

Conquering Fractions

Addition / Subtraction

In order to add or subtract fractions, you must first have a common denominator.

Example:

$$\frac{2}{5} + \frac{1}{3}$$

You cannot add these fractions yet because their denominators are not the same.

Finding a common denominator:

Example:

$$\frac{2}{5} + \frac{1}{3}$$

Since these denominators are prime numbers, the easiest way to find a common denominator is to simply multiply them together to obtain the number 15.

$$\frac{2}{15} + \frac{1}{15}$$

$$\frac{2}{5(3)} + \frac{1}{3(5)}$$

5 times 3 gave us 15, and 3 times 5 gave us 15.

$$\frac{2(3)}{5(3)} + \frac{1(5)}{3(5)}$$

When we multiply the denominator by a number, we must also multiply the numerator by the same number. (This is equivalent to multiplying by 1)

$$\frac{6}{15} + \frac{5}{15}$$

Now that we have the same denominators, we are allowed to add the fractions together:

$$\frac{6}{15} + \frac{5}{15} = \frac{6+5}{15} = \frac{11}{15}$$

Continued →

There are numerous possibilities when it comes to finding common denominators; for instance, we could have made both of the previous denominators 30 by multiplying the 5 by 6, and the 3 by 10: $\left[\frac{2}{5}(6) \text{ and } \frac{1}{3}(10)\right]$ However, we are looking for the smallest number into which both denominators will divide. This particular number is called the *Least Common Denominator*, or the LCD.

If the one of the denominators is divisible by the other, then the larger of the denominators can serve as the common denominator ; in fact, it is the LCD.

Example:

$$\frac{5}{18} - \frac{1}{3}$$

In this subtraction problem, 3 will divide into 18; therefore, 18, which is the larger of the two, is the common denominator

$$\frac{5}{18} - \frac{1}{3(6)}$$

← 3 is multiplied by 6 to obtain 18. The denominator of the other fraction does not have to be multiplied because it is the least common denominator.

$$\frac{5}{18} - \frac{1(6)}{3(6)}$$

← Whatever is done to the denominator must also be done to the numerator. We multiplied the denominator by 6; thus, we also multiply the numerator by 6. Now we are able to subtract:

$$\frac{5}{18} - \frac{6}{18} = \frac{5-6}{18} = -\frac{1}{18}$$

Sometimes finding LCD's can be challenging:

Example:

$$\frac{12}{56} + \frac{4}{63}$$

Neither of these denominators divides into the other, and multiplying them together would yield a huge number. There is a way to derive a more reasonable number (LCD), and that is by finding the Least Common Multiple. For more information on this topic, as well as some practice problems, please refer to our handout entitled, "Finding The LCM - LEAST COMMON MULTIPLE," on the math carousel in the lobby of The Learning Center.

Adding Fractions

Add the following fractions. Provide the answers in their lowest terms.

1) $\frac{2}{3} + \frac{1}{3} =$

2) $\frac{1}{6} + \frac{2}{3} =$

3) $\frac{3}{7} + \frac{1}{3} =$

4) $\frac{3}{3} + \frac{1}{3} =$

5) $\frac{2}{8} + \frac{5}{8} =$

6) $\frac{3}{4} + \frac{6}{6} =$

7) $\frac{5}{8} + \frac{4}{4} =$

8) $\frac{4}{7} + \frac{3}{5} =$

9) $\frac{2}{6} + \frac{6}{7} =$

10) $\frac{2}{3} + \frac{8}{8} =$

11) $\frac{1}{7} + \frac{4}{6} =$

12) $\frac{5}{5} + \frac{2}{2} =$

13) $\frac{1}{2} + \frac{1}{5} =$

14) $\frac{4}{5} + \frac{4}{8} =$

15) $\frac{2}{2} + \frac{3}{3} =$

16) $\frac{4}{4} + \frac{4}{8} =$

17) $\frac{1}{2} + \frac{4}{4} =$

18) $\frac{2}{7} + \frac{2}{8} =$

19) $\frac{2}{8} + \frac{2}{8} =$

20) $\frac{5}{5} + \frac{6}{8} =$

21) $\frac{4}{5} + \frac{1}{4} =$

22) $\frac{9}{9} + \frac{5}{9} =$

23) $\frac{5}{6} + \frac{6}{9} =$

24) $\frac{2}{5} + \frac{3}{7} =$

25) $\frac{5}{8} + \frac{3}{6} =$

26) $\frac{2}{4} + \frac{3}{4} =$

27) $\frac{2}{3} + \frac{8}{9} =$

28) $\frac{1}{2} + \frac{2}{3} =$

29) $\frac{5}{7} + \frac{1}{3} =$

30) $\frac{1}{2} + \frac{1}{3} =$

Solutions

- | | | | | |
|---------------------|--------------------|---------------------|---------------------|-------------------|
| 1) 1 | 2) $\frac{5}{6}$ | 3) $\frac{16}{21}$ | 4) $\frac{4}{3}$ | 5) $\frac{7}{8}$ |
| 6) $\frac{7}{4}$ | 7) $\frac{13}{8}$ | 8) $\frac{41}{35}$ | 9) $\frac{25}{21}$ | 10) $\frac{5}{3}$ |
| 11) $\frac{17}{21}$ | 12) 2 | 13) $\frac{7}{10}$ | 14) $\frac{13}{10}$ | 15) 2 |
| 16) $\frac{3}{2}$ | 17) $\frac{3}{2}$ | 18) $\frac{15}{28}$ | 19) $\frac{1}{2}$ | 20) $\frac{7}{4}$ |
| 21) $\frac{21}{20}$ | 22) $\frac{14}{9}$ | 23) $\frac{3}{2}$ | 24) $\frac{29}{35}$ | 25) $\frac{9}{8}$ |
| 26) $\frac{5}{4}$ | 27) $\frac{14}{9}$ | 28) $\frac{7}{6}$ | 29) $\frac{22}{21}$ | 30) $\frac{5}{6}$ |