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Improve your time & pressure management skills!Learn in the language you are most comfortable with. Choose from any of our 8 languagesAIR 1|Delhi Judicial 2024!Start your learning journey now!LearnPracticeImproveSucceed We apply the following rules to convert a decimal number to octal. We divide the decimal number by 8 repeatedly until the quotient becomes 0. Starting at the least significant digit, we write the remainders in the same order of divisions. For example, to convert decimal 88 to octal, we divide 88 by 8 repeatedly until the quotient becomes 0. When we divide 88 by 8, the quotient is 11 and the remainder is 0. Thus, 0 is the least significant digit of the octal equivalent. We continue the algorithm with 11. When we divide 11 by 8, the quotient is 1 and the remainder is 3. Then 3 is the second least significant digit. Finally, we divide 1 by 8. When we do this operation, the quotient is 0 and the remainder is 1. Because the quotient is 0, we stop the procedure. Then we write the last remainder to the most significant digit of the octal number. To sum up, the octal representation of 88 is 130. (88)10 = (130)8 In case, the decimal number is not an integer, we can convert the whole number and fractional parts separately and add the octal equivalents up. To convert the fractional part of a decimal number, we apply the following rules. We multiply the fractional part by 8 repeatedly until the product becomes an integer or our calculations. At each step, we write the integer part of the rightmost digit to the fractional part of the octal number. We continue with the fractional part of the product. For example, to convert 88.37 to octal, we multiply the fractional part by 8 repeatedly. 0.37 × 8 = 2.96.06 × 8 = 7.68.068 × 8 = 5.44 The fractional part of 88.37 is 0.37. When we multiply 0.37 by 8, the result is 2.96. The integer part of 2.96 is 2. Thus we write 2 to the first digit on the RHS of the radix point. 0.2 We continue with the fractional part of 2.96. When we multiply 2.96 by 8, the result is 7.68. We write the integer part of 7.68 to the next digit of the octal. 0.27 The fractional part of 0.27 is 0.27. Therefore, we continue with this number. The product of 0.68 and 8 is equal to 5.44. We write the integer part to the next digit. (0.37)10 = (0.275...)8 Octal representation of 88.37 is equal to the sum of octal representations of 88 and 0.37. Thus, decimal 88.37 is equal to octal 130.275.... (88.37)10 = (88)10 + (0.37)10 = (130)8 + (0.275...)8 = (130.275...)8 Decimal to octal converter. Computes the octal equivalent of the entered decimal number and Describes each step of the conversion for both whole number and fractional parts, HOW TO USE DECIMAL TO OCTAL CONVERTER? You can use decimal to octal converter in two ways. You can enter a decimal number to the input box and click on the "CONVERT" button. The result and explanations appear below the calculator You can click on the DIE ICON next to the input box. If you use this property, a random decimal number is generated and entered to the calculator, automatically. You can see the result and explanations below the calculator. You can create your own examples and practice using this property. To check the octal equivalent of other decimals you can clear the input box by clicking on the CLEAR button under the input box. You can copy the generated solution by clicking on the "Copy Text" link, appears under the solution panel. Even you can download the solution as an image file with .jpg extension if you click on the "Download Solution" link at the bottom of the solution panel. You can share the downloaded image file. Download Article Everything you need to quickly convert base 10 into base 8 Download Article Octal is the base 8 number system, that only uses the digits 0 through 7. Its main advantage is the ease of conversion with binary (base 2), since each digit in octal can be written as a unique three-digit binary number.[1] Converting decimal to octal is a little more difficult, but you don't need to know any math past long division. Start with the division method, which finds each digit by dividing by powers of 8. The remainder method is faster and uses similar math, but it can be a little harder to understand why it works. 1 Use this method to learn the concepts. Of the two methods on this page, this method is easier to understand. If you're already confident working in different number systems, try the faster remainder method, below. 2 Write down the decimal number. For this example, we'll convert the decimal number 98 into octal. Advertisement 3 List the powers of 8. Remember that "decimal" is called base 10 because each digit represents a power of 10.[2] We call the first three digits 1s place, the 10s place, the 100s place — but we could also write this as the 100 place, the 101 place, and the 102 place. Octal, or the base 8 number system, uses powers of 8 instead of powers of 10. Write a few of these powers of 8 in a horizontal line, from largest to smallest. Note that these numbers are all written in decimal (base 10): 82 81 0 Rewrite these as single numbers: 64 8 1 You don't need any powers of 8 larger than your original number (in this case, 98). Since 83 = 512, and 512 is larger than 98, we can leave it off the chart. 4 Divide the decimal number by the largest power of eight. Take a look at your decimal number: 98. The nine in the 10s place tells you that there are nine 10s in this number. 10 goes into 98 nine times. Similarly, with octal, we want to know how many "64s" go into the final number. Divide 98 by 64 to find out. The easiest way to do this is to make a chart, reading top to bottom:[3]98÷ 64 8 1 = 1 — This is the first digit of your octal number. 5 Find the remainder. Calculate the remainder of the division problem, or the amount left over that doesn't go evenly. Write your answer at the top of the second column. This is what's left of your number after the first digit is calculated. In our example, 98 ÷ 64 = 1. Since 1 × 64 = 64, the remainder is 98 - 64 = 34. Add this to your chart:[4] 6 Divide the remainder by the next power of 8. To find the next digit, we move one step down to the next power of 8. Divide the remainder by this number and fill out your chart's second column. 7 Repeat until you've found the full answer. Just as before, find the remainder of your answer and write it at the top of the next column. Keep dividing and finding the remainder until you've done this for every column, including 80 (the ones place). Your final row is the final decimal number converted to octal.[5] Here's our example with the full chart filled out (note that 2 is the remainder of 34÷8): 98 34 2+ + ÷ + 64 8 1 = = 1 4 2 The final answer: 98 base 10 = 142 base 8. You can write this as 9810 = 1428 8 Check your work. To check your work, multiply each digit in octal by the power of 8 it represents. You should end up with your original number. Let's check our answer: 142 × 80 = 2 × 1 = 2 × 4 × 81 = 4 × 8 = 32 1 × 82 = 1 × 64 = 64 2 × 32 + 64 = 98, the number we started with. 9 Try this practice problem. Practice this method by converting the decimal number 327 into octal. When you think you have the answer, highlight the invisible text below to see the whole problem laid out. Highlight this area: 327 7 7+ + ÷ + 64 8 1 = = 5 0 7 The answer is 507. (Hint: it's fine to have 0 as the answer to a division problem.) Advertisement 1 Start with any decimal number. We'll start with the decimal number 670. This method is faster than the successive division method. Most people find it more difficult to understand why it works, and may want to start with the easier method above. 2 Divide this number by 8. Ignore decimal values for now. You'll see why this calculation is useful soon. In our example: 670 ÷ 8 = 83. 3 Find the remainder. Now that we've "counted by 8" as many times as we can, the remainder is the small number left over. This is the last digit of our octal number, in the ones place (80). The remainder is always smaller than 8, so it can't be represented by any of the other digits.[6] In our example: 670 ÷ 8 = 83 remainder 6. Our octal number so far is ????. If your calculator has a "modulus" or "mod" button, you can find this value by entering "670 mod 8." 4 Divide the answer to your division problem by 8. Set aside the remainder and return to your division problem. Take your answer and divide by 8 again. Note the answer, then find the remainder. This is the second-to-last digit of your octal number, the 81 = 8s place. In our example: The answer to our last division problem was 83. 83 ÷ 8 = 10 remainder 3. Our octal number so far is ?736. 5 Divide by 8 again. As before, take the answer to your last division problem. Divide it by 8 again, and find the remainder. This is the third-to-last digit of your octal number, the 82 = 64s place. In our example: The answer to our last division problem was 10. 10 ÷ 8 = 1 remainder 2. Our octal number so far is ?236. 6 Repeat until you find the final digit. When you calculate your last division problem, the answer will be 0. The remainder to this problem is the first digit in your octal number. You have now fully converted the decimal number. In our example: The answer to our last division problem was 1. 1 ÷ 8 = 0 remainder 1. Our final answer is the octal number 1236. We can write this as 12368 to show that it is an octal number. 7 Understand how this works. If you're having trouble understanding this method, here's an explanation:[7] You start with a pile of 670 units. The first division problem divides these into groups, with 8 units in each group. Anything left over, the remainder, doesn't fit into the octal 8s place. It must be in the 1s place instead. Now you take your pile of groups, and divide them into sections with 8 groups each. Each section now has 8 groups with 8 units each, or 64 units total. The remainder doesn't fit into these, so it can't fit into the octal 64s place. It must be in the 8s place. This continues until you discover the entire number. Advertisement Add New Question Question How I convert octal to decimal? Every number in the ones place counts as one, every number in the tens place counts as 8 and every number in the 100's place counts as 64. Use this formula to find the answer. Example: 326; 3(64)+2(8)+6(1); 92+16+6; 214. Question What is 40 decimal converted to octal solution? 50 octal is the solution you are looking for. Question How can I convert the decimal number 645 into octal number? 645÷8=80 rem 5 and then 80÷8=10 rem 0, next 10÷8=1 rem 2 and finally 1÷8=0 rem 1. The remainders in ascending order are the answer so your answer is 1205. See more answers Ask a Question Advertisement Try to convert these decimal numbers on your own, using either method above. When you think you have the answer, highlight the invisible text on the right side of the equation. (Note that 10 means decimal and 8 means octal.) 9910 = 1438 36310 = 5538 521010 = 121328 4756910 = 1347218 This article was reviewed by Joseph Meyer. Joseph Meyer is a High School Math Teacher based in Pittsburgh, Pennsylvania. He is an educator at City Charter High School, where he has been teaching for over 7 years. Joseph is also the founder of Sandbox Math, an online learning community dedicated to helping students succeed in Algebra. His site is set apart by its focus on fostering genuine comprehension through step-by-step understanding (instead of just getting the correct final answer), enabling learners to identify and overcome misunderstandings and confidently take on any test they face. He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. This article has been viewed 728,066 times. Co-authors: 22 Updated: February 24, 2025 Views: 728,066 Categories: Featured Articles | Conversion Aids Print Send fan mail to authors Thanks to all authors for creating a page that has been read 728,066 times. 1 practiced both methods. The division method laid the foundation for me, but the remainder method was so much faster once I got the hang of it! 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Joseph is also the founder of Sandbox Math, an online learning community dedicated to helping students succeed in Algebra. His site is set apart by its focus on fostering genuine comprehension through step-by-step understanding (instead of just getting the correct final answer), enabling learners to identify and overcome misunderstandings and confidently take on any test they face. He received his MA in Physics from Case Western Reserve University and his BA in Physics from Baldwin Wallace University. This article has been viewed 728,066 times. Co-authors: 22 Updated: February 24, 2025 Views: 728,066 Categories: Featured Articles | Conversion Aids Print Send fan mail to authors Thanks to all authors for creating a page that has been read 728,066 times. 1 practiced both methods. The division method laid the foundation for me, but the remainder method was so much faster once I got the hang of it! So cool how the answers to the practice problems weren't revealed until I highlighted them."... more Share your story * You can enter decimals with a notation, e.g.: 572 = 5.72e2. Octal to Decimal converter ► Decimal number is a number expressed in the base 10 numeral system. Decimal number's digits have 10 symbols: 0,1,2,3,4,5,6,7,8,9. Each digit of a decimal number counts a power of 10. Decimal number example:65310 = 6×102+5×101+3×100 Octal number is a number expressed in the base 8 numeral system. Octal number's digits have 8 symbols: 0,1,2,3,4,5,6,7. Each digit of an octal number counts a power of 16. Octal number example:6278 = 6×82+2×81+7×80 = 158010 How to convert from decimal to octal conversion steps: Divide the number by 8. Get the integer quotient for the next iteration. Get the remainder for the octal digit. Repeat the steps until the quotient is equal to 0. Example #1 Convert 756210 to octal: Division#8 Quotient(integer) Remainder(decimal) Digit # 7562/8 945 2 0 945/8 118 1 1 118/8 14 6 2 14/8 1 6 3 1/8 0 1 1 4 So 756210 = 166128 Example #2 Convert 3563110 to octal: Division#8 Quotient Remainder(decimal) Remainder(octal) Digit # 3563/8 445 3 7 0 445/8 55 5 1 556/8 69 4 4 2 69/8 8 5 3 8/8 1 0 0 4 1/8 0 1 1 5 So 3563110 = 1054578 Octal to octal conversion table Decimalbase 10 Octalbase 8 0 0 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 10 9 11 10 12 11 13 12 14 13 15 14 16 15 17 16 18 17 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080 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