

<b>#2084 GLA</b>	
Guided Learning Activity  <b>Subtracting Mixed Numerals</b>  Author: Dennis Morrow <b>∑ SIGMA-MAC</b>	This packet contains background information for GLA 2084a, 2084b, etc. It is intended for student and tutor use as needed.

## College of the Canyons Mathematics Supplement

### Subtraction with Mixed Numerals

#### Subtraction:

Subtraction is organized similarly to addition. The fractions are aligned, and the whole numbers are aligned. However, both parts of the bottom number are subtracted from the top number.

$$\begin{array}{r}
 6\frac{1}{3} \frac{4}{12} \\
 - 4\frac{1}{4} \frac{3}{12} \\
 \hline
 2\frac{1}{12} = 2\frac{1}{12}
 \end{array}$$

The tricky part of subtraction comes in the borrowing. If the bottom fraction is bigger than the top fraction one unit must be borrowed from the top's whole number, but that one unit is not ten of the fraction's pieces unless the fraction's denominator is ten.

$$\begin{array}{r}
 6\frac{1}{4} \frac{3}{12} \\
 - 4\frac{1}{3} \frac{4}{12} \\
 \hline
 \end{array}$$

This time we must subtract  $\frac{4}{12}$  from  $\frac{3}{12}$ . We cannot subtract 4 from 3, so we borrow a unit from the 6. The 6 becomes  $5\frac{12}{12}$ . Now the  $6\frac{3}{12}$ , also known as  $6 + \frac{3}{12}$ , becomes  $5\frac{12}{12} + \frac{3}{12}$  or  $5\frac{15}{12}$ , and the problem becomes:

$$\begin{array}{r}
 5\frac{15}{12} \\
 - 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

Done from the beginning without the explanations it would look like:

$$\begin{array}{r}
 5 \quad 15 \\
 \cancel{6} \frac{1}{4} \quad \frac{3}{12} \\
 -4 \frac{1}{3} \quad \frac{4}{12} \\
 \hline
 1 \quad \frac{11}{12}
 \end{array}$$

**Examples of Subtraction:**

$$\begin{array}{r}
 6 \frac{1}{4} \quad \frac{3}{12} \quad 5 \quad 15 \\
 \cancel{6} \frac{1}{4} \quad \frac{3}{12} \quad \cancel{6} \quad \frac{3}{12} \\
 -4 \frac{2}{3} \quad \frac{8}{12} \quad -4 \quad \frac{8}{12} \\
 \hline
 1 \quad \frac{7}{12}
 \end{array}$$

$$\begin{array}{r}
 15 \frac{2}{5} \quad \frac{6}{15} \quad 14 \quad 21 \\
 \cancel{15} \frac{2}{5} \quad \frac{6}{15} \quad \cancel{15} \quad \frac{6}{15} \\
 -5 \frac{2}{3} \quad \frac{10}{15} \quad -5 \quad \frac{10}{15} \\
 \hline
 9 \quad \frac{11}{15}
 \end{array}$$

$$\begin{array}{r}
 16 \frac{3}{4} \quad \frac{15}{20} \quad 15 \quad 35 \\
 \cancel{16} \frac{3}{4} \quad \frac{15}{20} \quad \cancel{16} \quad \frac{15}{20} \\
 -9 \frac{4}{5} \quad \frac{16}{20} \quad -9 \quad \frac{16}{20} \\
 \hline
 6 \quad \frac{19}{20}
 \end{array}$$

$$\begin{array}{r}
 25 \frac{4}{5} \quad \frac{12}{15} \\
 -15 \frac{2}{15} \quad \frac{2}{15} \\
 \hline
 10 \quad \frac{10}{15} = 10 \frac{2}{3}
 \end{array}$$

For the purpose of instruction the first three of those examples were made to look longer than necessary. This is how they would appear if they were done without the need to be instructive:

$$\begin{array}{r}
 5 \quad 15 \\
 \cancel{6} \frac{1}{4} \quad \frac{3}{12} \\
 -4 \frac{2}{3} \quad \frac{8}{12} \\
 \hline
 1 \quad \frac{7}{12}
 \end{array}$$

$$\begin{array}{r}
 14 \quad 21 \\
 \cancel{15} \frac{2}{5} \quad \frac{6}{15} \\
 -5 \frac{2}{3} \quad \frac{10}{15} \\
 \hline
 9 \quad \frac{11}{15}
 \end{array}$$

$$\begin{array}{r}
 15 \quad 35 \\
 \cancel{16} \frac{3}{4} \quad \frac{15}{20} \\
 -9 \frac{4}{5} \quad \frac{16}{20} \\
 \hline
 6 \quad \frac{19}{20}
 \end{array}$$

<b>#2084a GLA</b>	Student: _____
Guided Learning Activity  <b>Subtracting Mixed Numerals, Exercise Set #1</b>  Author: Dennis Morrow <b>Σ SIGMA-MAC</b>	Course Instructor: _____  Date Completed: _____  Approved: _____

## Subtraction with Mixed Numerals, Exercise Set #1

### Subtraction:

Subtraction is organized similarly to addition. The fractions are aligned, and the whole numbers are aligned. However, both parts of the bottom number are subtracted from the top number.

$$\begin{array}{r}
 6\frac{1}{3} \frac{4}{12} \\
 - 4\frac{1}{4} \frac{3}{12} \\
 \hline
 2\frac{1}{12} = 2\frac{1}{12}
 \end{array}$$

The tricky part of subtraction comes in the borrowing. If the bottom fraction is bigger than the top fraction one unit must be borrowed from the top's whole number, but that one unit is not ten of the fraction's pieces unless the fraction's denominator is ten.

$$\begin{array}{r}
 6\frac{1}{4} \frac{3}{12} \\
 - 4\frac{1}{3} \frac{4}{12} \\
 \hline
 \end{array}$$

This time we must subtract  $\frac{4}{12}$  from  $\frac{3}{12}$ . We cannot subtract 4 from 3, so we borrow a unit from the 6. The 6 becomes  $5\frac{12}{12}$ . Now the  $6\frac{3}{12}$ , also known as  $6 + \frac{3}{12}$ , becomes  $5\frac{12}{12} + \frac{3}{12}$  or  $5\frac{15}{12}$ , and the problem becomes:

$$\begin{array}{r}
 5\frac{15}{12} \\
 - 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

And without explanation it looks like:

$$\begin{array}{r}
 5\frac{15}{12} \\
 \ominus 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

**Exercises:**

1.  $36\frac{5}{9} - 25\frac{7}{8}$

The LCD = 72.  $72/9=8, 72/8=9$ . Fill in the blanks.

$$\begin{array}{r} \underline{\quad} \quad \underline{\quad} \\ 3\cancel{6}\frac{5}{9} \quad \frac{\quad}{72} \\ -25\frac{7}{8} \quad \frac{\quad}{72} \\ \hline \underline{\quad} \quad \frac{\quad}{72} \end{array}$$

$$10\frac{49}{72}$$

Ans: \_\_\_\_\_

2.  $25\frac{13}{24} - 8\frac{47}{48}$

The LCD = 48.  $48/24=2$  and  $48/48=1$ . Fill in the blanks.

$$\begin{array}{r} \underline{\quad} \quad \underline{\quad} \\ 2\cancel{5}\frac{13}{24} \quad \frac{\quad}{48} \\ -8\frac{47}{48} \quad \frac{\quad}{48} \\ \hline \underline{\quad} \quad \frac{\quad}{48} = \underline{\quad} \end{array}$$

$$16\frac{9}{16}$$

Ans: \_\_\_\_\_

**Simplify the following completely. Execute the problems using mixed numerals, and write the answers as mixed numerals.**

3.  $48\frac{31}{48} - 31\frac{13}{16}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

4.  $42\frac{1}{6} - 21\frac{2}{3}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

5.  $53\frac{2}{9} - 23\frac{11}{36}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

6.  $73\frac{1}{24} - 25\frac{11}{12}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

7.  $65\frac{1}{6} - 17\frac{13}{18}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

8.  $35\frac{1}{21} - 21\frac{5}{7}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$29\frac{11}{12}, 47\frac{1}{8}, 47\frac{4}{9}, 13\frac{1}{3}$

9.  $51\frac{1}{6} - 31\frac{4}{15}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

10.  $81\frac{7}{16} - 43\frac{25}{48}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

11.  $18\frac{1}{108} - 12\frac{5}{54}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

12.  $102\frac{1}{48} - 81\frac{2}{15}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$19\frac{9}{10}, 37\frac{11}{12}, 5\frac{11}{12}, 20\frac{71}{80}$

<b>#2084b GLA</b>	Student: _____
Guided Learning Activity  <b>Subtracting Mixed Numerals, Exercise Set #2</b>  Author: Dennis Morrow <b>Σ SIGMA-MAC</b>	Course Instructor: _____  Date Completed: _____  Approved: _____

## Subtraction with Mixed Numerals, Exercise Set #2

### Subtraction:

Subtraction is organized similarly to addition. The fractions are aligned, and the whole numbers are aligned. However, both parts of the bottom number are subtracted from the top number.  $6\frac{1}{3} - 4\frac{1}{4}$  is done as follows:

$$\begin{array}{r}
 6\frac{1}{3} \frac{4}{12} \\
 - 4\frac{1}{4} \frac{3}{12} \\
 \hline
 2\frac{1}{12} = 2\frac{1}{12}
 \end{array}$$

The tricky part of subtraction comes in the borrowing. If the bottom fraction is bigger than the top fraction one unit must be borrowed from the top's whole number, but that one unit is not ten of the fraction's pieces unless the fraction's denominator is ten.

$$\begin{array}{r}
 6\frac{1}{4} \frac{3}{12} \\
 - 4\frac{1}{3} \frac{4}{12} \\
 \hline
 \end{array}$$

This time we must subtract  $\frac{4}{12}$  from  $\frac{3}{12}$ . We cannot subtract 4 from 3, so we borrow a unit from the 6. The 6 becomes  $5\frac{12}{12}$ . Now the  $6\frac{3}{12}$ , also known as  $6 + \frac{3}{12}$ , becomes  $5\frac{12}{12} + \frac{3}{12}$  or  $5\frac{15}{12}$ , and the problem becomes:

$$\begin{array}{r}
 5\frac{15}{12} \\
 - 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

And without explanation it looks like:

$$\begin{array}{r}
 5\frac{15}{12} \\
 - 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

**Exercises:**

1.  $47\frac{4}{9} - 35\frac{5}{8}$

The LCD = 72.  $72/9=8, 72/8=9$ . Fill in the blanks.

$$\begin{array}{r} \underline{\quad} \quad \underline{\quad} \\ 47\frac{4}{9} \quad \underline{\quad} \\ -35\frac{5}{8} \quad \underline{\quad} \\ \hline \underline{\quad} \quad \underline{\quad} \\ \quad \quad \underline{\quad} \\ \quad \quad \underline{\quad} \end{array}$$

$$11\frac{59}{72}$$

Ans: \_\_\_\_\_

2.  $29\frac{19}{24} - 8\frac{47}{48}$

The LCD = 48.  $48/24=2$  and  $48/48=1$ . Fill in the blanks.

$$\begin{array}{r} \underline{\quad} \quad \underline{\quad} \\ 29\frac{19}{24} \quad \underline{\quad} \\ -8\frac{47}{48} \quad \underline{\quad} \\ \hline \underline{\quad} \quad \underline{\quad} \\ \quad \quad \underline{\quad} \\ \quad \quad \underline{\quad} = \underline{\quad} \end{array}$$

$$20\frac{13}{16}$$

Ans: \_\_\_\_\_

**Simplify the following completely. Execute the problems using mixed numerals, and write the answers as mixed numerals.**

3.  $118\frac{4}{15} - 65\frac{2}{3}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

4.  $102\frac{11}{48} - 53\frac{9}{16}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$$52\frac{3}{5}, 48\frac{2}{3}$$

5.  $78\frac{4}{9} - 47\frac{19}{36}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

6.  $87\frac{5}{24} - 39\frac{7}{12}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

7.  $95\frac{1}{6} - 47\frac{7}{18}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

8.  $87\frac{4}{21} - 52\frac{6}{7}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$30\frac{11}{12}, 47\frac{5}{8}, 47\frac{7}{9}, 34\frac{1}{3}$

9.  $91\frac{5}{6} - 49\frac{14}{15}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

10.  $72\frac{3}{16} - 45\frac{25}{48}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

11.  $38\frac{11}{120} - 23\frac{13}{60}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

12.  $93\frac{7}{48} - 71\frac{19}{30}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$41\frac{9}{10}, 26\frac{2}{3}, 14\frac{7}{8}, 21\frac{41}{80}$

<b>#2084c GLA</b>	Student: _____
Guided Learning Activity  <b>Subtracting Mixed Numerals, Exercise Set #3</b>  Author: Dennis Morrow <b>Σ SIGMA-MAC</b>	Course Instructor: _____  Date Completed: _____  Approved: _____

### Subtraction with Mixed Numerals, Exercise Set #3

#### Subtraction:

Subtraction is organized similarly to addition. The fractions are aligned, and the whole numbers are aligned. However, both parts of the bottom number are subtracted from the top number.

$$\begin{array}{r}
 6\frac{1}{3} \frac{4}{12} \\
 - 4\frac{1}{4} \frac{3}{12} \\
 \hline
 2\frac{1}{12} = 2\frac{1}{12}
 \end{array}$$

The tricky part of subtraction comes in the borrowing. If the bottom fraction is bigger than the top fraction one unit must be borrowed from the top's whole number, but that one unit is not ten of the fraction's pieces unless the fraction's denominator is ten.

$$\begin{array}{r}
 6\frac{1}{4} \frac{3}{12} \\
 - 4\frac{1}{3} \frac{4}{12} \\
 \hline
 \end{array}$$

This time we must subtract  $\frac{4}{12}$  from  $\frac{3}{12}$ . We cannot subtract 4 from 3, so we borrow a unit from the 6. The 6 becomes  $5\frac{12}{12}$ . Now the  $6\frac{3}{12}$ , also known as  $6 + \frac{3}{12}$ , becomes  $5\frac{12}{12} + \frac{3}{12}$  or  $5\frac{15}{12}$ , and the problem becomes:

$$\begin{array}{r}
 5\frac{15}{12} \\
 - 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

And without explanation it looks like:

$$\begin{array}{r}
 5\frac{15}{12} \\
 \ominus 4\frac{4}{12} \\
 \hline
 1\frac{11}{12}
 \end{array}$$

**Exercises:**

1.  $39\frac{2}{9} - 24\frac{3}{8}$

The LCD = 72.  $72/9=8, 72/8=9$ . Fill in the blanks.

$$\begin{array}{r} \text{---} \quad \text{---} \\ 39\frac{2}{9} \quad \frac{\text{---}}{72} \\ -24\frac{3}{8} \quad \frac{\text{---}}{72} \\ \hline \text{---} \quad \frac{\text{---}}{72} \end{array}$$

$$14\frac{61}{72}$$

Ans: \_\_\_\_\_

2.  $23\frac{17}{24} - 8\frac{43}{48}$

The LCD = 48.  $48/24=2$  and  $48/48=1$ . Fill in the blanks.

$$\begin{array}{r} \text{---} \quad \text{---} \\ 23\frac{17}{24} \quad \frac{\text{---}}{48} \\ -8\frac{43}{48} \quad \frac{\text{---}}{48} \\ \hline \text{---} \quad \frac{\text{---}}{48} = \text{---} \end{array}$$

$$14\frac{13}{16}$$

Ans: \_\_\_\_\_

**Simplify the following completely. Execute the problems using mixed numerals, and write the answers as mixed numerals.**

3.  $68\frac{1}{6} - 59\frac{2}{3}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

4.  $102\frac{5}{48} - 51\frac{7}{16}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$$8\frac{1}{2}, 50\frac{2}{3}$$

5.  $103\frac{4}{9} - 23\frac{25}{36}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

6.  $93\frac{7}{24} - 28\frac{11}{12}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

7.  $74\frac{5}{6} - 37\frac{17}{18}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

8.  $65\frac{8}{21} - 41\frac{5}{7}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

$79\frac{3}{4}, 64\frac{3}{8}, 36\frac{8}{9}, 23\frac{2}{3}$

9.  $78\frac{1}{6} - 51\frac{7}{15}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

10.  $69\frac{5}{16} - 47\frac{23}{48}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

11.  $41\frac{7}{150} - 22\frac{13}{60}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_

12.  $98\frac{7}{48} - 76\frac{7}{30}$

LCD=\_\_\_\_\_

Ans:\_\_\_\_\_