

Lesson: Adding and Subtracting Fractions and Mixed Numbers

Sixth Grade Objective: 1.04 Develop fluency in addition, subtraction, multiplication and division of nonnegative rational numbers.

- a) Analyze computational strategies
- b) Describe the effect of operations on size
- c) Estimate the results of computations
- d) Judge the reasonableness of solutions

Lesson: Adding and Subtracting Fractions

Like Denominators

$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$ If the denominators (bottom numbers) are alike you add the numerators (top numbers) and the denominator stays the same!

Unlike Denominators

Step 1:

What is the difference in this problem? Right! The denominators are not the same.

$\frac{1}{4} + \frac{2}{5} =$ To make like denominators find the LCM (least common multiple) of 4 and 5, which is 20.

Step 2: Set up the problem and make equivalent fractions.

$$\frac{2}{4} + \frac{2}{5} = \frac{10}{20} + \frac{8}{20} = \frac{18}{20}$$

Since the LCM is 20, place it as the denominator. Now make Equivalent fractions. Ask yourself “What times 4 equals 20?” Right 5, now multiply the five by the numerator 2 and 10 is the new numerator. Do the same for $\frac{2}{5}$. Ask yourself, “What times 5 equals 20?” Right 4, now multiply the four by the 2 and the 8 is the new numerator. Add the numerators and the answer is $\frac{18}{20}$.

Step 3: Simplify your answer.

$\frac{18}{20} = \frac{9}{10}$ Find the GCF (greatest common factor) and divide to simplify the problem. The GCF of 18 and 20 is 2 so divide the numerator and denominator by 2.

Subtracting fractions: Follow the same steps above, except instead of adding you subtract.

Lesson: Adding and Subtracting Mixed Numbers

Step 1:

$4\frac{3}{5} - 2\frac{6}{7}$ Denominators are different so we must first find the LCM of 5 and 7. The answer is 35.

Step 2:

$4\frac{3}{5} - 2\frac{6}{7} = 4\frac{21}{35} - 2\frac{30}{35} =$ Set up your problem and make equivalent fractions.

Step 3:

$$4\frac{3}{5} - 2\frac{6}{7} = 4\frac{21}{35} - 2\frac{30}{35} =$$

3 36
/ /

Sometimes in subtracting you have to borrow. Ask yourself, what is the problem with this problem? Correct, you are not able to subtract 21 minus 30!

We are going to borrow one whole from the 4 and make it a 3. The whole is the same

as $\frac{35}{35}$ and we can now add it to $\frac{21}{35}$ to make $\frac{36}{35}$.

Step 4:

$$4\frac{3}{5} - 2\frac{6}{7} = 3\frac{36}{35} - 2\frac{30}{35} = 1\frac{6}{35}$$

To add a mixed number follow the same steps except do not borrow and add the whole numbers and numerators. Simplify your answer.

Try these on your own!

Evaluate.

1. $\frac{3}{7} + \frac{4}{7} =$

2. $\frac{5}{8} - \frac{2}{7} =$

3. $3\frac{1}{4} + \frac{7}{12} =$

Check your answers

Evaluate.

1. $\frac{3}{7} + \frac{4}{7} = \frac{7}{7} = 1$

2. $\frac{5}{8} - \frac{2}{7} = \frac{35}{56} - \frac{16}{56} = \frac{19}{56}$

3. $3\frac{1}{4} + \frac{7}{12} = 3\frac{3}{12} + \frac{7}{12} = \frac{10}{12} = 3\frac{5}{6}$

Quiz Yourself!

Evaluate.

1. $\frac{2}{3} - \frac{4}{9} =$

2. $\frac{6}{13} + \frac{7}{13} =$

3. $5\frac{1}{3} - 2\frac{3}{5} =$

4. $6\frac{2}{9} + 3\frac{1}{4} =$

5. The zoo manager opened several bags of elephant food by mistake. Once the bags were used he wanted to combine them into one bag. Look at the bag totals to determine if he can combine them into one bag. Why or Why not? Show your work.

Bag 1: $\frac{2}{3}$ Bag 2: $\frac{1}{8}$ Bag 3: $\frac{1}{4}$

Extra Practice!

Click on the website.

<http://www.jamit.com.au/fraction-games.htm>

Check Your Answers

1. $\frac{2}{3} - \frac{4}{9} = \frac{12}{18} - \frac{8}{18} = \frac{4}{18} = \frac{2}{9}$ Remember to always simplify your answer.

2. $\frac{6}{13} + \frac{7}{13} = \frac{13}{13} = 1$

3. $5\frac{1}{3} - 2\frac{3}{5} = \overset{4}{\cancel{5}}\frac{20}{15} - 2\frac{9}{15} = 2\frac{11}{15}$

Remember after we made equivalent fractions we were not able to subtract 5 minus 9, so we borrowed from the whole number 5 and made it a 4. Then we added the denominator 15 and numerator 5 to get 20. Then you subtract your two whole numbers, 4 minus 2 to get 2 and 20 minus 9 to get 11.

4. $6\frac{2}{9} + 3\frac{1}{4} = 6\frac{8}{36} + 3\frac{9}{36} = 9\frac{17}{36}$

5. The zoo manager opened several bags of elephant food by mistake. Once the bags were used he wanted to combine them into one bag. Look at the bag totals to determine if he has enough to fill one bag. Why or Why not? Show your work.

$$\text{Bag 1: } \frac{2}{3} \quad \text{Bag 2: } \frac{1}{8} \quad \text{Bag 3: } \frac{1}{4}$$

The word combine tells you to add the bags to see if it equals a whole bag.

$$\frac{2}{3} + \frac{1}{8} + \frac{1}{4} = \frac{16}{24} + \frac{3}{24} + \frac{6}{24} = \frac{25}{24} = 1\frac{1}{24}$$

Yes, he has enough to make one bag and $\frac{1}{24}$ left over.

***Remember: Improper fractions are fractions that have a bigger numerator than denominator. To make it into a mixed number (whole number and fraction) divide:

$$24 \overline{)25} \text{ The answer is } 1\frac{1}{24}.$$
$$\begin{array}{r} -24 \\ \hline 1 \end{array}$$