

## Least Common Multiple and Greatest Common Factor

When working with a group of two or more numbers, we sometimes have to find two special numbers, the least common multiple and the greatest common factor.

### Least Common Multiple

The Least Common Multiple is the smallest number that is a multiple of each number in the group. The least common multiple of 2 and 3 is 6 since it is the smallest number both 2 and 3 divide evenly

Finding the least common multiple.

Factor each number

Write down all the factors of the first number

Add in the factors from the other numbers that are not in the LCM already

Multiply all the numbers together

Ex.

Find LCM for 30 and 45

$$30 = 2 \cdot 3 \cdot 5$$

$$45 = 3 \cdot 3 \cdot 5$$

LCM – start with 30 and write down  $2 \cdot 3 \cdot 5$

Look at 45, it has 2-3's and a 5, the LCM has a 5 but only one 3 so we put in the other 3 to get

$$\text{LCM} = 2 \cdot 3 \cdot 5 \cdot 3 = 90$$

Ex.

Find LCM for 6, 8, 15

$$6 = 2 \cdot 3$$

$$8 = 2 \cdot 2 \cdot 2$$

$$15 = 3 \cdot 5$$

LCM – start with 6 and get  $2 \cdot 3$

Go to 8 and put in 2 3's and get  $2 \cdot 3 \cdot 2 \cdot 2$

Go to 15 and put in the 5 and get  $2 \cdot 3 \cdot 2 \cdot 2 \cdot 5$

$$\text{LCM} = 2 \cdot 3 \cdot 2 \cdot 2 \cdot 5 = 120$$

### Greatest Common Factor

The greatest common factor is the largest number that is a factor of each number in the set of numbers. It is used in the reduction of fractions.

Finding the Greatest Common Factor

Factor each number

Look at each factor in the first number and if it occurs in the other numbers (if it occurs in all numbers then include it in the GCF)

Ex.

Find the GCF of 8 and 12

$$8 = 2*2*2$$

$$12 = 2*2*3$$

GCF – look at first 2 in 8 it is also in 12 so get 2 so far

$$8 = 2*2*2$$

$$12 = 2*2*3$$

now go to the next 2 of 8 it is also in 12 so we get  $2*2$  so far

$$8 = 2*2*2$$

$$12 = 2*2*3$$

now go to the next 2 of 8 it is not in 12 so we have  $2*2 = 4$  as the GCF

Ex.

Find the GCF of 60 and 200

$$60 = 2*2*3*5$$

$$200 = 2*2*2*5*5$$

look at things in common

$$60 = 2*2*3*5$$

$$200 = 2*2*2*5*5$$

so the GCF is  $2*2*5 = 20$