

The Greatest Common Factor (GCF)

The GCF of two or more numbers is the greatest factor the numbers have in common.

Example: What is the GCF of 76 and 148?

Solution: $76 = 2 \times 38 = 2 \times 2 \times 19$

$148 = 2 \times 74 = 2 \times 2 \times 37$

Since both have two 2's in common, the GCF is 4 (2×2).

Another way to think of GCF is 'What is the largest number that divides into all the numbers in question?'

Example 2: What is the GCF of 420, 555, and 615?

Least Common Multiple (LCM)

The LCM of two or more numbers is the least (smallest) number that is divisible by each number.

Example: What is the LCM of 32 and 50?

Solution: Multiples of 32 – 32, 64, 96, 128, 160, 192, 224, 256, 288,
320, 352, 384, 416, 448, 480, 512, 544, 576,
608, 640, 672, 704, 736, 768, 800, 832, 864,...

Multiples of 50 – 50, 100, 150, 200, 250, 300, 350, 400, 450,
500, 550, 600, 650, 700, 750, 800, 850, 900,...

The LCM is 800.

A lot of work....is there a more efficient way of finding the answer?

Yes! Let's break down 32 and 50 into prime factors.

$$32 = 2 \times 2 \times 2 \times 2 \times 2$$

$$50 = 2 \times 5 \times 5$$

$$\text{LCM} = 2 \times 5 \times 5 \times 2^4 = 800$$

(GCF x the highest power of all remaining primes or the product of the highest power of all unique primes)

Example 2: Find the least common multiple of 20, 36, 38.

$$20 = 2 \times 2 \times 5 = 2^2 \times 5$$

$$36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$$

$$38 = 2 \times 19 = 2 \times 19$$

$$\text{LCM} = 2 \times 2 \times 3^2 \times 5 \times 19 = 3420 \quad (\text{or } 2^2 \times 3^2 \times 5 \times 19)$$

Example 3: Find the least common multiple of 28, 40, 44.

$$28 =$$

$$40 =$$

$$44 =$$