

Fractions

How and when do I use the borrowing technique?

The borrowing technique is used when subtracting fractions. The following problems show situations where the borrowing technique is used.

EXAMPLE

$$9\frac{1}{3} - 5\frac{2}{3} = ?$$

- At first glance this problem looks pretty easy. However you cannot complete the subtraction $1/3 - 2/3$, since $1/3$ is smaller than $2/3$.

$$8\cancel{9}\frac{1}{3} + \frac{3}{3} - 5\frac{2}{3} = ?$$

- One is taken (borrowed) from the 9 and “given” to $1/3$. Note that the one is written as $3/3$ so it can be added to $1/3$.

$$8\frac{4}{3} - 5\frac{2}{3} = ?$$

- After borrowing, this mixed number still represents what it did originally. The new equivalent form now makes it possible to complete the subtraction.

$$= 3\frac{2}{3}$$

EXAMPLE

$$8\frac{1}{3} - 4\frac{3}{4} = ?$$

$$8\frac{1 \times 4}{3 \times 4} - 4\frac{3 \times 3}{4 \times 3} = ?$$

- First, create common denominators for your fractions.

$$8\frac{4}{12} - 4\frac{9}{12} = ?$$

- You will have to use the borrowing technique again since the fraction $4/12$ is smaller than $9/12$.

$$7\cancel{8}\frac{4}{12} + \frac{12}{12} - 4\frac{9}{12} = ?$$

- One is borrowed from the 8 and is “given” to $4/12$ in order to make it larger than $9/12$. It is written as $12/12$ so that it may be added to $4/12$.

$$7\frac{16}{12} - 4\frac{9}{12} = ?$$

- Complete the subtraction to finish the problem.

$$= 3\frac{7}{12}$$