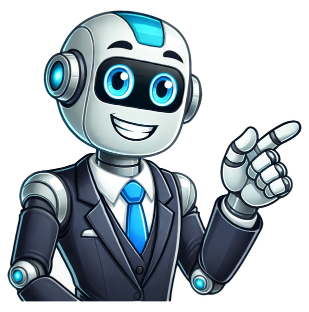

# Lcd math definition

The least common denominator (LCD) is the smallest number divisible by all denominators of the given set of fractions. It is the smallest number among the common multiples of the denominators.  In simple words, LCD is the LCM of the denominators of the given fractions. The concept of LCD in math is really useful when it comes to comparing, adding or subtracting unlike fractions. Example: Add the fractions $\frac{1}{9}$ and $\frac{3}{5}$.  To add any two fractions, firstly we check if the denominators are the same. Here, the denominators are 9 and 5.   Find the least common denominator. Multiples of $9 = 9,\; 18,\; 27,\; 36,\; 45$, ... Multiples of $5 = 5,\; 10,\; 15,\; 20,\; 25,\; 30,\; 35,\; 40,\; 45$, ... Common multiples of 9 and $5 = 45,\; 50,\; 95$, ... LCM (9, 5) $=$ LCD $(\frac{1}{9}$ and $\frac{3}{5})= 45$ The least common denominator of a set of fractions is the smallest number of all the common multiples of denominators. It is also known as the Lowest Common Denominator (abbreviated as LCD).  More Worksheets To find the least common denominator, we can use either of the ways as given below:  Listing Method One way is to list the multiples of both the denominators. This method is convenient to use when the denominators are small numbers. Example: Find the least common denominator of $\frac{5}{8}$ and $\frac{11}{12}$.  Multiples of $8 = 8,\; 16,\; 24,\; 32,\; 40,\; 48$,...  Multiples of $12 = 12,\; 24,\; 36,\; 48$,...  Common Multiples of 8 and $12 = 24,\; 48$,...  LCD $(\frac{5}{8} ,\; \frac{11}{12}) =$ LCM (8,12) $= 24$ We can make the denominators of $\frac{5}{8}$ and $\frac{11}{12}$ same by finding the LCD. Multiply both numerator and denominator of $\frac{5}{8}$ with 3. Multiply both numerator and denominator of $\frac{11}{12}$ with 2. $\frac{5}{8} \times \frac{3}{3}= \frac{15}{24}$ $\frac{11}{12}\times \frac{2}{2} = \frac{22}{24}$ Prime Factorization Method Find the prime factorization of the denominators. Identify the common (matching) factors. Note down the remaining factors. Multiply them together.  Example: $\frac{5}{21},\; \frac{3}{30}$ Prime factorization of $21 = 3\times7$ Prime factorization of $30 = 3\times2\times5$ Common factors $= 3$ Uncommon factors $= 2,\; 7,\; 5$ LCD $= 2 \times7 \times5 \times3 = 210$ NOTE: If the two or more denominators have HCF $= 1$, simply multiply the denominators to find the LCD.  For example, $\frac{1}{9}$ and $\frac{4}{7}$.  Since the HCF of 9 and 7 is 1, the Least Common Denominator is the product of two denominators. On multiplying the denominators, we get $9 \times 7 = 63$.  The concept of LCD in math is really helpful when working with fractions. Let's see how to simplify operations on fractions using the least common denominator. We will discuss two points. Comparing & ordering fractions using the least common denominator Adding and subtracting fractions using the least common denominator We can easily compare and order unlike fractions by finding LCD. Example: Find the LCD of the fractions: $\frac{3}{5},\;\frac{4}{6},\;\frac{9}{20}$ 5 5 10 15 20 25 30 35 40 45 50 55 60 6 6 12 18 24 30 36 42 48 54 60 66 72 20 20 40 60 80 100 120 140 160 180 200 220 240 Using the table of multiples above, we can observe that LCM of 5, 20 and $6 = 60$. Thus, LCD of the given fractions is 60  The fractions can be rewritten as: $\frac{36}{60},\;\frac{40}{60},\;\frac{27}{60}$ Ascending order: $\frac{27}{60}\lt\frac{36}{60}\lt\frac{40}{60} \Rightarrow \frac{9}{20}\lt\frac{3}{5}\lt\frac{4}{6}$ Descending order: $\frac{40}{60}\gt\frac{36}{60}\gt\frac{27}{60} \Rightarrow \frac{4}{6}\gt\frac{3}{5}\gt\frac{9}{20}$ Using the least common denominator, fractions can be added and subtracted. Example 1: Find: $\frac{5}{6}\;-\;\frac{9}{20}$. $6 = 2 \times 3$ $20 = 2 \times 2 \times 5$ LCM (6, 20) $= 2 \times2 \times3 \times5 = 60$ LCD $(\frac{5}{6},\;\frac{9}{20}) = 60$ $\frac{5\times10}{6\times10} = \frac{50}{60}$ $\frac{9\times3}{20\times3} = \frac{27}{60}$ We get $\frac{5}{6}\;-\;\frac{9}{20} = \frac{50}{60}\;-\;\frac{27}{60} = \frac{13}{60}$ Example 2: Find $\frac{3}{4} + \frac{1}{5}$.  Since GCD$(4,\; 5) = 1$, LCM $(4,\; 5) = 4\times 5 =  20$ LCD$(\frac{3}{4},\;\frac{1}{5}) = 20$ The fractions can be rewritten as $\frac{15}{20}$ and $\frac{4}{20}$. Sum $= \frac{15}{20} + \frac{4}{20} = \frac{19}{20}$ In this article, we learned about Least Common Denominator, its definition, applications along with examples on how to find LCD. Let's solve a few more examples and practice problems for better understanding. 1. Find the LCD for $\frac{2}{5},\;\frac{1}{7}$ and $\frac{4}{9}$.  Solution: The denominators 5, 7, and 9 have no common factors other than 1. HCF (5, 7 and 9) $= 1$ Thus, LCM (5, 7 and 9) $= 5 \times 7 \times 9 = 315$ LCD$(\frac{2}{5},\;\frac{1}{7},\;\frac{4}{9}) =  315$. 2. Simplify: $\frac{21}{4}\;-\;\frac{7}{3}$ Solution: We will first find the LCD of the denominators. LCM (3, 4) $= 12$ LCD $(\frac{21}{4},\;\frac{7}{3}) = 12$ $\frac{21\times3}{4\times3} = \frac{63}{12}$ and $\frac{7\times4}{3\times4} = \frac{28}{12}$ $\frac{21}{4}\;-\;\frac{7}{3} = \frac{63}{12}\;-\;\frac{28}{12} = \frac{35}{12}$ 3. Find the LCD of $\frac{7}{8}$ and $\frac{1}{6}$ by listing multiples. Solution: Multiples of $8 = 8,\; 16,\; 24,\; 32,\; 40,\; 48$, ... Multiples of $6 = 6,\; 12,\; 18,\; 24,\; 30,\; 36$, ... LCM(8, 6) $= 24$ Thus, LCD$(\frac{7}{8},\; \frac{1}{6}) = 24$ 4. Compare the fractions $\frac{2}{9},\;\frac{3}{4}$.  Solution: 9 and 4 have no common factor other  than 1. Thus, LCM(4, 9) $= 9\times4 = 36$ Thus, LCD$(\frac{7}{8}$ and $\frac{1}{6}) = 36$ Let's rewrite the fractions using the common denominator. $\frac{2}{9} = \frac{8}{36}$ and $\frac{3}{4} = \frac{27}{36}$ Here, $\frac{8}{36} \lt \frac{27}{36}$ Thus, $\frac{2}{9} \lt \frac{3}{4}$ Attend this Quiz & Test your knowledge.$\frac{1}{6}\lt\frac{5}{8}$$\frac{2}{7}\lt\frac{1}{11}$$\frac{2}{3}\lt\frac{8}{13}$$\frac{1}{10}\gt\frac{7}{8}$Correct answer is: $\frac{1}{6}\lt\frac{5}{8}$LCD $=$ LCM $(6,\; 8) = 24$ $\frac{1\times4}{6\times4} = \frac{4}{24}$ and $\frac{5\times3}{8\times3} = \frac{15}{24}$ $\frac{4}{24}\lt\frac{15}{24}$Correct answer is: LCMThe LCD of fractions is calculated by finding the LCM of the denominators.Correct answer is: $\frac{5}{12}$3 and 4 are coprimes. So, HCF$(3,\; 4) = 1$ LCM $(3,\; 4) = 12$ Thus, LCD of $\frac{1}{3}$ and $\frac{1}{4}$ is $3\times4 = 12$.Correct answer is: divisible bySince the LCD is a LCM of denominators. Thus, it is basically a multiple of denominators. Thus, it is divisible by all denominators. What is the difference between LCM and LCD? Are LCM and LCD the same or different? LCD of fractions is the LCM of the denominators of the fractions. LCM of two or more numbers is the smallest number of common multiples of given numbers. How is LCD different from the common denominator? Least Common Denominator is the smallest common multiple of the common multiples of the denominators of a set of fractions. On the other hand, the common denominator is the common multiple of the denominators. For example: For the fractions $\frac{3}{5}$ and $\frac{2}{7}$, the least common denominator is 35. The common denominator can be 35, 70, 105, etc. How are the LCD and GCF different? LCD stands for Least Common Denominator and GCF stands for Greatest Common Factor. They are just about opposites. LCD is the least multiple that is the same for two or more denominators whereas, the GCF of two or more numbers is the greatest factor that these numbers share. Can you find the LCD by simply multiplying the denominators? Multiplying all of the denominators results in a common denominator between the fractions, it does not always give you the LCD. If the GCF of denominators is 1, then the LCD of fractions can be calculated by simply multiplying the denominators. The lowest Common Denominator or Least Common Denominator is the Least Common Multiple of the denominators of a set of fractions.  Common denominator : when the denominators of two or more fractions are the same. Least Common denominator is the smallest of all common denominators. Why do we need LCD ? It simplifies addition, subtraction and comparing fraction.Common Denominator can be simply evaluated by multiplying the denominators. In this case, 3 * 6 = 18 But that may not always be least common denominator, as in this case LCD = 6 and not 18. LCD is actually LCM of denominators.Examples :   LCD for fractions 5/12 and 7/15 is 60. We can write both fractions as 25/60 and 28/60 so that they can be added and subtracted easily. LCD for fractions 1/3 and 4/7 is 21. Example Problem : Given two fractions, find their sum using least common dominator.Examples:   Input : 1/6 + 7/15 Output : 19/30 Explanation : LCM of 6 and 15 is 30. So, 5/30 + 14/30 = 19/30 Input : 1/3 + 1/6 Output : 3/6 Explanation : LCM of 3 and 6 is 6. So, 2/6 + 1/6 = 3/6 Note* These answers can be further simplified by Anomalous cancellation.   C++ // C++ Program to determine // LCD of two fractions and // Perform addition on fractions #include using namespace std; // function to calculate gcd // or hcf of two numbers. int gcd(int a, int b) { if (a == 0) return b; return gcd(b % a, a); } // function to calculate // lcm of two numbers. int lcm(int a, int b) { return (a * b) / gcd(a, b); } void printSum(int num1, int den1, int num2, int den2) { // least common multiple // of denominators LCD // of 6 and 15 is 30. int lcd = lcm(den1, den2); // Computing the numerators for LCD: // Writing 1/6 as 5/30 and 7/15 as // 14/30 num1 *= (lcd / den1); num2 *= (lcd / den2); // Our sum is going to be res_num/lcd int res_num = num1 + num2; cout