

Dr Oliver Mathematics

Lowest Common Multiple

For the lowest common multiple of a set of numbers we could simply list the multiples of one of them and stop as soon as we found one that is divisible by the other numbers but, again, it is easier to use the prime factorisations.

Once you have these, for each prime that appears anywhere in any of the factorisations, choose the largest power of that prime and then the lowest common multiple is the product of these powers of primes.

1. Find the lowest common multiple of 75, 80, and 98.

Solution

$$75 = 3 \times 5^2$$

$$80 = 2^4 \times 5$$

$$98 = 2 \times 7^2.$$

So the primes we need to consider are 2, 3, 5, and 7:

- 80 contains 2^4 and 98 contains $2 = 2^1$ and so we choose 2^4 .
- 75 contains $3 = 3^1$ (no other number has a power of 3) and so we choose 3.
- 75 contains 5^2 and 80 contains $5 = 5^1$ and so we choose 5^2 .
- 98 contains 7^2 (no other number has a power of 7) and so we choose 7^2 .

Hence

$$\text{LCM}(75, 80, 90) = 2^4 \times 3 \times 5^2 \times 7^2 = \underline{\underline{58\,800}},$$

and clearly it would have been rather time consuming to begin listing, say, the multiples of 90 until such time as you found one that was divisible by both 75 and 80.