eight days? 24 * 8 = 192
3	40 [%]	A game spinner is divided into five equal sections labeled A, B, C, D and E. On one spin, what is the probability in percent of landing on a vowel? A and E are the only vowels so the probability is 2/5 which is the equivalent of 40%.
4	6	What is two and three fifths plus three and two fifths? 2 3/5 + 3 2/5 = 5 + 5/5 = 6
5	14 [years]	Mayim is seven years old, and her father is thirty-five. How old in years will Mayim be the next time that her father's age is an integer multiple of hers? 35 – 7 = 28, so Mayim's age has to be a factor of 28. The next time that this happens, she will be 14, and her father will be 42
6	288 [square inches]	Moo Deng eats two square feet of grass a day. How many square inches of grass does she eat per day? 2*12*12 = 288
7	3 [lines of symmetry]	How many lines of symmetry does a regular hexagon have that do not intersect its vertices? A hexagon has 6 lines of symmetry, 3 of which do not go through the vertices. 
8	37	Howie counts down by sevens starting with one hundred, ninety-three and so on. What is the 10^{th} number he says? 100 – 9(7) = 37

9	24	What is the sum of the digits in the largest three-digit integer that has three different digits? The number is 987. 9 + 8 + 7 = 24
10	5 [units]	A triangle has two sides with lengths 17 and 21 units. What is the smallest possible integer length in units of the third side? 21 – 17 + 1 = 5