"Math is Cool" Masters -- 2023-24

4th Grade

Mental Math Solutions

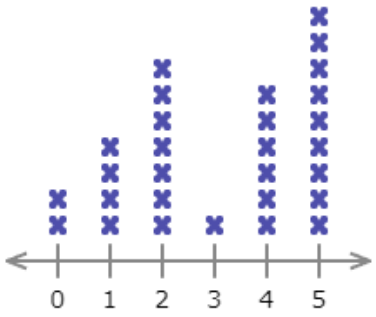
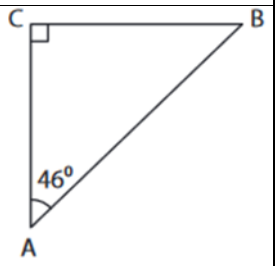
	Answer	Solution
1	10 [students]	There are forty students in the orchestra, and one-quarter of them play the viola. How many students play the viola? 40 * 1/4 = 10
2	81	What is the largest perfect square less than one hundred? $81 = 9^2$ and it is the largest perfect square less than 100.
3	25 [= z]	Solve for z: three times seven equals z minus four 3x7 = z – 4 21 = z – 4 z = 25
4	99999	What is the next number in the following sequence? Five, sixty-six, seven hundred seventy-seven, eight thousand eight hundred eighty-eight, and so on. 5, 66, 777, 8888, 99999
5	135 [minutes]	How many minutes are in two point two five hours? 1 hour = 60 minutes 2 hours = 120 minutes 0.25 hours = 15 minutes 120 + 15 = 135
6	20 [cents]	A one pound bag of frozen corn costs three dollars and twenty cents. How many cents does one ounce of the corn cost? $3.20/16 oz = 320 cents/16 oz = 20 cents/oz
7	28 [degrees]	A right triangle has an angle measuring sixty-two degrees. In degrees, what is the measurement of the smallest angle in the triangle? 180 – 90 = 90 90 – 62 = 28

8	11 [$]	Sunnyside Elementary 5th grade students are going to watch a new movie. They ordered one large popcorn for seven dollars and forty movie tickets. They spent a total of four hundred and forty-seven dollars. In dollars, how much does one movie ticket cost? (447 – 7) / 40 = 11

"Math is Cool" Masters -- 2023-24

4th Grade

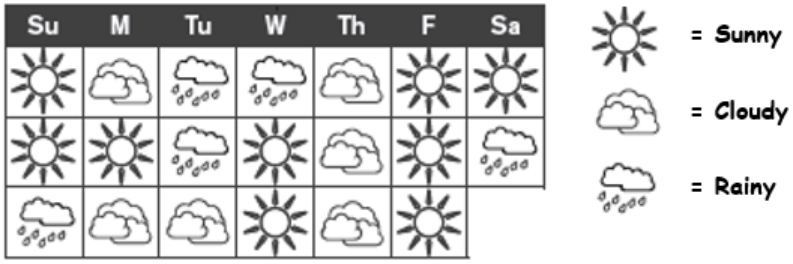
Individual Test Solutions

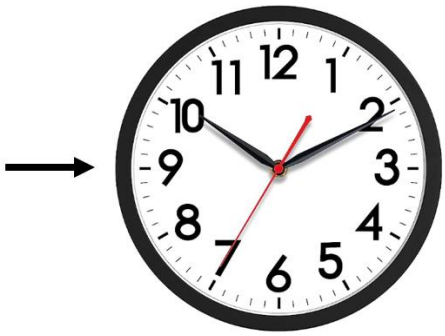
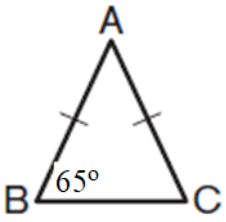
	Answer	Solution
1	700	Evaluate: 100×7 100x7 = 700
2	80 [in]	Enzo is 6 feet 8 inches tall. What is his height in inches? 1 foot=12 inches 6 feet=6 ×12=72 inches So Enzo's height=72+8=80 inches
3	8 [gallons]	There are 6 and 5/6 gallons of water in Aashi's fish tank. If she adds 1 and 1/6 gallons more water to the tank, how many gallons of water will the tank contain? $6\frac{5}{6} + 1\frac{1}{6} = 8$
4	6 [students]	Mr. Sampson asked his students how many times each of them had been to a movie theater in the last year, and the results are displayed in the following graph, with each 'x' representing one student. How many students had been to a movie theater exactly 4 times? There are 6 'x' marks above the value of 4.  Number of trips to a movie theater
5	44 [degrees]	In degrees, what is the measure of ∠B (angle B) in the following right triangle?  ∠A + ∠B+ ∠C=180, ∠B=180-∠A - ∠C ∠B=180-46 – 90 ∠B=44
6	40	What is 10% of 400? 10% × 400=40
7	7	What is the next number in the following arithmetic sequence? 35, 28, 21, 14, and so on The sequence numbers decrease by 7 and the next number is 14 – 7 = 7.

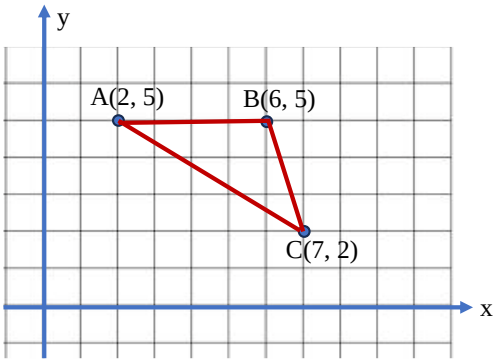
<table>
<tr><td>8</td><td>98 [inches]</td><td>The radius of a circle is 49 inches. In inches, what is the diameter of the circle?
Diameter = 2 x radius
2x49 = 98</td></tr>
<tr><td>9</td><td>23</td><td>How many odd whole numbers are there between 54 and 100?
They are 55, 57, …, 99. There are 23.</td></tr>
<tr><td>10</td><td>700,000</td><td>What is 721,293 rounded to the nearest hundred thousand?
721,293 rounds down to 700,000</td></tr>
<tr><td>11</td><td>10 [gallons]</td><td>Bennett's car can travel 48 miles per gallon of gasoline. Bennett plans to visit his aunt, who lives 240 miles away. How many gallons of gasoline will Bennett's car need for this round-trip journey to and from his aunt?
240 X 2/48 =10</td></tr>
<tr><td>12</td><td>3</td><td>Dr. Wood is a pediatrician, and she weighed the children who recently visited her office. The children's weights in pounds are: 23, 29, 36, 37, 44, 48, 53, 62, 68, 78, 85, 97, 99. She wants to represent the data in the stem-and-leaf plot shown here. What is the missing number that goes in the box in this stem-and-leaf plot?

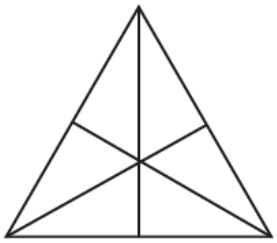
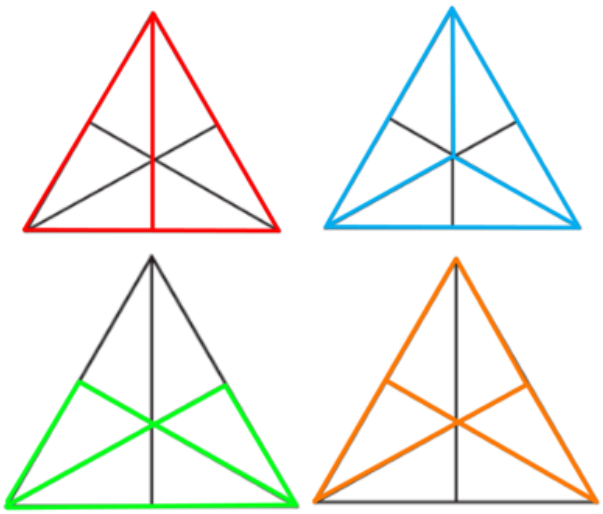
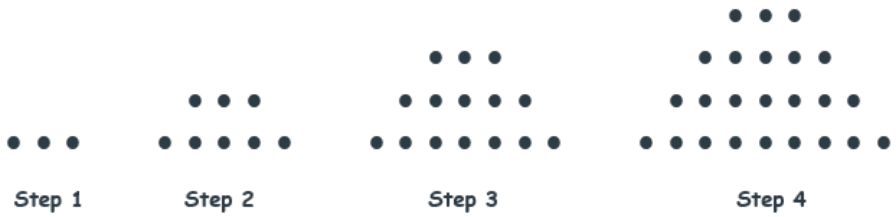
For number 53, stem is 5, leaf will be 3

<table><tr><th>Stem</th><th>Leaf</th></tr><tr><td>2</td><td>3 9</td></tr><tr><td>3</td><td>6 7</td></tr><tr><td>4</td><td>4 8</td></tr><tr><td>5</td><td>☐</td></tr><tr><td>6</td><td>2 8</td></tr><tr><td>7</td><td>8</td></tr><tr><td>8</td><td>5</td></tr><tr><td>9</td><td>7 9</td></tr></table></td></tr>
<tr><td>13</td><td>308 [$]</td><td>For a scouting service project, Oliver has raised $285.50 for a local senior center. Additionally, he runs a 5-mile race and raises $4.50 for every mile. In dollars, how much money did Oliver raise in total?
285.60 +5x4.5 = 308</td></tr>
<tr><td>14</td><td>3 [boxes]</td><td>Zender has ten boxes, five erasers, and four pens. He puts each eraser into a different box, and each pen into a different box. Two of the boxes end up containing both a pen and an eraser. How many boxes contain nothing?
Since two boxes contain both a pen and an eraser, only 7 boxes are used.
3 boxes do not contain either pen or eraser.</td></tr>
</table>

15	25 [%]	Annabel recorded the weather of her home city for twenty days in October as shown below. It was either sunny, cloudy, or rainy. On what  percentage of the days did it rain? 5 days rained/20 days=25%
16	4	The sum of two whole numbers is 6, and the two numbers are 2 units apart on the number line. What is the larger of the two numbers? 2 + 4 = 6
17	324 [$]	Yovani's room is rectangular with dimensions 12 feet long by 9 feet wide. He wants to cover the room with a carpet. The carpet is sold at a price of $3.00 per square foot. In dollars, how much will it cost him to buy enough carpet to exactly cover the floor? 12 x 9 x 3=324
18	8 [days]	Four people can finish a project in six days, when each person works at the same rate. If three people instead work at this same rate, how many days will it take to finish this project? 4 x 6 ÷3=8
19	86 [points]	Ishaan's average score for two tests is 84 points. If his score is 90 points on the third test, what is his average score of all three tests, in points? (2 x 84 +90)/ 3 = 86
20	30 [°]	$\angle A$ is complementary to $\angle B$. If $\angle B$ measures sixty degrees, what is the measure of $\angle A$ in degrees? $\angle A+\angle B = 90$, $A = 90 - 60 = 30$
21	125 [cents]	Cloud has three nickels, two dimes and one quarter. Finn has one nickel, one dime and two quarters. In cents, how much money do Cloud and Finn have, combined? 3 x5+2 x10+25+5+10+2 x25=125 cents = $1.25

22	5	In the following clock face, leave six consecutive (next to each other) numbers in a row in their current positions. Rearrange the other six numbers in such a way that the sum of every possible pair of adjacent numbers is a prime number. What number will be in the position originally occupied by the 9?  The 6 numbers to leave in place are 11, 12, 1, 2, 3, and 4, because each of these pairs sums to a prime number.
23	50 [%]	Olivia has three red Skittles, two blue Skittles and five green Skittles in her pocket. If Olivia randomly picks one Skittle from her pocket, what is the probability in percent that the picked Skittle is green? 5/(3+2+5)=0.5 = 50%
24	12 [years]	Niko is 5 years older than his brother Edison. Seven years ago, Edison was half as old as Niko. How old is Edison now in years? Niko=Edison+5, Niko-7=2 x(Edison-7), solve for Edison=12
25	65 [°]	In isosceles triangle ABC shown here, the length of AB equals the length of AC, and ∠B = 65 degrees. What is ∠C in degrees?  ∠B = 65 degrees, Since isosceles triangle ABC, ∠C = 65 degrees
26	14 [= median]	What is the median of the following set of numbers? {5, 16, 14, 24, 10, 30, 7} Arrange data points from smallest to largest 5, 7, 10, 14, 16, 24, 30. There are 7 numbers, so, the median will be the center value which is 14.
27	3 [distinct prime factors]	How many distinct (different) prime factors does the number 2024 have? $2024= 2^3 \bullet 11 \bullet 23$, There are 3 distinct prime factors
28	18 [= average]	Veena has one dozen eggs and Caylin has two dozen eggs. As a whole number, what is the average number of eggs that they have? (12 + 24)/2 = 18
29	19 [years]	There are two zeros in the year 2010. How many years between 2001 and 2100 inclusive (including 2001 and 2100) have this feature? They are 2001, 2002, …, 2009, 2010, 2020, …, 2090, and 2100. There are 19 of these years.

30	0 [= units digit]	What is the ones digit of the number that results from the following multiplication problem? $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$ 5x2 = 10, therefore the number will end in a 0.
31	10 [divisors]	How many positive integer divisors does 405 have? 1, 3, 5, 9, 15, 27, 45, 81, 135, 405.
32	6 [square inches]	Each small square in the following plot is 1 square inch. What is the area of the triangle with the vertices at A(2,5), B(6,5) and C(7,2) in square inches?  (6-2) x (5-2)/2=6
33	1067 [square feet]	The length of a swimming pool is the greatest 2 digit prime number (in feet), and its width is the smallest 2 digit prime number (in feet). In square feet, what is the area of this swimming pool? The greatest 2 digit prime number is 97. The smallest 2 digit prime number is 11. So the area of this swimming pool= 97×11=1067
34	40 [%]	A drawer contains five socks: two red and three orange. What is the probability as a percent that two socks randomly pulled out of the drawer will be the same color? There are C(5,2) =10 different ways to get two socks. There 1+C(3,2) =4 ways to get matching socks. The probability is 4/10=2/5.
35	18 [candies]	Mike has 55 candies. He gives 25 candies to his friend Tom. Then, Mike gives 20% of his remaining candies to his friend Adam. Next, he gives a quarter of his remaining candies to Ed. How many candies does Mike have left? (55-25) x80% x3/4 =18
36	36	The product of the digits of a given two-digit whole number is 18. When the digits exchange their places, the new number is 27 more than the original one. What is the original two-digit number? 3*6 = 18 63 – 36 = 27

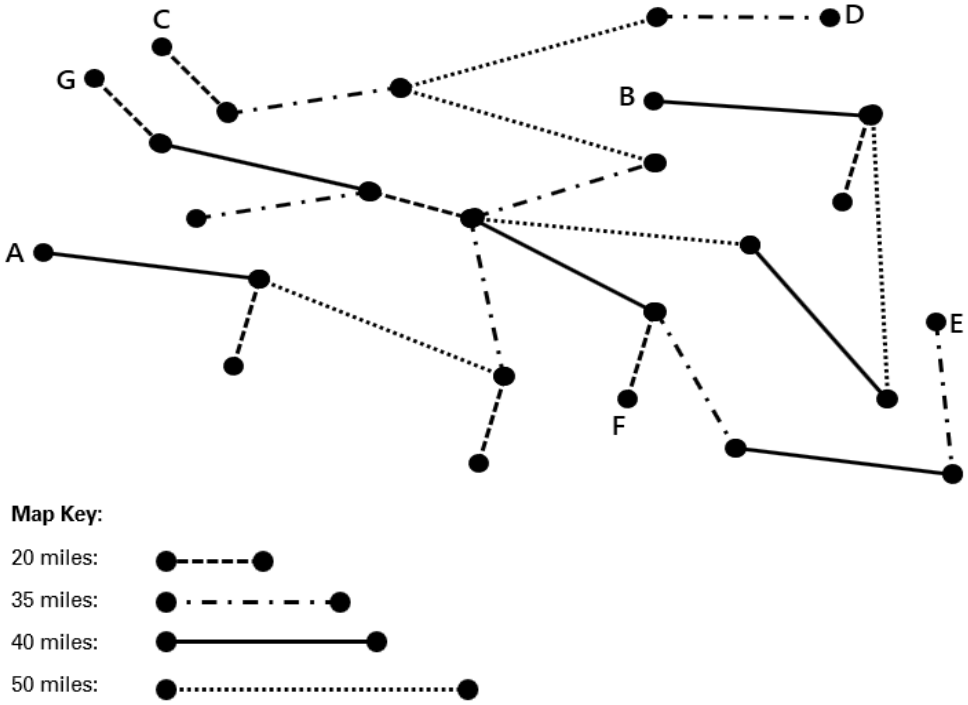
37	30 [ping pong balls]	Nayeli has some Ping-Pong balls in a box. Every turn she removes two-thirds of the balls, adds 2, and then triples the number of remaining balls. After 4 turns there are 54 balls in the box. How many Ping-Pong balls did the box contain at the beginning? After 3 turns: (54/3-2) x3=48; After 2 turns: (48/3-2)x3=42; After the first turn: (42/3-2)x3=36; At the beginning: (36/3-2)x3=30 balls
38	16 [triangles]	In the figure as shown, how many triangles of any size are there?  1 – biggest outer triangle 6 – smallest individual triangles 2 – half of big triangle (red) 3 – third of big triangle (blue) 2 – bottom triangles (lime) 2 – top/bottom triangles (orange) Total = 16 
39	336 [more dots]	The following figure shows the first four steps of a dot pattern. How many more dots are in Step 30 of the pattern than are in Step 24 of the pattern?  Step 1 Step 2 Step 3 Step 4 Let n = step number # of dots = $(n+1)^2 - 1$ n = 30: dots = $31^2 - 1 = 960$ n = 24: dots = $25^2 - 1 = 624$ 960 – 624 = 336

40	75 [miles per hour]	Clive lives 30 miles from the WinCo store. If he drives to the store at 37.5 miles per hour, at what speed in miles per hour does he need to drive back home to achieve an average of 50 miles per hour for the round trip? The time needed to drive to the store is 30/37.5 hours. The total time for the round trip is 60/50 hours. The speed for driving back home is 30/(60/50-30/37.5)=75

"Math is Cool" Masters -- 2023-24

4th Grade

Multiple Choice Solutions

	Answer	Solution
USE THE FOLLOWING MAP AND KEY TO SOLVE PROBLEMS #1 THROUGH #3. The following diagram is a tree graph, which shows the road network between towns. Each town is indicated by a circle, and the road lengths are indicated in the Map Key.  		
1	B	What is the shortest route, in miles, between town A and town F? A) 175 B) 185 C) 205 D) 210 E) Answer not given. 40 + 50 + 35 + 40 + 20 = 185

2	*C*	Kimmel drives from town C to town G on the shortest route possible at an average rate of 40 miles per hour. If he left town C at 11:10 am, at what time will he arrive at town G later that day? A) 4:00 pm B) 4:10 pm C) 4:40 pm D) 5:10 pm E) Answer not given. Distance from C to G = 20 + 35 + 50 + 35 + 20 + 40 + 20 = 220 miles. 220 / 40 mph = 5.5 hours. 11:10 am + 5.5 hours = 4:40 pm.
3	*D*	What is the longest possible distance, in miles, between any two towns shown on the map? The route taken must not retrace itself at any point. A) 295 B) 305 C) 320 D) 350 E) Answer not given. Distance from B to D = 40 + 50 + 40 + 50 + 35 + 50 + 50 + 35 = 350 miles.

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #4 THROUGH #6.

In the dice game 'Pig', players roll a single standard 6-sided die, numbered 1 through 6. A player's turn consists of rolling the die and scoring as many points as the number of dots showing on the top of the die, unless they roll a '1'. In that case they lose all points accumulated in that turn, and it is the next player's turn. If they roll anything other than a '1', they can add the points to the current points from their turn, and either roll again, or 'bank' the points and add them to their previous total. Once they have 'banked' their points, then it is the next player's turn.

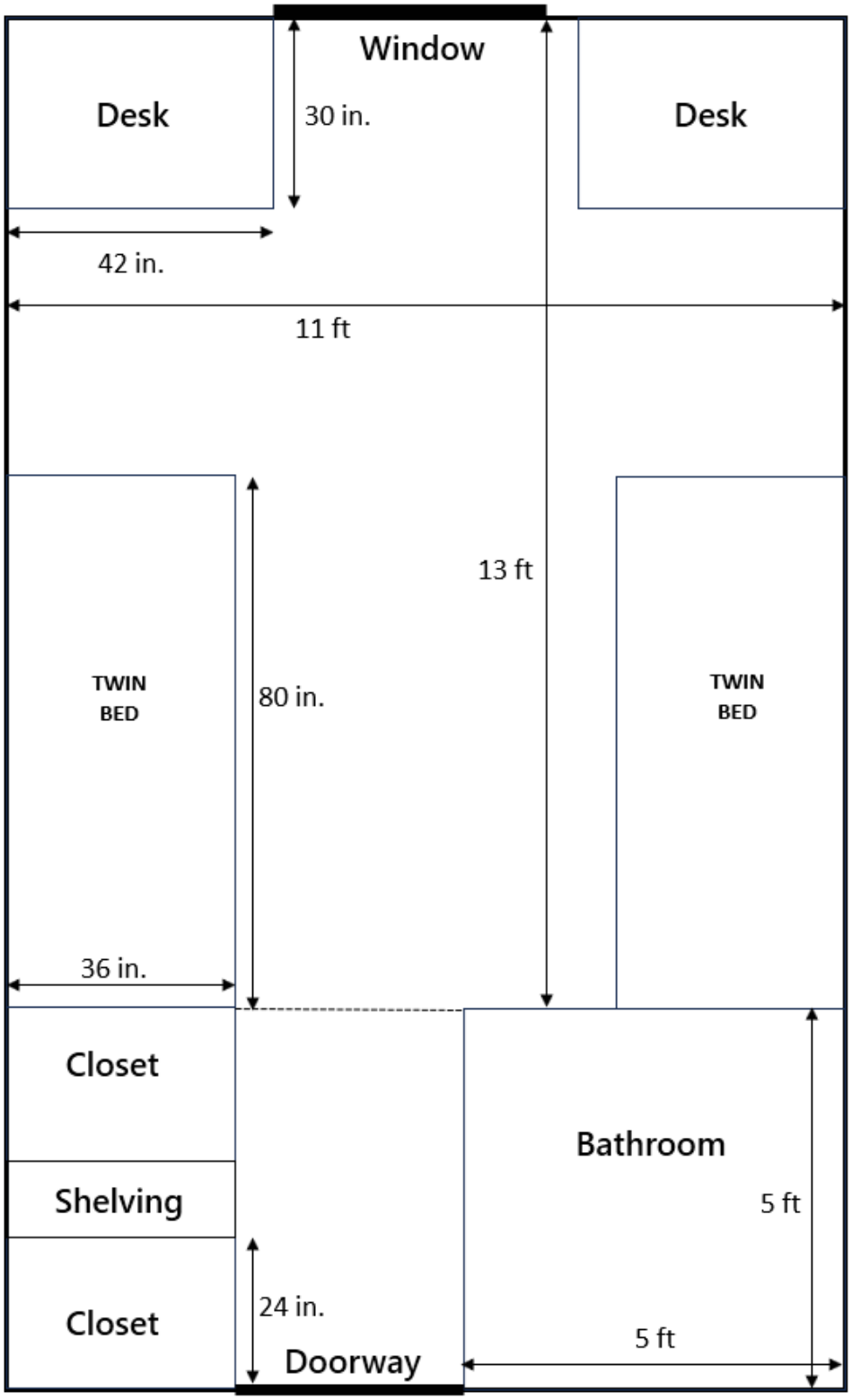
Example:
Sheldon rolls 2, 2, 6, 4, and banks 14 points. He adds the 14 points to his previous 10 points for a total of 24 points.
Raj rolls 3, 5, 1, turn is over, and banks 0 points. He still has his previous total of 15 points.

4	*C*	A new game starts between Aziz and Benito, so the score is 0 to 0. Aziz rolls the die a total of 5 times, then banks his score. What is the maximum number of points that he could have now? A) 10 B) 24 C) 30 D) 36 E) Answer not given. His maximum possible roll is a 6 each time. 5x6 = 30 points maximum.
5	*C*	Benito takes his first turn, and rolls the die a total of 7 times, then banks his score, which is 39. What is the minimum number of 6's that he must have rolled? A) 2 B) 3 C) 4 D) 5 E) Answer not given. If all 7 rolls were a 5, that would be 7x5 = 35 points. Four of them need to be a 6 to get 39 points.

6	*C*	Aziz takes his second turn. He does not roll a 1 on his first or second roll. What is the probability that he rolled a 3 on his first roll and a 4 on his second roll? A) 1/10 B) 1/12 C) 1/25 D) 1/36 E) Answer not given. Since he didn't roll a 1, there are 5 possible outcomes for each roll: 2, 3, 4, 5, 6. P(3 and 4) = (1/5)(1/5) = 1/25

USE THE FOLLOWING INFORMATION TO SOLVE PROBLEMS #7 THROUGH #10.

Felix and Kirby are sharing a dorm room for their freshman year at Princeton University. The floor plan of their room is shown here. Both desks are identical, the beds are identical, and the closets are identical. All dimensions are given in feet (ft) or inches (in).

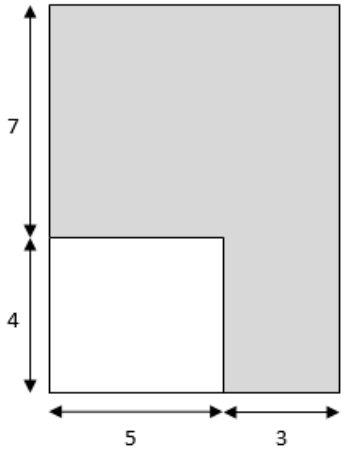
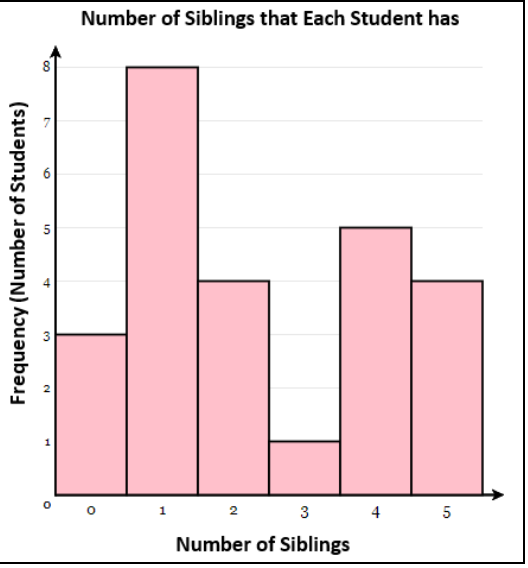


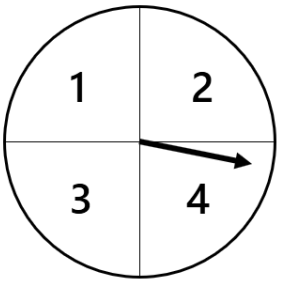
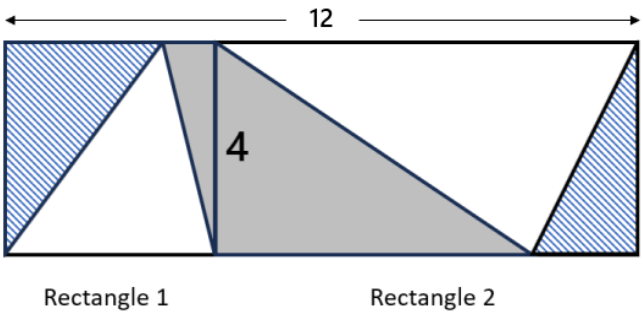
7	*C*	What is the length of the room, in feet, from the window to the doorway? A) 13 ft B) 15 ft C) 18 ft D) 20 ft E) Answer not given. 13 + 5 = 18
8	*B*	Each bed has an option to be elevated by hanging them from the ceiling, to provide additional floor space. In square feet, how much additional floor space will be provided by elevating both beds? A) 20 ft^2 B) 40 ft^2 C) 240 ft^2 D) 480 ft^2 E) Answer not given. The area of one bed = 80x36 = 2880 square inches. 2880/144 sq in per sq ft = 20 sq ft. Area of two beds = 20x2 = 40 sq ft.
9	*A*	The shelving unit extends from the floor to the ceiling, which is 8 feet high. What is the volume of the shelving unit, in cubic feet? A) 24 ft^3 B) 48 ft^3 C) 56 ft^3 D) 72 ft^3 E) Answer not given. From the diagram, the shelving unit is 1 ft wide by 3 ft long. Volume = (1)(3)(8) = 24 ft^3.
10	*C*	The shelving unit contains 6 equally spaced shelves, and Felix and Kirby decide that they will each take 3 shelves. Kirby insists on taking the top shelf. In how many ways can they distribute the remaining shelves so that each of them gets 3? A) 5 B) 8 C) 10 D) 12 E) Answer not given. Can list by brute force: KKFFF KFKFF KFFKF KFFFK FKKFF FKFKF FKFFK FFKKF FFKFK FFFKK Mathematically, need the permutations of KKFFF = 5!/(2!3!) = 10

"Math is Cool" Masters -- 2023-24

4th Grade

Team Test Solutions

	Answer	Solution
1	20 [sq. units]	The figure shows two rectangles, with lengths given in units. In square units, what is the area of the unshaded region? 4x5 = 20 
2	371 [= the number]	A number has the digits 7, 3, and 1, each used exactly once. To the nearest hundred, the number rounds to 400. What is the number? 371 rounds to 400
3	4 [= missing number]	What missing number goes in the box to make a true statement? $(4 \times 1) + (4 \times 5) = \square \times 6$ 4 [= missing number]
4	5 [siblings]	The following histogram shows how many siblings each of the 25 students in Mr. Chang's 4th grade class has. What is the greatest number of siblings that a student has? The largest number of siblings shown in the graph is 5. 

5	50 [%]	A spinner has four equal sections. If it is spun one time, what is the probability in percent that it does not land on 2 or 3? 2 or 3 is half the area, therefore there is a 50% chance that it will also not land there. 
6	16 [square units]	Two rectangles have a common side length of 4 units, and a combined length of 12 units. Each rectangle is divided into three triangles. The combined area of the two striped triangles is 8 square units. What is the combined area of the gray shaded triangles, in square units?  Total area = 4x12 = 48 Each white triangle is $\frac{1}{2}$ the area of its respective rectangle, therefore $\frac{1}{2}$ of the total area, which equals 24. 24 – 8 = 16
7	155	What number comes next in the sequence that begins as follows? 5, 7, 15, 17, 35, 37, 75, 77, and so on The alternating pattern is: +2, x2 + 1
8	25 [jellybeans]	Gustavo got 800 jellybeans in his Easter basket. He decided to eat exactly 31 of them every day. After many days of this, he discovered that he did not have 31 jellybeans left to eat, so he ate the rest. How many jellybeans did he eat that day? 800/31 = 25 r 25

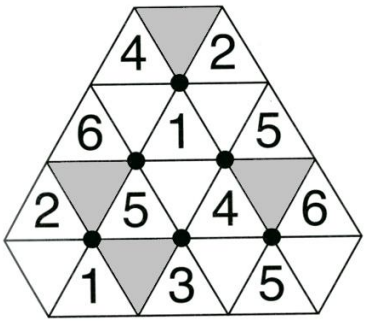
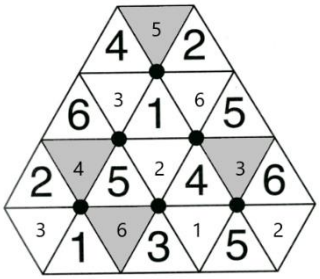
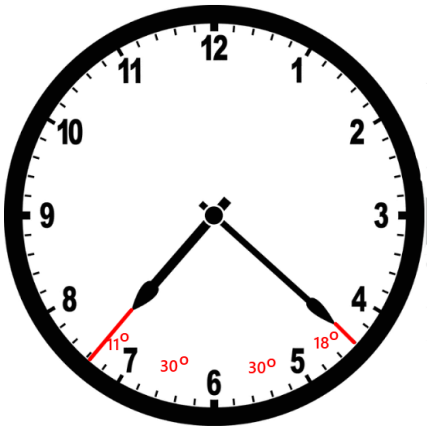
9	21 [= sum]	Shen has some hamsters and some cages. If he puts four hamsters into each cage, there is one cage left over. If he puts three hamsters into each cage, there is one hamster left over. What is the sum of the number of hamsters and the number of cages? H = # of hamsters C = # of cages C = H/4 + 1 C = (H – 1)/3 H/4 + 1 = (H – 1)/3 3H + 12 = 4H – 4 H = 16, C = 5 16 + 5 = 21
10	802 [= sum]	A palindrome is a whole number that reads the same forwards as backwards, such as 22 or 616. The product of a 2-digit palindrome and a 3-digit palindrome is 41,085. What is the sum of the two palindromes? The product ends in 5, so at least one of the numbers must begin and end with 5. Find the prime factorization of $41{,}085 = 3^2 5^1 11^1 83^1$ Only one factor of 5, so either 55 OR 5X5, not both. If we assume one number is 55, the other number is 9x83 = 747, also a palindrome. 55+747=802

"Math is Cool" Masters -- 2023-24

4th Grade

Linda Moore Triple Jump Solutions

	Answer	Solution
1	7 [= larger no]	The sum of two numbers is 12. The product of the two numbers is 35. What is the larger number of the two? 5 + 7 = 12 5x7 = 35
2	400 [cm]	How many centimeters are in 4 meters? 4x100 = 400
3	14 [numbers]	A number sequence starts with 6, and adds 4 each time. The last number in the sequence is 58. How many total numbers are in the sequence? 6, 10, 14, …, 58 58 – 6 = 52 52/4 = 13 Have to add four 13 times to first number.
4	10 [ways]	Yolia has five different colored pairs of socks: purple, blue, red, green and orange. For crazy-sock day at school, in how many different ways can she pick two different colors of socks to wear? The order of the colors does not matter. PB, PR, PG, PO BR, BG, BO RG, RO GO 10 ways
5	64 [sq cm]	A square tile has a perimeter of 16 centimeters. What is the area in square centimeters of a square tile with twice that perimeter? 16/4 = 4 cm side Twice the perimeter means 8 cm per side. 8x8 = 64

6	18 [= sum]	The following figure is made up of six overlapping hexagons, each of which has a black dot in the middle surrounded by six triangles. The whole numbers 1 through 6 are to be placed into the triangles of each hexagon. The numbers can go in any order, but they cannot be repeated within any single hexagon.  What is the sum of the four numbers in the shaded triangles? 5+4+3+6 = 18 
7	300 [= sum]	The fraction 1/3 can be written as a repeating decimal. What is the sum of the first 100 digits that appear after the decimal point? 1/3 = 0.3333… 3x100 = 300
8	89 [°]	In degrees, what is the measurement of the smaller angle between the two hands of a clock when it is exactly 7:22 pm? An increment of one minute on the clock face is 6°. At 7:22, the minute hand will be exactly two tick marks past the 4. The question is: where is the hour hand between 7 and 8? In 1 hour, the hour hand moves 30°, therefore in 22/60 hours = 11/30 hours, it moves 11°. 

9 — 100 [%]

Biff and Eho play a game, where they each flip a coin and try to predict what the other person flipped, heads or tails. They both win if at least one of them has a correct prediction. Biff always guesses the same thing that he flipped, and Eho always guesses the opposite of what he flipped. As a percentage, what is the probability that that they win in any one game? They will always win.

Biff flip	Eho flip	Win?
H	H	yes – Biff guessed H
H	T	yes – Eho guessed H
T	H	yes – Eho guessed T
T	T	yes – Biff guessed T

10 — 345 [= sum]

In the following array of numbers, each row and each column forms an arithmetic sequence of numbers, with the same number being added each time across the row or down the column. What is the sum of the five numbers in the last row, indicated by the shaded squares?

		25		
	50			
		47		
74				

The completed array is as follows, starting work in the 3rd column.

59	42	25	8	-9
64	50	36	22	8
69	58	47	36	25
74	66	58	50	42
79	74	69	64	59

The sum of the numbers in the last row is:
79 + 74 + 69 + 64 + 59 = 345

"Math is Cool" Masters -- 2023-24

4th Grade

College Bowl Round #1 Solutions

	Answer	Solution
1	48	What is the product of four and twelve? 4*12=48
2	9 [pieces]	Mr. Tosch has seven kids and wants to distribute his sixty-three candies between them equally. How many pieces will each of them get? 63/7=9
3	49 [square inches]	What is the area in square inches of a square with side length seven inches? $7^2 = 49\ in^2$
4	76	If two x plus five equals sixty-three, what is the value of three x minus eleven? 2x+5 = 63 => 2x = 58 => x=29 3(29)-11 = 87-11 = 76
5	12 [ways]	In how many distinct ways can you rearrange the letters in the word "COOL", spelled C O O L? *COOL, COLO, CLOO* *LOOC, LOCO, LCOO* *OCLO, OCOL, OOCL, OOLC, OLCO, OLOC* 12 total
6	3 [palindromes]	A palindrome is a whole number that reads the same forwards and backwards. How many palindromes are between thirty and fifty-eight? 33, 44, 55
7	29 [questions]	Charles is solving math problems at Math Is Cool. He is doing the individual test, which has forty questions. If it takes him three minutes to solve each question, how many questions will he have left to solve after thirty-three minutes have elapsed? 33 minutes / 3minutes per question = 11 questions 40 – 11 = 29 questions left

8	6 [apples]	Biff has fifteen apples, and then gives sixty percent of them to Eho. How many apples does Biff have left? 15*0.6 = 9 15-9 = 6
9	1839	Evaluate: Nine hundred seventy-five plus eight hundred sixty-four. 975 + 864 = 1839
10	48 [ounces]	How many ounces are in three pounds? 3 lbs * 16 oz/lb = 48 oz

"Math is Cool" Masters -- 2023-24

4th grade

College Bowl Round #2 Solutions

	Answer	Solution
1	150 [miles]	Leo drives for two and a half hours at sixty miles per hour. How many miles total did he travel? 2.5*60 = 150
2	25	What is the next number in the sequence that begins: one, four, nine, sixteen, and so on Perfect squares
3	1440 [minutes]	Ben plays tennis for two hours, six days a week. How many total minutes will he play for in two weeks? 60 minutes/hour * 2 hours/day * 6 days/week * 2 weeks = 1440 minutes
4	49	If x equals eleven, what is the value of six x minus seventeen? 6x-17 = 6(11) – 17 = 66 – 17 = 49
5	25 [%]	If Peter flips 2 fair coins, what is the probability as a percent that they both land on heads? $\frac{1}{2}$*1/2 = $\frac{1}{4}$ = 25%
6	10 [units]	The area of a circle is twenty-five times pie square units, and its circumference can be written as A times pie units. What is the value of A? Pi*r^2 = 25*pi => r = 5 2*pi*(5) = 10*pi A = 10
7	15 [days]	It takes Jax twenty minutes to read one chapter of his novel. If his novel has forty-five chapters, and he reads one hour every day, how many days will it take him to get through the entire book? (20 min/ch)*(45 ch's) = 900 min (900 min)/(60 min/hr) = 15 hr 15 hours at 1 hour per day is 15 days.
8	67	Evaluate: seven times eight plus eleven 7*8 + 11 = 56 + 11 = 67

9	24600	Round the number twenty four thousand, six hundred and seventeen to the nearest hundred. 24,617 rounds to 24,600
10	18	What is twice the sum of three and six? 2*(3+6) = 2*9 = 18

"Math is Cool" Masters -- 2023-24

4th grade

College Bowl Round #3 Solutions

	Answer	Solution
1	9	What is three squared? $3^2 = 9$
2	10 [%]	When rolling a fair ten-sided die, numbered one to ten, what is the probability, in percent, of rolling a three? 1/10 = 10%
3	2 [marbles]	Jaylen has twelve marbles in a bag. Four are green, two are yellow, and the remainder are blue. How many more blue marbles are there than green marbles? 12-4-2 = 6 blue marbles 6-4 = 2 more marbles
4	210	What is the product of the first four prime numbers? 2*3*5*7 = 210
5	5 [pieces]	Leon has a string measuring twenty-five centimeters, and cuts it into pieces of length fifty millimeters. How many pieces can he make without wasting any string? 25 cm * 10mm/cm = 250 mm 250 mm / 50 mm = 5
6	5	Josie writes down the numbers from ten to twenty-two, including ten and twenty-two. How many times does she write down the digit two? 1**2**, **2**0, **2**1, **22**
7	36 [cups of lemon juice]	To make two gallons of lemonade, it takes twenty-four cups of water, eight cups of lemon juice, and two cups of sugar. If Mrs. Stephenson wishes to make nine gallons of lemonade, how many cups of lemon juice are needed? 2 gallons of lemonade <-> 8 cups of lemon juice *9/2 9 gallons of lemonade <-> 36 cups of lemon juice
8	600 [seconds]	How many seconds are in ten minutes? 10*60 = 600

9	29 [inches]	What is the side length in inches of an equilateral triangle that has a perimeter of eighty-seven inches? 87/3 = 29
10	995	What is the largest three-digit whole number that is divisible by five? 995 is the largest 3-digit number that is divisible by 5.

"Math is Cool" Masters -- 2023-24

4th grade

College Bowl Round #4 Solutions

	Answer	Solution
1	10 [= average]	What is the average of ten, twelve, eleven and seven? (7+10+11+12)/4 = 40/4 = 10
2	46	What is the next number in the sequence that begins: Twenty-six, thirty-one, thirty-six, forty-one, and so on. Pattern is +5
3	241 [cents]	Seven quarters, three dimes, five nickels, and eleven pennies equals how many total cents? 7*25 + 3*10 + 5*5 + 11*1 = 175+30+25+11 = 241
4	105 [= sum]	What is the sum of all of the multiples of seven between one and forty? 7 + 14 + 21 + 28 + 35 = 105 or, 7(1 + 2 + 3 + 4 + 5) = 7(15)
5	2 [minutes]	A faucet releases five liters of water per minute in the winter, and ten liters per minute in the summer. If it takes the faucet four minutes to fill a bucket in the winter, how many minutes would it take in the summer to fill the same bucket? If it takes 4 minutes at 5 liters per minute, it is 4*5 = 20 liters 20 liters / 10liters/minute = 2 minutes
6	16 [inches]	A regular octogen and a regular hexagon have the same perimeter. If the side length of the octogen is twelve inches, what is the side length of the hexagon in inches? Octogen: 8*12 = 96 Hexagon: 96/6 = 16
7	6 [factors]	How many positive factors does the number twenty-eight have? 1, 2, 4, 7, 14, 28
8	14 [stones]	On a nature walk, Rosie collected thirty-seven stones. Fifteen stones were gray, eight stones were white, and the rest of the stones were black. How many stones were black? 37 – 15 – 8 = 14

9	50 [percent]	Thirty-two is what percent of sixty-four? 32/64 = $\frac{1}{2}$ $\frac{1}{2}$ * 100% = 50%
10	175 [miles]	A biker traveled at thirty-five miles per hour for five hours. How many miles did they travel? 35 * 5 = 175

"Math is Cool" Masters -- 2023-24

4th grade

College Bowl Round #5 Solutions

	Answer	Solution
1	30	What is the sum of the five smallest even whole numbers? 2+4+6+8+10 = 30
2	130 [inches]	In inches, what is the perimeter of a regular decagon with side length thirteen inches? 10 * 13 = 130
3	50 [%]	What is the probability, as a percent, that a random whole number chosen from one to ten, inclusive, is odd? 1,3,5,7,9 -> 5 numbers 5/10 = 50%
4	9	Colt tripled his favorite number, then added seven, and then halved the result. His final result was seventeen. What favorite number did he start with? Working backwards, before he halved it, it was 17*2=34, before he added 7 it was 34-7=27, and before he triple it, it was 27/3=9.
5	900 [$]	Gary, Barry, and Larry all are going on a trip, and each brought a certain amount of money. Gary brought twice as much as Barry, and Barry brought one hundred dollars less that Larry. If Larry brought three hundred dollars, how many dollars do the three of them have in total? Larry = $300 Barry = 300-100 = $200 Gary = 2*200 = $400 300 + 200 + 400 = 900
6	-243	What number comes next in the sequence that begins as follows: One, negative three, nine, negative twenty-seven, eighty-one, and so on. The pattern is to multiply by -3 each time. 81(-3) = -243
7	6	What is the greatest common factor of twelve and eighteen? 12 = 2x6 18 = 3x6

8	206 [yards]	How many yards are equivalent to six hundred eighteen feet? 618/3 = 206
9	375	Find the value of twenty squared minus five squared. $20^2 - 5^2 = 400 - 25 = 375$
10	180 [sq units]	In square units, what is the area of a right triangle with legs of length nine and forty units? $\frac{1}{2} * 9 * 40 = 180$

"Math is Cool" Masters -- 2023-24

4th grade

College Bowl Round #6 Solutions

	Answer	Solution
1	20	Not including forty, what is the largest even number that divides into forty without a remainder? Factors of 40 are: 1, 2, 4, 5, 8, 10, 20, 40
2	132	Find the sum of ten times twelve plus three times four. 10*12+3*4=120+12=132
3	10	What is the average of six and fourteen? (6+14)/2 = 20/2 = 10
4	22 [pints]	How many pints are in two gallons plus three quarts? 2 gallons = 16 pints 3 quarts = 6 pints 16 + 6 = 22 pints
5	56 [sq units]	A rectangle has sides of length five and ten units. One side length is decreased by three units and the other is increased by three units. What is the largest possible final area of the rectangle, in square units? (5-3)*(10+3) = 2*13 = 26 (5+3)*(10-3) = 8*7 = 56 56 is largest
6	131	What is the sum of all the prime numbers between forty and fifty? 41+43+47 = 131
7	99 [= the range]	What is the range of the following set of numbers? Twenty-three, fifty-four, one, eleven, thirty-two, sixty-eight, one hundred, ninety-six 100 – 1 = 99
8	90 [°]	In degrees, what is the measurement of one of the interior angles of a rectangle? Every interior angle of a rectangle measures 90 [°].

9	4 [turns]	Jay and Om are playing a dice game. Each turn they both roll a six-sided die and the player with the higher number adds the number they rolled to their score until someone's score totals twenty-one or more. If they roll the same number, they both add the number to their score. What is the least number of turns the game could take before someone wins? Assuming one of them gets 6 every time, it would still take them 4 turns to reach 21 (6, 12, 18, 24)
10	84 [days]	How many days are in one dozen weeks? 7 days/week * 12 weeks/dozen = 84 days

"Math is Cool" Masters -- 2023-24

4th grade

College Bowl EXTRA

	Answer	Solution
1	29 [= sum]	What is the sum of the next two terms in the sequence that begins as follows: one, four, seven, ten, and so on Pattern is +3. 10+3 = 13; 13+3=16 13+16=29
2	8	What is one-third of one-half of forty-eight? 1/3 * (1/2*48) = 1/3 * 24 = 8
3	[x=] 1	Find the value of x if two x plus one equals three x. 2x+1=3x -> 1=x
4	391	What is the product of seventeen and twenty-three? 17x23 = 391
5	5 [Starbursts]	Evan has a bag that has six total Starburst candies, two pink and 4 yellow. What is the least number of Starbursts Evan would have to randomly take out to ensure he has at least 1 pink Starburst? To guarantee he has a pink, he must get all the yellows, and then a pink on top of that, giving us 4+1 = 5.
6	5556	What is twelve thousand three hundred forty-five minus six thousand seven hundred eighty-nine? 12345-6789 = 5556
7	512 [cubic inches]	In cubic inches, what is the volume of a cube with a side length of eight inches? V = 8x8x8 = 512
8	96 [$]	Lily earns twelve dollars per hour and Rylan earns twice as much as Lily. How many dollars does Rylan earn in four hours? Rylan earns 12x2 = 24 $/hr 24x4 = 96 $