Chapter 4 section 6
Add, sub mixed fractions

Example 1: page 301

$$2\frac{7}{8}+1\frac{3}{4}$$

Way 1: Change both to improper fractions

$\quad\quad\dfrac{23}{8}+\dfrac{7}{4}$ Find LCD and write equivalent fractions

$\quad\quad\dfrac{23}{8}+\dfrac{7\bullet 2}{4\bullet 2}$ Simplify

$\quad\quad\dfrac{23}{8}+\dfrac{14}{8}$

$\quad\quad\dfrac{37}{8}\quad\quad$ Change to a mixed fraction

$\quad\quad 4\dfrac{5}{8}$

Note: if the problem starts with a mixed fraction, then the answer should be a mixed fraction.

Way 2: work with the whole number and work with the fractions then put together.

$\quad\quad 2\dfrac{7}{8}+1\dfrac{3}{4}$

$\quad\quad\left(2+1\right)+\left(\dfrac{7}{8}+\dfrac{3}{4}\right)\quad\quad$ Add whole numbers and write equivalent fractions

$\quad\quad 3+\left(\dfrac{7}{8}+\dfrac{3\bullet 2}{4\bullet 2}\right)$

$\quad\quad 3+\left(\dfrac{7}{8}+\dfrac{6}{8}\right)\quad$ Simplify

$\quad\quad 3+\dfrac{13}{8}\quad\quad\quad$ Change to a mixed fraction

$\quad\quad 3+\left(1+\dfrac{5}{8}\right)\quad$ Add whole numbers

$\quad\quad 4+\dfrac{5}{8}$

$\quad\quad 4\dfrac{5}{8}$

One can also do the problem in a vertical format

$$2\frac{7}{8} = \quad 2\frac{7}{8} \quad = \quad 2\frac{7}{8}$$

$$+1\frac{3}{4} = +1\frac{3\cdot 2}{4\cdot 2} = +1\frac{6}{8}$$

$$3\frac{13}{8}$$

$$3+\left(1\frac{5}{8}\right)$$

$$4\frac{5}{8}$$

a) $3\frac{1}{4}+2\frac{1}{3}$ b) $4\frac{5}{8}+2\frac{1}{16}$ c) $5\frac{2}{3}+6\frac{5}{8}$

Subtracting mixed fractions are done the same way.

$$5\frac{3}{4}-2\frac{1}{3}$$

a) Change both to improper fractions

b) whole numbers and fractions.
Let's look at how the setup looks

$$5\frac{3}{4}-2\frac{1}{3}$$

$$\left(5+\frac{3}{4}\right)-\left(2+\frac{1}{3}\right) \quad \text{Distribute the negative sign (definition of subtraction}$$

$$5+\frac{3}{4}-2-\frac{1}{3} \qquad \text{Rearrange the terms}$$

$$\left(5-2\right)+\left(\frac{3}{4}-\frac{1}{3}\right) \quad \text{Create equivalent fractions}$$

$$3+\left(\frac{9}{12}-\frac{4}{12}\right) \qquad \text{Simplify}$$

$$3+\frac{5}{12}$$

$$3\frac{5}{12}$$

c) vertically.

Borrowing
Example 8: page 306

$$8\frac{1}{4}-5\frac{5}{6}$$

a) If the problem is done with improper fractions, then there is on borrowing:

$$\frac{33}{4}-\frac{35}{6}$$ equivalent fractions

$$\frac{33\cdot3}{4\cdot3}-\frac{35\cdot2}{6\cdot2}$$

$$\frac{99}{12}-\frac{70}{12}$$ simplify

$$\frac{29}{12}$$ Change to mixed fraction

$$2\frac{5}{12}$$

b) Whole number and fractions

$$8\frac{1}{4}-5\frac{5}{6}$$

$$\left(8-5\right)+\left(\frac{1}{4}-\frac{5}{6}\right)$$ equivalent fractions

$$3+\left(\frac{3}{12}-\frac{10}{12}\right)$$ if one subtracts the fractions, a negative value appears so

$$\left(2+\frac{12}{12}\right)+\left(\frac{3}{12}-\frac{10}{12}\right)$$ rearrange

$$2+\left(\frac{12}{12}+\frac{3}{12}\right)-\frac{10}{12}$$

$$2+\left(\frac{15}{12}\right)-\frac{10}{12}$$ rearrange

$$2+\left(\frac{15}{12}-\frac{10}{12}\right)$$ subtract

$$2+\frac{5}{12}$$

$$2\frac{5}{12}$$

a) $3\dfrac{1}{3} - 2\dfrac{1}{4}$

b) $4\dfrac{5}{8} - 2\dfrac{1}{16}$

c) $4\dfrac{7}{9} - 2\dfrac{1}{6}$

d) $5\dfrac{5}{6} - 4\dfrac{3}{8}$

e) $9 - 2\dfrac{7}{8}$