3. Simplify.

a) $\frac{7}{12} + \frac{9}{12} - \frac{5}{12}$

$= \frac{7+9-5}{12} = \frac{11}{12}$

b) $\frac{9}{10} - \frac{3}{5} + \frac{7}{8} = \frac{9}{10} + \frac{7}{8} - \frac{3}{5}$

$= \frac{9\times4 + 7\times5 - 3\times8}{40} = \frac{36+35-24}{40} = \frac{71-24}{40} = \frac{47}{40}$

$\frac{47}{40} = 1\frac{7}{40}$

c. $\frac{5}{12} \quad \frac{2}{3} \quad \frac{1}{2} + 7$

$= \frac{5}{12} + \frac{7}{1} - \frac{2}{3} - \frac{1}{2}$ [L.C.M = 12]

$= \frac{5 + 7 \times 12 - 2 \times 4 - 1 \times 6}{12}$

$= \frac{5 + 84 - 8 - 6}{12}$

$= \frac{89 - 14}{12} = \frac{75}{12} = 6\frac{3}{12}$

d. $\frac{1}{2} + \frac{3}{4} - \frac{5}{8} - \frac{1}{16}$

$$\frac{1\times8 + 3\times4 - 5\times2 - 1\times1}{16} = \frac{8+12-10-1}{16}$$

$$\frac{8+12-10-1}{16} = \frac{20-10}{16} = \frac{10-1}{16} = \frac{9}{16}$$

e. $8\frac{3}{4} + 7\frac{1}{2} - 3\frac{1}{4} - 2\frac{1}{2} = \frac{35}{4} + \frac{15}{2} - \frac{13}{4} - \frac{5}{2}$

$$\frac{35\times1 + 15\times2 - 13\times1 - 5\times2}{4}$$

2	4, 2, 4, 2
2	2, 1, 2, 1
	1, 1, 1, 1

L.C.M = 4

$$= \frac{35+30-13-10}{4} = \frac{42}{4} = 10\frac{2}{4}$$

f. $10\frac{5}{6} - 7\frac{2}{3} + 8\frac{1}{3} - 5\frac{1}{2} = \frac{65}{6} + \frac{25}{3} - \frac{23}{3} - \frac{11}{3}$

$$\frac{65\times1+25\times2-23\times2-11\times2}{6}$$

$$= \frac{65+50-46-22}{6} = \frac{47}{6} = 7\frac{5}{6}$$

3	6, 3, 3, 3
2	2, 1, 1, 1
	1, 1, 1, 1

L.C.M = 6

g. $5\frac{5}{12} - 6 + 8 - 5\frac{3}{5} = \frac{65}{12} + \frac{8}{1} - \frac{6}{1} - \frac{28}{5}$

$$\frac{65\times5+8\times60-6\times60-28\times12}{60}$$

$$= \frac{325+480-360-336}{60} = \frac{109}{60} = 1\frac{49}{60}$$

2	12, 5
2	6, 5
3	3, 5
5	1, 5
	1, 1

L.C.M = 60

h. $10\frac{1}{4} + 6\frac{3}{8} - 15 + 1\frac{1}{12} = \frac{41}{4} + \frac{51}{8} + \frac{13}{12} - \frac{15}{1}$

$$\frac{41\times6+51\times3+13\times2-15\times24}{24}$$

$$= \frac{246+153+26-360}{24} = \frac{26}{24} = 1\frac{2}{24}$$

2	4, 8, 12
2	2, 4, 6
2	1, 2, 3
3	1, 1, 3
	1, 1, 1

L.C.M = 24

i. $25 - 20\frac{1}{2} + 15\frac{3}{5} - 5 = \frac{25}{1} + \frac{78}{5} - \frac{41}{2} - \frac{5}{1}$

$$\frac{25\times10 + 78\times2 - 41\times5 - 5\times10}{10}$$

2	5, 2
5	5, 1
	1, 1

$$= \frac{250 + 156 - 205 - 50}{10} = \frac{151}{10} = 15\frac{1}{10}$$ L.C.M = 10

j. $\frac{9}{14} + \frac{2}{7} + 4\frac{3}{7} - 1\frac{2}{21} = \frac{9}{14} + \frac{31}{7} - \frac{9}{7} - \frac{23}{21}$

$$\frac{9\times3 + 31\times6 - 9\times6 - 23\times2}{42}$$

7	14, 7, 21
2	2, 1, 3
3	1, 1, 3
	1, 1, 1, 1

$$= \frac{27 + 186 - 54 - 46}{42} = \frac{118}{42} = 2\frac{34}{42}$$ L.C.M = 42