

# Adding and Subtracting Fractions

In order to add or subtract fractions, we must first have a common denominator (same bottom of the fractions).

Can we add or subtract the following as is?

1.  $\frac{3}{4} - \frac{2}{3}$

2.  $\frac{4}{5} + 7\frac{1}{6}$

3.  $\frac{2}{3} - \frac{8}{3}$

Answers:

1. No....4 and 3 are not the same

2. No....5 and 6 are not the same.

3. Yes, 3 is the same as 3.

# Getting a Common Denominator

Example:

$$\frac{3}{4} - \frac{2}{3}$$

$$4(3) = 12$$

$$\frac{1}{3} - \frac{7}{9}$$

$$9$$

$$\frac{6}{8} + \frac{5}{12}$$

$$8(12) \div 4 = 24$$

Find the least common denominator (LCD) by finding the smallest number both denominators go into.

Shortcuts to finding the LCD:

- Does one denominator go into the other? If so, the LCD will be the larger of the two denominator .
- Do the two denominators have any common factors?
  - If not, the LCD will be the product of the two denominators.
  - If yes, the LCD will be the product of the two denominators divided by the greatest common factor.

# Using the common denominator

Example:

$$\frac{3}{4} - \frac{2}{3}$$

$$\text{LCD} = 12$$

$$\frac{3}{4} \left( \frac{3}{3} \right) - \frac{2}{3} \left( \frac{4}{4} \right) = \frac{9}{12} - \frac{8}{12}$$

$$\frac{1}{12}$$

- The least common denominator will be the denominator of your answer.
- Figure out what you need to multiply each denominator by to reach that denominator
- Multiply BOTH the numerator and the denominator of each fraction by the appropriate number
- Subtract the numerators. You already have the denominator of the answer.
- Check to see if your answer can be simplified.

# Practice Adding Fractions

$$\frac{6}{8} + \frac{5}{12}$$

# What if one or both of my fractions is negative?

Adding positive and negative numbers is like a tug of war.

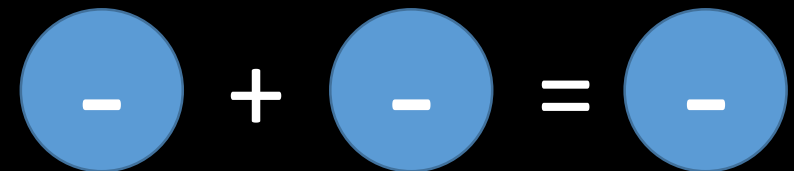
If both teams are pulling in the same direction, you add up their efforts and use the sign for that direction.

$$-\frac{3}{8} + \left(-\frac{7}{8}\right) \text{ Both fractions are negative.}$$

$$-\frac{3+7}{8} \text{ The answer will be negative.}$$

$$-\frac{10}{8} \text{ This fraction can be simplified.}$$

$$-\frac{5}{4}$$

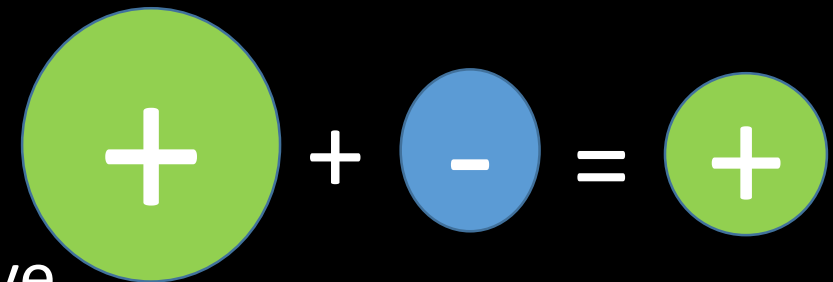


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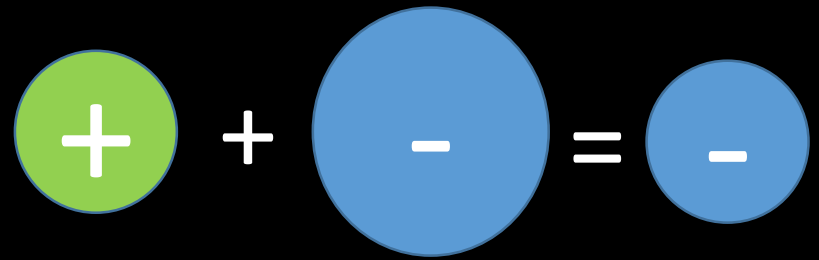
If the teams are pulling in different directions, you find the difference. The larger team will win, so your answer will have the sign of the more massive number

$+\frac{3}{8} + (-\frac{7}{8})$  One is positive; one is negative.



$-\frac{7-3}{8}$  The more massive number is negative.

$-\frac{4}{8}$  This fraction can be simplified.



$-\frac{1}{2}$