MATH 0500 SUPPLEMENT

LEAST COMMON MULTIPLE (LCM): HORIZONTAL-LINE METHOD

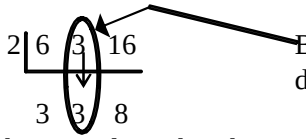
The following is an alternative method for determining the Least Common Multiple of a set of numbers. Students usually find this method easy to learn and use, especially when studying the Least Common Denominator (LCD) needed for the second test.

Example 1: Find the LCM for 6, 3 and 16

First - Write the numbers in a horizontal line.

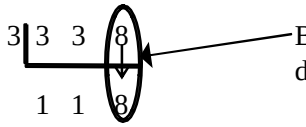
6 3 16

Second - Divide by the smallest prime number that will evenly (no remainder) divide at least two of the numbers. In this case, 2 will divide 6 and 16.



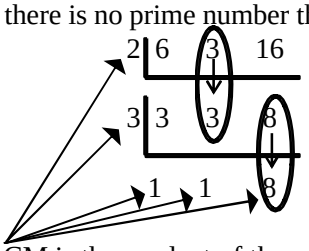
Bring down any number that cannot be divided evenly by 2.

Third - Repeat the second step but this time divide at least two of the bottom numbers.



Bring down any number that cannot be divided evenly by 3.

Since there is no prime number that divides at least two of the bottom numbers, we are finished.



The LCM is the product of the outside numbers: 2 x 3 x 1 x 1 x 8 = 48

RULE: To determine the Least Common Multiple (LCM):

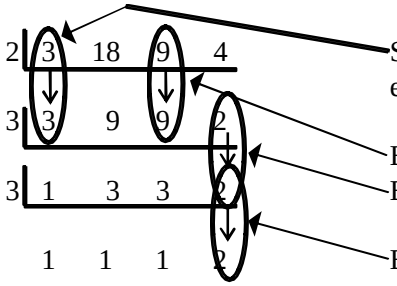
1. Write the numbers in a horizontal line.
2. Divide by the smallest prime number that divides at least two of the numbers. Bring down any number(s) that cannot be divided evenly.
3. Repeat the second step until no prime number will evenly divide at least two of the bottom numbers.

Example 2: Find the LCM of 3, 18, 9 and 4

The smallest prime that divides at least two of them is 2.

Here, 3 is the smallest.

Here again, 3 is the smallest.



Since 3 cannot be divided evenly by 2, bring it down.

Bring down.

Bring down.

Bring down.

At this point, there is no prime that divides at least two of the bottom numbers--so we are finished.
The LCM is the product of the outside numbers: 2 x 3 x 3 x 1 x 1 x 1 x 2 = 36

Example 3: Find the LCM of 7 and 5

$$\begin{array}{r|l} & 7\ \ 5 \\ \hline \end{array}$$

No prime number divides 7 and 5 evenly; therefore, the LCM is
$7 \times 5 = 35$

Example 4: Find the LCM of 6 and 9

$$\begin{array}{r|l} 3 & 6\ \ 9 \\ \hline & 2\ \ 3 \end{array}$$

The LCM is $3 \times 2 \times 3 = 18$

Example 5: Find the LCM of 12, 15 and 24

$$\begin{array}{r|l} 2 & 12\ \ 15\ \ 24 \\ \hline 2 & 6\ \ 15\ \ 12 \\ \hline 3 & 3\ \ 15\ \ 6 \\ \hline & 1\ \ 5\ \ 2 \end{array}$$

The LCM is $2 \times 2 \times 3 \times 1 \times 5 \times 2 = 120$

Example 6: Find the LCM of 4, 12 and 18

$$\begin{array}{r|l} 2 & 4\ \ 12\ \ 18 \\ \hline 2 & 2\ \ 6\ \ 9 \\ \hline 3 & 1\ \ 3\ \ 9 \\ \hline & 1\ \ 1\ \ 3 \end{array}$$

The LCM is $2 \times 2 \times 3 \times 1 \times 1 \times 3 = 36$

SELF-TEST

Use the Horizontal-Line Method to find the Least Common Multiple (LCM) of the following:

1) 6, 18

2) 3, 5, 6

3) 3, 5, 7

4) 24, 36, 40

5) 12, 42, 39

6) 17, 51, 68, 12

ANSWERS

1) 18 2) 30 3) 105

4) 360 5) 1092 6) 204

Revised 10/27/97