SOLUTIONS

Sum, difference, product and quotient

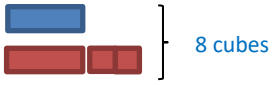
In Mathematics, most problems involve either a sum, difference, product, quotient, or a mixture of those. Let's learn about their definitions. You will need to know them to solve problems in this challenge.

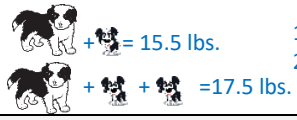
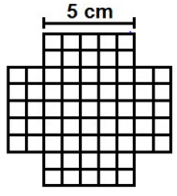
SUM *– The sum is the result of adding two or more numbers.*

DIFFERENCE *– The difference of two numbers is the result of subtracting these two numbers.*

PRODUCT *– The product of two or more numbers is the result of multiplying these numbers.*

QUOTIENT *– The quotient of two numbers is the result of the division of these numbers.*

Problems		*Answer*
1.	What is the sum of these numbers? 1 3 5 5 3 1	*18*
2.	Melissa placed red and blue cubes on the table. The sum of red and blue cubes is 8. There are 2 more red cubes than blue cubes. How many blue cubes did Melissa place on the table? Guess and check or draw a model.  8 cubes (8-2) ÷ 2 = 3 blue cubes	*3 [blue cubes]*
3.	Caitlin is thinking of a number that is less than 10. The difference between the number that she is thinking of and two is 5. What is the number that Caitlin is thinking of? □ – 2 = 5, □ =7	*7*
4.	Laura is thinking of two numbers that sum up to 15. If one number is 6, what is the difference of the two numbers? □ + ☆ = 15, □ = 6, then ☆ = 15 – 6 = 9 ☆ – □ = 9 – 6 = 3	*3*
5.	Anna writes all the numbers from 1 to 5 and finds the sum. Janessa writes all the numbers from 6 to 10, and finds the sum. Maya calculates the difference of Anna's and Janessa's numbers. What number does Maya get? Anna: 1 + 2 + 3 + 4 + 5 = 2 × 6 + 3 = 15 Janessa: 6 + 7 + 8 + 9 + 10 = 2 × 16 + 8 = 32 + 8 = 40 Maya: 40 – 15 = 25 Another way: Since each number Janessa is adding is 5 more than the corresponding Anna's number. Since there are 5 numbers, Maya would get 5 x 5 = 25.	*25*
6.	 What is the largest sum you can make by forming two 2-digit numbers using the above cards where each card can only be used once? In order to make the largest sum, you need a pair of largest numbers possible. 74 + 52 = 126 or 72 + 54 = 126	*126*
7.	The sum of the weights of Thalia and Beatrice is 118 kg. Thalia weighs 14 kg more than Beatrice. How many kg does Thalia weigh? Beatrice ▭ Thalia ▭ +14 kg } 118 kg 118 - 14 = 104 kg the weight of 2 identical Beatrice 104 ÷ 2= 52 kg the weight of Beatrice 52 + 14 = 66 kg the weight of Thalia	*66 [kg]*

8.	Alice adds all the numbers from 1 to 20. Bob adds all the numbers from 11 to 30. Tim subtracts Alice's answer from Bob's. What is the number Tim gets? Alice: 1 + 2 + 3 + … + 20 Bob :11+12 + 13 + … + 30 Each number Bob is adding is 10 more than the corresponding Alice's number. The answer is therefore 10 x 20 = 200. You can also do direct calculation.	*200*
9.	Jack's age is three times Derek's age, and Tim is twice as old as Derek. The sum of their ages is 36. How old is each boy? Derek Tim Jack 36 36 ÷ 6 = 6 year is 1 block, Derek is 6 6 × 2 = 12 Tim is 12 6 × 3 = 18 Jack is 18	*Jack: 18* *Derek: 6* *Tim: 12*
10.	Ananya has chosen 3 different positive whole numbers less than 20. She calculated that their product is 100. What is their sum? Find the factors of 100. 100: 1×100 = 2×50 = 4×25 = 5×20 = 10×10. Ananya chose 3 different positive whole numbers, so it must be 2×5×10 = 100, thus, 2+ 5 + 10 = 17	*17*
11.	Danika's dog gave birth to 7 puppies, all alike except for their colors. The weight of the mother and one puppy is 15.5 pounds. The weight of the mother and two puppies is 17.5 pounds. What is the sum of the weights of all 7 puppies in pounds?  = 15.5 lbs. =17.5 lbs. 17.5 – 15.5 = 2 lbs. is the weight of 1 puppy 2×7 = 14 lbs. is the sum of weights of all 7 puppies	*14 [lbs.]*
12.	Add, subtract, multiply, and/or divide the numbers shown to get an answer of **two**. You may change the order, but you must use every number once and only once. **10 8 7 6 4** Write an equation (number sentence) to show how you got your answer. Possible answers: 10/(6 + 4) + (8 - 7) = 2; 10 + 6 - (8/4 x 7) = 2; (10 - 7) x (8 - 6) - 4 = 2	*Possible answers:* *10/(6 + 4) + (8 - 7) = 2;* *10 + 6 - (8/4 x 7) = 2;* *(10 - 7) x (8 - 6) - 4 = 2*
13.	The sum of the digits of 2018 is a prime number. How many years will it be until the sum of the digits of the year is again a prime number? The year 2018 the digits of the year have a sum of 2+0+1+8 = 11. In year 2019 and 2020, the digits of the year have sums of 12 and 4 respectively. 2+0+2+1 = 5, 5 is a prime number.	*3*
14.	If the sum of 5 consecutive numbers is 450, find the positive difference between the first and last numbers. The middle number of the 5 consecutive numbers is 450/5 = 90. The 5 numbers are 88, 89, 90, 91, 92. The positive difference between the first and the last numbers is 92 – 88 = 4.	*4*
15.	David is writing a sequence of numbers whose first term is 1 and second term is 2. Each term after the second term is either the sum of the two previous terms if the sum is odd or the previous term if the sum is even. For example, if two consecutive terms in the sequence were 11 and 13, their sum would be even. Therefore, the next term would be 13. What is the 2018th term of David's sequence? Note that first several terms of the sequence are 1, 2, 3, 5, 5, … We note that after this, all the terms of the sequence are 5's because 5 + 5 is even. Thus 2018th term of the sequence is 5.	*5*
16.	The figure below is a map of all the streets of the city of Squareville. The length of each block on the map (horizontal or vertical) is 1 cm, and the scale of the map is 1:12000. What is the sum of length of all the streets (in km correct to 2 decimal places)?  5×8 = 40 cm 12×9 = 108 cm (40+108) × 12000 = 148×12000 = 17,776,000 cm 1 km = 1000 m = 1000×100 cm = 100,000 cm 17,776,000 ÷ 100,000 ≈ 17.76 km	*17.7~~8~~6*

17.	Find the sum of all the 3-digit whole numbers that can be formed by using the digits 4, 5 and 6. *Hint:* digits can be repeated so the following are valid 3-digit numbers that should be included in the sum 444, 655, and 666). Create a list of all possible numbers. __ __ __ As on the first position, it could be any of the digits 4, 5, 6, so there are 3 options to fill this position. As we allow repetition, there are 3 options to fill the 2nd and 3rd positions as well. 3 × 3 × 3 = 27 numbers 444 555 666 445 554 664 454 545 646 455 544 644 446 556 665 464 565 656 466 566 655 465 564 654 456 546 645 On every position we could have nine 4, nine 5, nine 6. Therefore, 9 × (4 + 5 + 6) = 135 1 4 9 8 5 Or add the number in every column. First column will give you the result of 4095. Second column = 4995, third column = 5895. Final sum is 4095 + 4995 + 5895 = 14985	*14985*
18.	The number 2005 is equal to the sum of 10 consecutive integers. What is the largest of these integers? Let's mark the biggest number as n, then the one before it (n-1), then (n-2),…(n-9) n + (n-1) +(n-2) + (n-3) + (n-4) + (n-5) +…+ (n-9) = 2005 10n – 45 = 2005, 10n = 2050, n = 205 You can also solve this problem using the model drawing.	*205*

Solution is available on 3/2/2018 at www.mathinaction.org