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Meaning of decompose in math

Decompose means to separate or break apart. We can decompose numbers as well as geometric shapes. Suppose you have just one sandwich made from two square-shaped bread slices, and you want to share it with your friend. What will you do? You can split the sandwich into two halves so that each one of you can enjoy it equally. So, now you will both have two triangle-shaped sandwiches. This means that you took a square shape and split it into two triangles. In other words, you decomposed the square to make two triangles. Does that sound interesting? Come on then, let's learn more about decomposition. It means to break apart numbers into two or more parts. All numbers can be split or broken down. For example, consider the number 6. Think of the different ways in which you may separate 6 into parts, 3 and 3 2 and 4 1 and 5 0 and 6 These parts are the decomposed numbers of 6. You can even reverse the order of the parts as well, such as: 3 and 3 4 and 2 5 and 1 6 and 0 Numbers can be decomposed in two ways: place value method and the addend method. In this method, you separate a number into its tens and ones. Example: Consider the number 14. It has two digits, 1 and 4. The digit 1 is in the tens place, and the digit 4 is in the ones place. This means 14 has 1 ten and 4 ones. You can write 14 as: $14 = 10 + 4$ (1 ten + 4 ones) So, 14 can be decomposed as $10 + 4$. Let us consider another example, 19. Here, digit 1 is in the tens place, and digit 9 is in the ones place. This means 19 has 1 ten and 9 ones. You can write 19 as: $19 = 10 + 9$ (1 ten + 9 ones) So, 19 can be decomposed as $10 + 9$. In this method, you separate a number into its different addends. Note: Addend refers to the numbers you add to form the sum. For example, $2 + 1 = 3$. Here, 2 and 1 are addends. Example: Consider the number 9. To decompose 9 into its addends, you will have to think of how you can create this number using smaller numbers. $9 = 0 + 9 = 1 + 8 = 2 + 7 = 3 + 6 = 4 + 5$ More Worksheets To decompose shapes means to break shapes into two or more shapes. The smaller shapes may resemble the larger shape or may be entirely new shapes. For example, let us take a rectangle. We can break it down to form smaller rectangles, triangles, a combination of squares and triangles, a combination of rectangles and triangles, etc. Figure 4 shows some of the shapes we can get by decomposing a rectangle. Decomposition in Math is evident in day-to-day life. Some examples of decomposing shapes in real-life are: Cutting a pizza into slices. Here, we break apart a circular figure into several sectors. Tearing an A4 sheet of paper into two halves. Here, we split a rectangle into two smaller rectangles. Cutting a slice of lemon in half. Here, we slice a circle into two semicircles. There are no fixed rules to follow when it comes to decomposing shapes. You have to think about breaking up a shape to form smaller standard geometric shapes. Consider figure 5 below, which depicts a rocket. When you think of it as a rocket, you will visualize a single figure. But when you think of it in terms of shapes, you will identify various geometric shapes. You can separate this figure into several smaller shapes, such as triangles, trapezoids, squares, and rectangles. Fig. 5: Figure depicting a rocket. Here, sections 1, 2, and 10 denote triangles; 3, 4, and 7 denote squares; 5 and 9 denote trapezoids; and sections 6 and 8 denote rectangles. Decomposition in Math is an essential skill for understanding higher concepts of math and geometry. Decomposing numbers helps to develop number sense and relationships between digits. Decomposing shapes sets the stage for understanding the concepts of perimeter, area, and volume. Example 1: Decompose the number 10. Solution: For decomposing 10, we separate it into its addends. $10 = 1 + 9$ $10 = 2 + 8$ $10 = 3 + 7$ $10 = 4 + 6$ $10 = 5 + 5$ Example 2: Decompose the number 12. Solution: in the number 12, the digit 1 is in the tens place, and the digit 2 is in the ones place. So, decomposing 12 into tens and ones will be equal to: $12 = 10 + 2$ (1 ten + 2 ones) Example 3: Can you decompose the given hexagon into three rhombuses? Solution: Yes, it is possible to decompose the given hexagon into three rhombuses. Let us consider O to be the center of the rhombus. We draw three line segments connecting the center to the three alternate vertices of the hexagon, A, E, and C. This will give us three rhombuses, AOE, AOC, and DEOC. The figure below illustrates this decomposition. Example 4: How can we decompose the given trapezoid into two triangles and a rectangle? Solution: We first draw two line segments, AE and DF, so that they meet the side BC at right angles. This will give us the rectangle AEF and the two triangles ABE and DCF. The figure below illustrates this decomposition. Attend this Quiz & Test your knowledge.A rectangle and a triangleA trapezoid and a triangleCorrect answer is: A trapezoid and a triangleIn a triangle, there are no curved edges or right angles. So, we can't break it into a circle or a rectangle. But if we draw a line segment DE that runs parallel to the base BC of the triangle, we will get a triangle ADE and a trapezoid DBCE. Correct answer is: All of the aboveIf we connect the opposite vertices of a rectangle with a line segment, we get two congruent triangles, as shown in figure (a) below. If we draw a line segment to connect the midpoints of the opposite sides of a rectangle (that are shorter), we get two congruent rectangles, as shown in figure (b) below. If we divide a rectangle into half and repeat the above steps, we get two congruent rectangles and triangles. Figure (c) below illustrates this decomposition. Correct answer is: 6 + 2If we add $6 + 2$, we get 8. But we don't get 8 on adding 4 and 3 or 4 and 1. So, we can break 8 as $6 + 2$. Correct answer is: $10 + 5$ Here, digit 1 is in the tens place, and digit 5 is in the ones place. So, we can split 15 as $10 + 5$ (1 ten and 5 ones). When we decompose a figure, can we get a shape that is congruent to the original shape? No, when we decompose a figure, we can't get a shape that is congruent to the original shape. This is because congruent shapes are of equal sizes, and decomposing means breaking down a shape into smaller shapes. What is the difference between composing and decomposing numbers? Composing numbers means adding two or more numbers to create a larger number. Decomposing numbers means breaking a number into smaller numbers. In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. It is essential to decompose the numbers to develop a clear concept of mathematics and geometry. Decomposition can either be of shapes or numbers. By decomposing the shape, we can get the parameters of the shape, while on the other hand, by decomposing the numbers, we can get a clear sense of numbers and their relations with the digits. Figure 1: Illustration of decomposition by prime factorization Composing vs. Decomposing Compose is the exact opposite of decompose. As decomposing means breaking numbers into their parts, composing in math means writing numbers together. In simple words, the numbers taken apart to write them together are called compose. For example, Compose 7 hundreds, 8 tens and, 2 ones. It is written as $700 + 80 + 2$, which equals 782. Compose 12 thousands, 3 hundreds, 7 tens, and 3 ones. It is written as $12000 + 300 + 70 + 3$, which is equal to 12373. Compose 5 hundreds and 5 tens. It is written as $500 + 50$ and equals 550. How Do Shapes Decompose? The decomposition of shape is to break the shape into other smaller shapes. The newly formed shape can be wholly different or the same in a smaller size. Let's take an example of a square. We can break this square into several different types of shapes. We can break it into smaller squares, or we can break it into a triangular form, or it can be a combination of triangles and squares or what so ever. Daily Life Examples Some real-life examples of decomposing of shapes are as follows: If we cut a pizza, we break a circular shape into triangular shapes. If we cut A4 size paper into two halves, we break a rectangular shape into two smaller rectangles. If we cut a lemon into two halves, we break a circle into two semi-circles. Figure 2: Illustration of decomposition of shapes. It is an irregular shape which is decomposed into two different shapes, a triangle and a square. It can further be decomposed into a rectangle. Process of Decomposing Shapes There's, as such, no rule for the decomposition of shapes. Consider an aeroplane. When you think of it, you will imagine only one figure. But when you think of it in shapes, different geometric shapes will definitely pop up in your mind. You can divide the figure into shapes like a trapezoid, rectangle, triangle and many others. How To Decompose Numbers? Decomposing numbers help us understand and comprehend patterns and relationship between large numbers or digits in an equation. Numbers are decomposed into thousands, hundreds, tens, and one's places or are decomposed by breaking numbers into various addends. Figure 3: Illustration of decomposition by the least common factor. In this figure, 72 and 120 are being decomposed, and their least common factor is 360. Methods To Decompose Numbers There are a couple of methods to decompose numbers, as discussed below. Method One: Decomposing Into Hundreds, Tens, and Ones Firstly, we will figure out the concept of ones and tens if we have a two-digit number without any decimal place. Then the number on the left side is tens, and the number on the right is ones. After knowing which digit is at the tens place and which is at one's place, break down the number into its parts. In other words, we can say numbers are taken apart. A three-digit number with no decimal place, the number on the right side is ones, the number on the left-hand side is hundreds, and the number in the middle is tens. When we break the three-digit number, we will decompose it into three pieces: ones, tens and hundreds. The same principle is applied to large numbers and infinite numbers. Now let us understand how decimals work. When we have digits on both sides of a decimal point, we must decompose them by breaking down numbers into parts on both sides. The tenth place is used by the single digit that comes right after the decimal point. The hundredth place is used when two digits are right after the decimal point. The thousandth place is used when there are three digits right after the decimal point. The left side can be decomposed by the same method when there is no decimal point in the equation. Method Two: Decomposing Into Various Addends Decomposing addends means breaking the numbers into a different sets of numbers. If we subtract one addend from the actual number, the required answer should be the second add, and when we add both, the actual number should be the sum we calculate. Example 1 Decompose the number 561.58 Solution The hundreds place is 5, so it can be written as 500 The tens place is 6, so it is written as 60 The ones place is 1, so it is written as 1 In tenths place, there is 5, so we can write it as: 0.5 At hundredths place, there is 8, so we can write it as 0.08 The final answer can be written as: $561.98 = 500 + 60 + 1 + 0.5 + 0.08$ Example 2 Decompose the number 73 Solution The tens place, there is 7, which is separated and written as: 70 In ones place there is 3, which is separated and written as 3 The final answer that we get in the end is written as $73 = 70 + 3$ Reminder: when a number is written in its standard form, it is called the standard form. But the form is expanded if written in its decomposed form. According to the previous example that we have written, "73" is the standard form and "70 + 3" is the expanded form, as the numbers are shown in the decomposed way. All images/graphs are created using GeoGebra. Decimal Point Definition < Glossary Index > Decrease Definition When elementary teachers talk about decomposition in math, they are referring to a technique that helps students understand place value and solve math problems more easily. It can be found in alternative formulas for problem solving as well as standard algorithms such as prime factorization. Decomposition and Place Value Decomposition is a useful tool for emphasizing the differing values of digits in a number. The number "362" can be broken down into 300 plus 60 plus 2 by decomposing it into hundreds, tens and ones. Decomposition and Problem Solving To decompose in basic operations, such as addition, subtraction, multiplication and division, means to take numbers apart in a problem to make it easier to understand and solve. Most elementary math programs teach an addition formula called "partial sums," which is based on decomposition. Partial Sums Addition When adding large numbers, such as 2,156 plus 3,421, it often helps to break the calculation apart and put the pieces together by place value. First, add the thousands to get 5,000. Second, put together the hundreds to gain 500. Third, combine the tens to form 70 and the ones to make 7. Finally, add all these partial sums together to solve the problem: 5,000 plus 500 plus 70 plus 7 equals 5,577. Prime Decomposition Around sixth grade, students learn the decomposition process of prime factorization, which helps in solving problems related to fractions. Primes are numbers that can only be divided by 1 or by themselves, such as 2, 3 and 5. The number 180, for example, can be decomposed into 2 times 2 times 3 times 3 times 5.