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Divide by 8 rule

What do we mean by "x is divisible by y"? It means - If we divide x by y, the result is a whole number and the remainder is 0. So, if I say 99 is divisible by 9; it means the remainder of $99 \div 9$ is 0. Examples: 108 is divisible by 12 because $108 \div 12 = 9$ 75 is divisible by 3 because $75 \div 3 = 25$ 66 is not divisible by 4 because $66 \div 4$ leaves a remainder of 2. 0 is divisible by 9 because $0 \div 9 = 0$ What is a divisibility rule? Divisibility rules are shortcuts for determining whether a number is divisible by another; without actually performing the calculation. Let us look at the divisibility rules of various numbers: What is the divisibility rule for 1? Every number is divisible by 1, so there is no specific rule for this $x \div 1 = x$ for every x. What is the divisibility rule for 2? If the last digit of the number is 0, 2, 4, 6 or 8; the number is divisible by 2. Examples: Number Last digit Is Divisible as per rule? Remainder after actual calculation 128 8 Yes 0 9875 5 No 1 876578453 3 No 1 What is the divisibility rule for 3? If the sum of all the digits of the number is divisible by 3, the number is divisible by 3. This rule can be used repetitively till we get a single digit number. Examples: Number Sum of the digits Is Divisible as per rule? Remainder after actual calculation 87 15 Yes 0 9873 9 Yes 0 876578453 8 No 2 What is the divisibility rule for 4? If the number formed by the last 2 digits of the given number is divisible by 4, the given number is divisible by 4. Examples: Number Number formed by the last 2 digits Number formed by the last 2 digits divisible by 4? Number divisible as per the rule? Remainder after actual calculation 87 87 No No 3 9876544 44 Yes Yes 0 876578453 53 No No 1 98754304 4 Yes Yes 0 What is the divisibility rule for 5? If the last digit of the number is either 5 or 0, the number is divisible by 5. Examples: Number Last digit Number divisible as per the rule? Remainder after actual calculation 87 7 No 2 9876530 0 Yes 0 876578455 5 Yes 0 98754304 4 No 4 What is the divisibility rule for 6? If the number is divisible by both 2 and 3, the number is divisible by 6. Examples: Number Last digit Divisible by 2? Sum of the numbers Divisible by 3? Divisible by 6 as per the rule? Remainder after actual calculation 87 7 No Does not matter No 3 9876530 0 Yes 2 No No 5 8765784516 6 Yes 12 Yes Yes 0 987543042 2 Yes 6 Yes Yes 0 Note that in the first example, we need not find out if the number is divisible by 3. If it is not divisible by 2, it will not be divisible by 6 even if it is divisible by 3. What is the divisibility rule for 7? Double the last digit and subtract it from the number formed by the rest of the digits. If the result is divisible by 7, the original number is divisible by 7. This rule can be repeated over and over. Examples: Number Double of the last digit Number formed by the rest of the digits Result of the subtraction Result obtained by doing this repetitively Result divisible by 7? Divisible by 7 as per the rule? Remainder after actual calculation 872 4 87 87 - 4 = 83 No No 4 9876530 0 987653 987653 - 0 = 987653 95 No No 6 8950578 16 895057 895057 - 16 = 895041 0 Yes Yes 0 68355 10 6835 6835 - 10 = 6825 0 Yes Yes 0 What is the divisibility rule for 8? If the number formed by the last 3 digits of the given number is divisible by 8, the given number is divisible by 8. Examples: Number Number formed by the last 3 digits Number formed by last 3 digits divisible by 8? Divisible by 8 as per the rule? Remainder after actual calculation 872 872 Yes Yes 0 9876530 530 No No 2 8950576 576 Yes Yes 0 68355 355 No No 3 A quick method that I apply to check the divisibility of a number by 8 is to halve the number 2 times. If the result is a whole number, the number is divisible by 8. For eg. $872 / 2 = 436$ and $436 / 2 = 218$ which is a whole number. What is the divisibility rule for 9? If the sum of the digits adds up to 9, the given number is divisible by 9. This rule can be repeated till we get a single digit number. Examples: Number Sum of the digits Repeat the process till we get single digit Is the result 9? Divisible by 9 as per the rule? Remainder after actual calculation 872 17 8 No No 8 9876530 38 2 No No 2 5106888 36 9 Yes Yes 0 68355 27 9 Yes Yes 0 What is the divisibility rule for 10? If the last digit of the number is 0, the given number is divisible by 10. It can't get easier than that Number Last digit Divisible by 10 as per the rule? Remainder after actual calculation 872 2 No 2 9876530 0 Yes 0 What is the divisibility rule for 11? Add the digits in odd position. The add the digits in even position. If the difference between the 2 results is divisible by 11, the original number is divisible by 11. Number Sum of the digits in odd position Sum of the digits in even position Difference between the 2 sums Is the difference divisible by 11? Divisible by 11 as per the rule? Remainder after actual calculation 8709 8 + 0 = 8 7 + 9 = 16 16 - 8 = 8 No No 8 9876530 9 + 7 + 5 + 0 = 21 8 + 6 + 3 = 17 21 - 17 = 4 No No 4 96419818 9 + 4 + 9 + 1 = 23 6 + 1 + 8 + 8 = 23 23 - 23 = 0 Yes Yes 0 What is the divisibility rule for 12? If the number is divisible by both 3 and 4, it is divisible by 12. Examples: Number Sum of the digits Is the number divisible by 3? Number formed by last 2 digits Is the number divisible by 4? Divisible by 12 as per the rule? Remainder after actual calculation 8709 24 Yes 9 No No 9 9876530 11 No Does not matter No 2 1209180 21 Yes 80 Yes Yes 0 Note that in the second examples, we need not find out of the number is divisible by 4. Since it is not divisible by 3, it does not matter if it is divisible by 4. What is the divisibility rule for 13? Remember the sequence 1, 10, 9, 12, 3, 4. Multiply the right most digit of the number with the left most number in the sequence, the second right most digit to the second left most digit of the number in the sequence. The cycle goes on and repeats after 5 digits. Add the results of these multiplications. If the sum is divisible by 13, the number is divisible by 13. Examples: Sequence 1, 10, 9, 12, 3, 4 Number Sum as per the rule Is the sum divisible by 13? Divisible by 13 as per the rule? Remainder after actual calculation 8709 9 x 1 + 0 x 10 + 7 x 9 + 8 x 12 = 9 + 0 + 63 + 96 = 168 No No 12 7654321 1 x 1 + 2 x 10 + 3 x 9 + 4 x 12 + 5 x 3 + 6 x 4 + 7 x 1 = 1 + 20 + 27 + 48 + 15 + 24 + 7 = 142 No No 12 1586 6 x 1 + 8 x 10 + 5 x 9 + 1 x 12 = 6 + 80 + 45 + 12 = 143 Yes Yes 0 What is the divisibility rule for 14? If the number is divisible by both 2 and 7, the number is divisible by 14. Examples: Number Is the number divisible by 2? Is the number divisible by 7? Divisible by 14 as per the rule? Remainder after actual calculation 8709 No Does not matter No 1 7654321 No Does not matter No 11 1246 Yes Yes Yes 0 What is the divisibility rule for 15? If the number divisible by both 3 and 5, it is divisible by 15. Number Is the number divisible by 3? Is the number divisible by 5? Divisible by 15 as per the rule? Remainder after actual calculation 8709 Yes No 9 7654321 No Does not matter No 1 23505 Yes Yes Yes 0 There are divisibility rules for other numbers which we will discuss in another blog post. Stay tuned... Do you have any interesting problem or puzzle to share with us? Mail us on info@edunfinite.com and get your question/ solution posted on our blog. Thoughts of standing at a chalkboard and completing what seems like endless long division problems may have your students scared to tackle division. While thinking in terms of multiplication and division is different than addition and subtraction, your students can grasp it. For many, having a clear set of rules and structure helps to clarify the concept and give students a hand when they try to solve equations. As you begin your section on division, be sure to share these rules with your class and discuss them as a part of your math talk: Divisibility by 2 If the last digit in a number is 0 or an even number, it's divisible by 2. For instance, 20 ends in a 0. When divided in half, the result is 10, which is an even number. When students see a number that ends in an even digit, they should know the number can be divided into two evenly. However, numbers that end in odd digits can be divided by two, they'll just have a remainder or decimal. Divisibility by 3 A number is divisible by 3 if the sum of the digits is divisible by 3. To use this trick, students must have some ability to divide, but checking smaller numbers is less daunting than a large one. For instance, if you ask students if 168 is divisible by 3, they should do the following: $1 + 6 + 8 = 15$ $15/3 = 5$ Therefore, 168 is divisible by 3. Using divisibility rules can help students understand division. If the last two digits of a number are divisible by 4, the whole number is. For example, in 1,012, 12 is divisible by 4. However, in 1,013, 13 is not. Divisibility by 5 When the last digit of a number is 0 or 5, the number can evenly be divided by 5. As such, 5, 10, 15, 20, 25 and so on can all be divided by 5. Students can look at large numbers and say right away whether it can evenly be divided into five parts. Divisibility by 6 Numbers divisible by 6 can also be divided by both 3 and 2. Students should test the number with both rules for 3 and 2. If the number passes both tests, it can be divided by 6. If it fails just one, test it cannot. For instance: 308 ends in an even digit, so it's divisible by 2. However, $3 + 0 + 8 = 11$, which cannot be divided evenly by 3. As such, 308 is not divisible by 6. Divisibility by 8 "The divisibility rule for 9 is the same as for 3." A large number is divisible by 8 if the last three digits are also divisible by 8 or are 000. In 7,120, 120 can be divided evenly by 8, so the whole number is divisible by 8 as well. Divisibility by 9 The divisibility rule for 9 is the same as for 3, which makes sense given that 9 can be divided by 3. If the sum of a number's digits is divisible by 9, so too is the entire number. For example: In 549, $5 + 4 + 9 = 18$ $18/9 = 2$ So, 549 is divisible by 9. Divisibility by 10 If the last digit is 0, the number can be divided evenly by 10. Why the rules help and how to use them These rules allow students to look at larger numbers in a less-daunting context. Divisibility rules also let them learn a lot about a number by simply looking at its digits. As such, you should encourage students to use all rules when examining a number. When looking at something like 1,159,350, students can go down the divisibility list, checking off which numbers the large one can be divided by. Of course, you won't only talk about even division in your math class. Some numbers will have remainders. You can still use the rules to talk about those numbers. Have students determine whether a certain number will have a remainder when divided by 2, 3, 4, 5, 6, 8 or 10. For lesson plan ideas that utilize divisibility rules, take a look at our book "Math Matters: Understanding the Math You Teach, Grades K-8, Second Edition," and visit our website to find additional, free resources. what is divide rule. division by 8. how to divide by 8

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