



Title

Session

Topic

Lesson Objective: To be able to add and subtract fractions with different denominators. (Grade D-C)



SOME: Be able to solve word problems involving adding and subtracting fractions.

MOST: Be able to add or subtract two mixed numbers.

ALL: Be able to add or subtract two fractions less than one.

Starter:

Work out these mathematical anagrams:

- | | |
|------------------|-------------|
| a) Info carts | Fractions |
| b) Flimsy pi | Simplify |
| c) Ration me nod | Denominator |
| d) Vital queen | Equivalent |
| e) Soon pirate | Operations |

Recap: Lowest Common Multiple.



Find the lowest common multiple of the following pairs of numbers:

a) 2 and 3 = 6

e) 4 and 14 = 28

b) 2 and 4 = 4

f) 6 and 15 = 30

c) 2 and 5 = 10

g) 16 and 20 = 80

d) 6 and 8 = 24

h) 25 and 20 = 100

When adding or subtracting fractions with different denominators, your answer's denominator is found from the LCM of the two original denominators.

Adding Fractions:



$$\begin{array}{ccc} \frac{2}{3} & + & \frac{1}{5} \\ \downarrow \times 5 & & \downarrow \times 3 \\ \frac{10}{15} & + & \frac{3}{15} \\ & = & \frac{13}{15} \end{array}$$

If we were to leave the calculation like this, we would not be able to work it out. We need to find the LCM of the two denominators.

You should always check to see if your answer can be simplified. In this case, the answer can't be cancelled down any further so it is left as it is.

$$\text{So, } \frac{2}{3} + \frac{1}{5} = \frac{13}{15}.$$

Multiples of 3 and 5	
3	5
6	10
9	15
12	20
15	25
15 is the LCM	

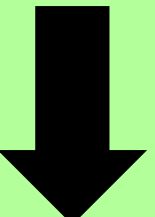
Adding Fractions:



$$\frac{1}{8} + \frac{5}{12}$$

←

x 3 x 2


$$\frac{3}{24} + \frac{10}{24} = \frac{13}{24}$$

Remember, we can't solve this problem if the denominators are different. We need to find the LCM of the two denominators.

Can the fraction be cancelled down? In this case it can't so leave the answer as it is.

Multiples of 8 and 12	
8	12
16	24
24	36
32	48
40	60
24 is the LCM	

So, $\frac{1}{8} + \frac{5}{12} = \frac{13}{24}$.

Subtracting Fractions:



Subtraction is exactly the same as addition, so we need to find a common denominator.

$$\begin{array}{r} \frac{5}{6} \\ - \frac{3}{4} \\ \hline \end{array} \quad \leftarrow$$

$\times 2$ $\times 3$

$$\begin{array}{r} \frac{10}{12} \\ - \frac{9}{12} \\ \hline \end{array} = \frac{1}{12}$$

Can the fraction be cancelled down? In this case it can't so leave the answer as it is.

Multiples of 4 and 6	
4	6
8	12
12	18
16	24
20	30
12 is the LCM	

$$\text{So, } \frac{5}{6} - \frac{3}{4} = \frac{1}{12}.$$

Subtracting Fractions:



Subtraction is exactly the same as addition, so we need to find a common denominator.

$$\begin{array}{r} \frac{7}{10} \\ \times 3 \\ \hline \frac{21}{30} \end{array} \quad \begin{array}{r} - \\ \frac{8}{15} \\ \times 2 \\ \hline \frac{16}{30} \end{array} \quad \begin{array}{r} \frac{5}{30} \\ = \\ \frac{1}{6} \end{array}$$

Can the fraction be cancelled down? In this case, it can be simplified down to one sixth.

Multiples of 10 and 15	
10	15
20	30
30	45
40	60
50	75
30 is the LCM	

So, $\frac{7}{10} - \frac{8}{15} = \frac{1}{6}$.

Some More Practice:



Work out the following and simplify where possible:

$$1) \frac{1}{3} + \frac{1}{5} = \frac{8}{15}$$

$$5) \frac{1}{5} - \frac{1}{10} = \frac{1}{10}$$

$$9) \frac{1}{3} + \frac{4}{9} = \frac{7}{9}$$

$$2) \frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$6) \frac{7}{8} - \frac{3}{4} = \frac{1}{8}$$

$$10) \frac{1}{4} + \frac{3}{8} = \frac{5}{8}$$

$$3) \frac{1}{5} + \frac{1}{10} = \frac{3}{10}$$

$$7) \frac{5}{6} - \frac{3}{4} = \frac{1}{12}$$

$$11) \frac{7}{8} - \frac{1}{2} = \frac{3}{8}$$

$$4) \frac{2}{3} + \frac{1}{4} = \frac{11}{12}$$

$$8) \frac{5}{6} - \frac{1}{2} = \frac{1}{3}$$

$$12) \frac{3}{5} - \frac{8}{15} = \frac{1}{15}$$

Mixed Numbers:



You solve these calculations exactly the same as the others except you change the mixed numbers to improper fractions first.

You should always check to see if your answer can be simplified. In this case, the answer can be cancelled down to 3 and 7 twelfths.

$$\begin{array}{r} 1 \frac{1}{3} \\ \downarrow \\ \frac{4}{3} \\ \downarrow \times 4 \\ \frac{16}{12} \end{array} + \begin{array}{r} 2 \frac{1}{4} \\ \downarrow \\ \frac{9}{4} \\ \downarrow \times 3 \\ \frac{27}{12} \end{array} = \frac{43}{12} = 3 \frac{7}{12}$$

Multiples of 3 and 4	
3	4
6	8
9	12
12	16
15	20
12 is the LCM	

Mixed Numbers:



You solve these calculations exactly the same as the others except you change the mixed numbers to improper fractions first.

$$\begin{array}{r}
 2\frac{1}{3} + 3\frac{5}{7} \\
 \downarrow \qquad \qquad \downarrow \\
 \frac{7}{3} + \frac{26}{7} \\
 \downarrow \times 7 \qquad \qquad \downarrow \times 3 \\
 \frac{49}{21} + \frac{78}{21} = \frac{127}{21} = 6\frac{1}{21}
 \end{array}$$

You should always check to see if your answer can be simplified. In this case, the answer can be cancelled down to 6 and 1 over twenty-one.

Multiples of 3 and 7	
3	7
6	14
9	21
12	28
15	35
18	42
21	49
21 is the LCM	

Mixed Numbers:



You solve these calculations exactly the same as the others except you change the mixed numbers to improper fractions first.

$$\begin{array}{r} 3\frac{1}{4} \\ - 1\frac{3}{5} \\ \hline \end{array} \quad \leftarrow$$

$$\begin{array}{r} \downarrow \\ \frac{13}{4} \\ - \frac{8}{5} \\ \hline \end{array} \quad \begin{array}{r} \downarrow \\ \frac{8}{5} \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} \times 5 \downarrow \\ \frac{65}{20} \\ - \frac{32}{20} \\ \hline \end{array} = \frac{33}{20} = 1\frac{13}{20}$$

You should always check to see if your answer can be simplified. In this case, the answer can be cancelled down to 1 and 13 twentieths.

Multiples of 4 and 5	
4	5
8	10
12	15
16	20
20	25
20 is the LCM	

Mixed Numbers:



You solve these calculations exactly the same as the others except you change the mixed numbers to improper fractions first.

$$\begin{array}{r}
 7\frac{1}{7} \\
 \downarrow \\
 \frac{50}{7} \\
 \downarrow \times 3 \\
 \frac{150}{21}
 \end{array}
 -
 \begin{array}{r}
 2\frac{2}{3} \\
 \downarrow \\
 \frac{8}{3} \\
 \downarrow \times 7 \\
 \frac{56}{21}
 \end{array}
 =
 \frac{94}{21}
 =
 4\frac{10}{21}$$

You should always check to see if your answer can be simplified. In this case, the answer can be cancelled down to 4 and 10 over 21.

Multiples of 3 and 7	
3	7
6	14
9	21
12	28
15	35
18	42
21	49
21 is the LCM	

Some More Practice:



Work out the following and simplify where possible:

$$1) 1\frac{7}{18} + 2\frac{3}{10} = 3\frac{31}{45}$$

$$5) \frac{5}{6} + \frac{7}{16} + \frac{5}{8} = 1\frac{43}{48}$$

$$2) 3\frac{1}{3} + 1\frac{9}{20} = 4\frac{47}{60}$$

$$6) \frac{7}{10} + \frac{3}{8} + \frac{5}{6} = 1\frac{109}{120}$$

$$3) 1\frac{1}{8} - \frac{5}{9} = \frac{41}{72}$$

$$7) 1\frac{1}{3} + \frac{7}{10} - \frac{4}{15} = 1\frac{23}{30}$$

$$4) 1\frac{3}{16} - \frac{7}{12} = \frac{29}{48}$$

$$8) \frac{5}{14} + 1\frac{3}{7} - \frac{5}{12} = 1\frac{31}{84}$$

Problem Solving:



- 1) In a class of children, three-quarters are Chinese, one-fifth are Malaysian and the rest are Indian. What fraction of the class are Indian?



- 2) Because of illness, two-fifths of a school were absent one day. If the school had 650 students on the register, how many were absent that day?

- 3) At a burger-eating competition, Lionel ate 34 burgers in 20 minutes while Brian ate 26 burgers in 20 minutes. How long after the start of the competition would they have consumed a total of 30 burgers between them?



Challenge!



$$\frac{1}{2} + \frac{1}{3} - \frac{1}{4} - \frac{1}{6}$$

How would you go about solving this problem?

Using your knowledge of fractions, can you solve it!?!?

Outcome:

**At the end of today's lesson, I can
now...**

**solve word problems involving adding
and subtracting fractions**

**add or subtract two mixed number
fractions**

**add or subtract two fractions less
than one.**

Grade:

**and have worked at a
Grade...**

C.

D.

D.

Next Steps:

**To improve, I need to be able
to...**

multiply two proper fractions.

**solve word problems involving
adding and subtracting fractions.**

**add or subtract two mixed number
fractions.**



