# LEAST COMMON MULTPLE

To convert 'unlike fractions' into equivalent 'like fractions' one requires the least common multiple of the unlike denominators.

**FACT 1: The product of denominators provides a common multiple.**

A common multiple of 10 and 15 is 10x15 = 150.

150 is a multiple of 10.

150 is also a multiple of 15

**FACT 2: The least common multiple (LCM) is the smallest common multiple of the denominators.**

150 is not the least common multiple of 10 and 15.

Multiples of 10 are: 10, 20, **30** …

Multiples of 15 are: 15, **30** …

Thus, the least common multiple of 10 and 15 is **30**.

**FACT 3: We obtain the LCM by eliminating any repeat occurrence of a common factor from the product of denominators.**

One repeat occurrence of the common factor '5' is eliminated to get the LCM.

Product = $10 \times 15$ = $(2 \times \mathbf{5}) \times (3 \times \mathbf{5})$ = 150

Least Common Multiple = $(2 \times \mathbf{5}) \times (3 \times \not{\mathbf{5}})$ = 30

**FACT 4: We may eliminate the repeat occurrence of common factor by applying side by side division to the denominators as follows.**

We divide the denominators by common factor. The LCM is the product of the common factor with the remaining factors in the bottom row.

**5 | 10, 15** (Divide by the common factor 5)

**2, 3**

**LCM = 5 x 2 x 3 = 30**

Find the LCM of 42 and 63.

**7 | 42, 63** (7 is a common factor)

**3 | 6, 9** (3 is a common factor)

**2, 3** (There are no more common factors)

**LCM = 7 x 3 x 2 x 3 = 126**

**FACT 5: For more than two denominators, a common prime factor to any two of the denominators may be taken out as follows.**

Find the LCM of 9, 14 and 21.

**3 | 9, 14, 21** (3 is a prime factor common to 9 and 21, bring 14 down as-is)
**7 | 3, 14, 7** (7 is a prime factor common to 14 and 7, bring 3 down as-is)
**3, 2, 1** (No prime factor is common to any two of these numbers)

**LCM = 3 x 7 x 3 x 2 x 1 = 126**

**FACT 6: We use LCM is the common denominator of the equivalent "like" fractions.**

To compare 7/10 to 11/15, we compute the LCM of 10 and 15 as 30 (see FACT 4).

$$\frac{7}{10} = \frac{7 \times 3}{10 \times 3} = \frac{21}{30} \quad \text{and} \quad \frac{11}{15} = \frac{11 \times 2}{15 \times 2} = \frac{22}{30}$$

Since $\frac{21}{30} < \frac{22}{30}$, therefore $\frac{7}{10} < \frac{11}{15}$

1. **Find the LCM (Least Common Multiple) of the following set of numbers:**

(a) 4 and 9 (b) 6 and 9 (c) 14 and 42 (d) 36 and 60
(e) 6, 15 and 18 (f) 6, 13 and 26 (g) 26, 33, 39 and 44

Answer: (a) 36 (b) 18 (c) 42 (d) 180 (e) 90 (f) 78 (g) 1716

2. **Use to LCM to find the equivalent like fractions for the following pairs of fractions.**

(a) $\frac{3}{5}, \frac{3}{10}$ (d) $\frac{5}{9}, \frac{7}{12}$ (g) $\frac{7}{15}, \frac{11}{25}$ (j) $\frac{9}{14}, \frac{11}{21}$
(b) $\frac{5}{6}, \frac{8}{9}$ (e) $\frac{3}{10}, \frac{4}{15}$ (h) $\frac{1}{6}, \frac{1}{8}$ (k) $\frac{19}{24}, \frac{11}{16}$
(c) $\frac{3}{4}, \frac{1}{6}$ (f) $\frac{3}{8}, \frac{5}{12}$ (i) $\frac{5}{9}, \frac{7}{15}$ (l) $\frac{13}{20}, \frac{11}{15}$

Answer: (a) 6/10, 3/10 (b) 15/18, 16/18 (c) 9/12, 2/12 (d) 20/36, 21/36
(e) 9/30, 8/30 (f) 9/24, 10/24 (g) 35/75, 33/75 (h) 4/24, 3/24
(i) 25/45, 21/45 (j) 27/42, 22/42 (k) 38/48, 33/48 (l) 39/60, 44/60

**End of Lesson**