

Comparing fractions with different numerators and denominators

How to compare fractions when they have different numerators and denominators

In previous lessons you have learned how to compare fractions when they have either like denominators or like numerators. What about comparing fractions when neither the denominators nor the numerators are same?

In this lesson you'll learn how to compare two or more fractions with different numerators and denominators.

Consider we want to compare $\frac{3}{4}$; $\frac{2}{3}$ and $\frac{5}{6}$

Solution: Remember, to make [comparing fractions](#) easier, we should have all of the fractions with same denominators and then fraction with the largest numerator is largest and that with the least numerator is the least fraction.

But, all the fractions given above have different denominators. Well, we can make them same. What it takes to make all the denominators same?

You should know the answer, the least common multiple of all the denominators.

So, let's find the **lcm** of 4, 3 and 6. To do the task recall 3, 4 and 6 times tables and write first 5 or 6 multiples of each as shown below:

3	3, 6, 9, 12, 15, 18 and so on
4	4, 8, 12, 16, 20 and so on
6	6, 12 stop; because we got 12 in all the multiple (hence lcm = 12)

Hence the least common multiple (**lcm**) of 3, 4 and 6 = 12

Now we need to change all the given fractions into equivalent fractions with denominators equal to 12, and we can do it easily as shown below:

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}; \quad \frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12} \quad \text{and} \quad \frac{5}{6} = \frac{5 \times 2}{6 \times 2} = \frac{10}{12}$$

Now we need to compare $\frac{9}{12}$, $\frac{8}{12}$ and $\frac{10}{12}$; which is super easy. Look at the numerators as the denominators are same.

Fraction with the largest numerator is largest and with the least numerator is least. So write the fractions in order from least to greatest by looking at numerators.

$$\frac{8}{12} < \frac{9}{12} < \frac{10}{12}$$

These are not the fractions in the question, but their equivalent fractions. So, you can replace the above fractions with their [equivalent fractions](#) we begin with.

$$\frac{2}{3} < \frac{3}{4} < \frac{5}{6} \text{ is our answer}$$

Example 2: Compare $\frac{4}{6}$; $\frac{3}{5}$ and $\frac{7}{15}$

Solution: You know that to compare fractions we need to have all the fractions with the same denominators. To do that we need to find the least common multiple of 5, 6 and 10 (the denominators of given fractions), as shown below:

5	5, 10, 15, 20, 25, 30 and so on
6	6, 12, 18, 24, 30, 36 and so on
15	15, 30 stop ; because we got 30 as the common multiple in all

Next step is to change all the given fractions into equivalent fractions with denominator equal to 30 (the lcm of all the denominators).

$$\frac{4}{6} = \frac{4 \times 5}{6 \times 5} = \frac{20}{30}; \quad \frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30} \text{ and } \frac{7}{15} = \frac{7 \times 2}{15 \times 2} = \frac{14}{30}$$

Now, we can write the all fractions with denominator of 30 from least to greatest by looking at their numerators.

$$\frac{14}{30} < \frac{18}{30} < \frac{20}{30}$$

Now write the original fractions by looking at the above order

$$\frac{7}{15} < \frac{3}{5} < \frac{4}{6}; \text{ fractions from least to greatest}$$