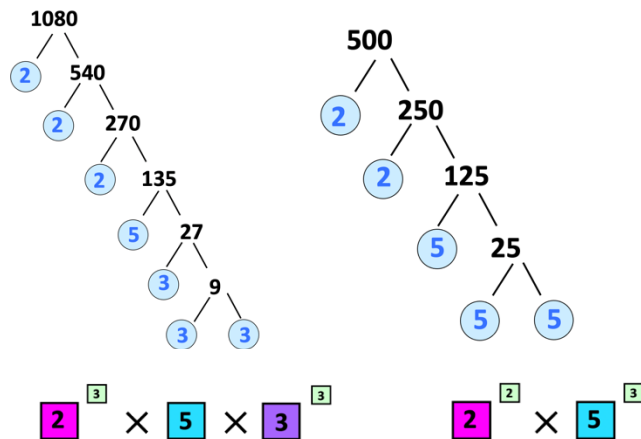


**Step 1:** Write each number as a product of its prime factors using a factor tree

For example **1080** and **500**:

Let's first make a factor tree for each number



Note: You are sometimes given a product of prime factors (see example 2 below)

**Step 2:** There are 2 ways to deal with this. First of all, let's define a base and power

$$8 = 2^3$$

base      power

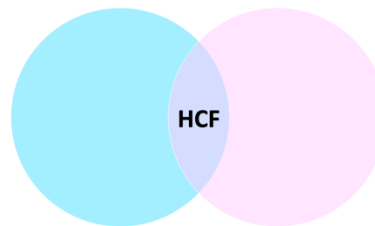
**Way 1:**

- HCF: Pick the **lowest power** of each base that is **common** to both. Multiply these answers together.
- LCM: Pick the **highest power** of **every** base number that appears. Base number doesn't need to be common this time

Example 1	Example 2
<p style="text-align: center;"><b>Find the HCF and LCM of 1080 and 500</b></p> <p>First we make a factor tree</p> <p style="text-align: center;"> <math>2^3 \times 3^3 \times 5</math>      <math>2^2 \times 5^3</math> </p> <p><b>HCF:</b> Only the pink and blue bases are common            So pick the 2 and 5            We want the <b>lowest powers</b> of each of these bases  <math>2^2 \times 5 = 20</math></p> <p><b>LCM:</b> pick every base            So pick 2,3,5            We want the <b>highest powers</b> of each of these  <math>2^3 \times 3^3 \times 5^3 = 27,000</math></p>	<p style="text-align: center;"><b>Find the HCF and LCM of</b></p> <p style="text-align: center;"> <math>2^2 \times 3^3 \times 5 \times 7^2</math>  <math>2^3 \times 5^2 \times 7^3</math> </p> <p>Let's colour code these</p> <p><math>2^2 \times 3^3 \times 5 \times 7^2</math>:</p> <p style="text-align: center;"> <math>2^2 \times 3^3 \times 5 \times 7^2</math> </p> <p><math>2^3 \times 5^2 \times 7^3</math>:</p> <p style="text-align: center;"> <math>2^3 \times 5^2 \times 7^3</math> </p> <p><b>HCF:</b> Only the pink, blue and purple bases are common            So pick the 2, 5 and 7            We want the <b>lowest powers</b> of each of these bases  <math>2^2 \times 5 \times 7^2 = 980</math></p> <p><b>LCM:</b> pick every base            So pick 2,3,5,7            We want the <b>highest powers</b> of each of these  <math>2^3 \times 3^3 \times 5^2 \times 7^3 = 1,852,200</math></p>

• **Way 2:**

➤ Draw a Venn diagram

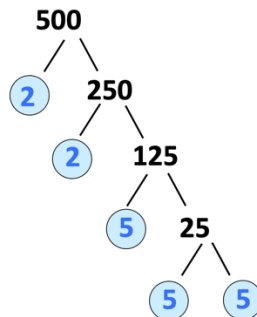
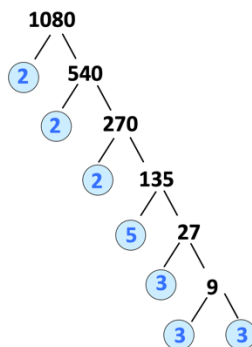


- For HCF: Multiply everything in the middle (common ground) together
- For LCM: Multiply EVERYTHING together

**Example 1**

**Find the HCF and LCM of 1080 and 500**

We first do a factor tree as above



$$2^3 \times 5 \times 3^3$$

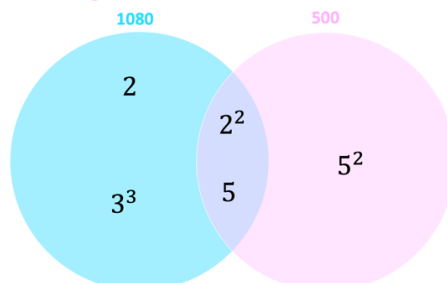
$$2^2 \times 5^3$$

Draw a venn diagram

We look for the common bases in each number first  
the **pink** and **blue** bases are common to both numbers hence the bases  
2 and 5

The **lowest power** of these **common** numbers go into the middle part of  
the venn diagram, hence  $2^2$  and 5

1080 must have three 2's, one 5 and three 3's (at the moment it only  
has two 2's and 1 five) so we need to make sure the circle of 1080 has  
all this by putting the missing parts in the half moon of 1080 on the left  
500 must have two 2's and three 5's (at the moment it only has two 2's  
and 1 five) so we need to make sure the circle of 500 has all this by  
putting the missing numbers in the half moon of 500 on the right



HCF: Multiply everything in the middle (common ground) together  
 $2^2 \times 5 = 20$

LCM: Multiply EVERYTHING together  
 $2 \times 3^3 \times 2^2 \times 5 \times 5^2 = 27,000$

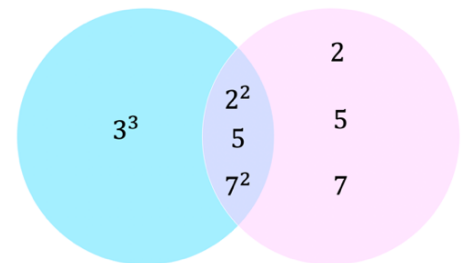
**Example 2**

**Find the HCF and LCM of**

$$2^2 \times 3^3 \times 5 \times 7^2$$

$$2^3 \times 5^2 \times 7^3$$

Draw a venn diagram (see the method for the  
example on the left first)



$$\text{HCF: } 2^2 \times 5 \times 7^2 = 980$$

$$\text{LCM: } 3^3 \times 2^3 \times 5 \times 7^2 \times 2 \times 5 \times 7 = 1,852,200$$