Fractions: Adding & Subtracting — Solutions

Solutions

1. $\frac{12}{16} = \frac{3}{4}$
2. $\frac{3}{7} > \frac{3}{9}$ (same numerator; smaller denominator $\Rightarrow$ larger fraction)
3. $\frac{11}{4} = 2\frac{3}{4}$
4. $\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$
5. $\frac{1}{7} + \frac{3}{7} = \frac{4}{7}$ $\qquad \frac{5}{9} + \frac{2}{9} = \frac{7}{9}$
6. Convert to a common denominator of 4: $\frac{1}{2} = \frac{2}{4}$
7. $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$
8. $\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

Solutions

1. e.g. $\frac{4}{6}, \frac{6}{9}, \frac{8}{12}$
2. $\frac{1}{12} < \frac{1}{8} < \frac{1}{2}$
3. $2\frac{3}{7} = \frac{17}{7}$
4. $\frac{4}{6} - \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$
5. $\frac{7}{10} - \frac{3}{10} = \frac{4}{10} = \frac{2}{5}$ $\qquad$ $\frac{8}{9} - \frac{5}{9} = \frac{3}{9} = \frac{1}{3}$
6. $\frac{3}{4} - \frac{1}{2} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4}$
7. $\frac{5}{6} - \frac{1}{4} = \frac{10}{12} - \frac{3}{12} = \frac{7}{12}$
8. $\frac{7}{8} - \frac{2}{3} = \frac{21}{24} - \frac{16}{24} = \frac{5}{24}$
9. $\frac{3}{8} < \frac{5}{12} < \frac{1}{2}$ (common denom. 24: $\frac{9}{24} < \frac{10}{24} < \frac{12}{24}$)

Solutions

1. $\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$
2. $\frac{3}{4} - \frac{1}{2} = \frac{3}{4} - \frac{2}{4} = \frac{1}{4}$
3. $\frac{36}{48} = \frac{3}{4}$
4. $1\frac{3}{4} + 1\frac{1}{2} = \frac{7}{4} + \frac{6}{4} = \frac{13}{4} = 3\frac{1}{4}$
5. $2\frac{1}{3} + 1\frac{1}{3} = 3\frac{2}{3}$ $3\frac{1}{4} + 1\frac{1}{2} = 3\frac{1}{4} + 1\frac{2}{4} = 4\frac{3}{4}$
6. $1\frac{3}{4}$ is at the $1\frac{3}{4}$ mark; $3\frac{1}{4}$ is at the $3\frac{1}{4}$ mark. Difference $= 3\frac{1}{4} - 1\frac{3}{4} = \frac{13}{4} - \frac{7}{4} = \frac{6}{4} = 1\frac{1}{2}$
7. $2\frac{2}{3} + 1\frac{3}{4} = \frac{8}{3} + \frac{7}{4} = \frac{32}{12} + \frac{21}{12} = \frac{53}{12} = 4\frac{5}{12}$
8. $1\frac{3}{4} - 3\frac{1}{4} = \frac{7}{4} - \frac{13}{4} = -\frac{6}{4} = -1\frac{1}{2}$

Solutions

1. $2\frac{2}{5} > 2\frac{1}{3} \quad (\frac{1}{3} = \frac{5}{15},\ \frac{2}{5} = \frac{6}{15},\ \text{so } 2\frac{2}{5} > 2\frac{1}{3})$
2. $\frac{23}{6} = 3\frac{5}{6}$
3. $3\frac{1}{4} - 1\frac{3}{4} = \frac{13}{4} - \frac{7}{4} = \frac{6}{4} = 1\frac{1}{2}$
4. $3\frac{3}{5} - 1\frac{1}{5} = 2\frac{2}{5}$ $\qquad 4\frac{5}{6} - 2\frac{1}{6} = 2\frac{4}{6} = 2\frac{2}{3}$
5. $4\frac{1}{4} - 1\frac{1}{2} = \frac{17}{4} - \frac{6}{4} = \frac{11}{4} = 2\frac{3}{4}$

   $1\frac{2}{3} + 2\frac{1}{4} = \frac{5}{3} + \frac{9}{4} = \frac{20}{12} + \frac{27}{12} = \frac{47}{12} = 3\frac{11}{12}$
6. $3\frac{1}{3} - 1\frac{3}{4} = \frac{10}{3} - \frac{7}{4} = \frac{40}{12} - \frac{21}{12} = \frac{19}{12} = 1\frac{7}{12}$

   $5\frac{1}{3} - 2\frac{3}{4} = \frac{16}{3} - \frac{11}{4} = \frac{64}{12} - \frac{33}{12} = \frac{31}{12} = 2\frac{7}{12}$

Solutions

1. $\frac{15}{20} = \frac{3}{4}$

2. $\frac{72}{96} = \frac{3}{4}$

3. $\dfrac{1}{2} + \dfrac{3}{6} = 1 \qquad \dfrac{2}{3} + \dfrac{2}{6} = 1$

4. $2\dfrac{3}{4} + 1\dfrac{2}{3} = \dfrac{11}{4} + \dfrac{5}{3} = \dfrac{33}{12} + \dfrac{20}{12} = \dfrac{53}{12} = 4\dfrac{5}{12}$

5. $4\dfrac{1}{5} - 1\dfrac{3}{4} = \dfrac{21}{5} - \dfrac{7}{4} = \dfrac{84}{20} - \dfrac{35}{20} = \dfrac{49}{20} = 2\dfrac{9}{20}$

6. Maya added the numerators and denominators separately. The correct method requires a common denominator:
$\dfrac{1}{2} + \dfrac{1}{3} = \dfrac{3}{6} + \dfrac{2}{6} = \dfrac{5}{6}$

7. Total eaten $= \dfrac{3}{8} + \dfrac{1}{4} + \dfrac{1}{3} = \dfrac{9}{24} + \dfrac{6}{24} + \dfrac{8}{24} = \dfrac{23}{24}$. Remaining $= 1 - \dfrac{23}{24} = \dfrac{1}{24}$

8. $\square = 5\dfrac{1}{6} - 3\dfrac{1}{4} = \dfrac{31}{6} - \dfrac{13}{4} = \dfrac{62}{12} - \dfrac{39}{12} = \dfrac{23}{12} = 1\dfrac{11}{12}$

9. **False.** Let $a = 1, b = 2, c = 3$: LHS $= \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$; RHS $= \frac{2}{5}$. Since $\frac{5}{6} \neq \frac{2}{5}$, the statement is false. The correct sum is $\frac{a(b+c)}{bc}$, not $\frac{2a}{b+c}$.