

3-5 Study Guide and Intervention

Adding and Subtracting Like Fractions

Add Like Fractions To add fractions with the same denominators, called **like denominators**, add the numerators and write the sum over the denominator.

$$\text{So, } \frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}, \text{ where } c \neq 0.$$

Example 1 Find $\frac{5}{12} + \frac{9}{12}$. Write in simplest form.

$$\frac{5}{12} + \frac{9}{12} = \frac{5+9}{12}$$

The denominators are the same. Add the numerators.

$$= \frac{14}{12} \text{ or } 1\frac{2}{12} \text{ or } 1\frac{1}{6}$$

Simplify and rename to a mixed number.

Example 2 Find $\frac{3}{8} + \left(-\frac{7}{8}\right)$. Write in simplest form.

$$\frac{3}{8} + \left(-\frac{7}{8}\right) = \frac{3+(-7)}{8}$$

The denominators are the same. Add the numerators.

$$= \frac{-4}{8} \text{ or } -\frac{1}{2}$$

Simplify.

Example 3 Find $1\frac{2}{9} + 3\frac{4}{9}$. Write in simplest form.

$$1\frac{2}{9} + 3\frac{4}{9} = (1 + 3) + \left(\frac{2}{9} + \frac{4}{9}\right)$$

Add the whole numbers and fractions separately or write as improper fractions.

$$= 4 + \frac{2+4}{9}$$

Add the numerators.

$$= 4\frac{6}{9} \text{ or } 4\frac{2}{3}$$

Simplify.

Exercises

Find each sum. Write in simplest form.

1. $\frac{11}{12} + \frac{9}{12}$

2. $\frac{13}{15} + \frac{9}{15}$

3. $\frac{4}{9} + \frac{8}{9}$

4. $\frac{4}{20} + \left(-\frac{9}{20}\right)$

5. $\frac{5}{6} + \frac{5}{6}$

6. $-\frac{9}{10} + \frac{4}{10}$

7. $\frac{19}{20} - \frac{17}{20}$

8. $9 + 4\frac{3}{7}$

9. $7\frac{3}{4} + 3\frac{1}{4}$

10. $-6\frac{7}{12} + \left(-8\frac{11}{12}\right)$

11. $-4\frac{9}{14} + 3\frac{5}{14}$

12. $2\frac{3}{5} + \left(-\frac{1}{5}\right)$

3-5 Study Guide and Intervention *(continued)***Adding and Subtracting Like Fractions**

Subtract Like Fractions To subtract fractions with like denominators, subtract the numerators and write the difference over the denominator. So, $\frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$, where $c \neq 0$.

Example 1 Find $\frac{3}{8} - \frac{5}{8}$. Write in simplest form.

$$\frac{3}{8} - \frac{5}{8} = \frac{3-5}{8}$$

The denominators are the same. Subtract the numerators.

$$= -\frac{2}{8} \text{ or } -\frac{1}{4}$$

Simplify.

Example 2 Evaluate $x - y$ when $x = 7\frac{1}{3}$ and $y = 5\frac{2}{3}$. Write in simplest form.

$$x - y = 7\frac{1}{3} - 5\frac{2}{3}$$

Replace x with $7\frac{1}{3}$ and y with $5\frac{2}{3}$.

$$= 7\frac{1}{3} - 5\frac{2}{3} = 6\frac{4}{3} - 5\frac{2}{3}$$

Since $\frac{1}{3} < \frac{2}{3}$, think of $7\frac{1}{3}$ as $6\frac{3}{3} + \frac{1}{3}$, or $6\frac{4}{3}$.

$$= 1\frac{2}{3}$$

Subtract the whole numbers. Then subtract the fractions.

Algebraic Fractions Algebraic fractions can be added and subtracted just like numerical fractions.

Example 3 Find $\frac{5b}{12} + \frac{3b}{12}$. Write in simplest form.

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

The denominators are the same. Add the numerators.

$$= \frac{8b}{12} \text{ or } \frac{2b}{3}$$

Simplify.

Exercises

Find each sum or difference. Write in simplest form.

1. $\frac{19}{20} - \frac{17}{20}$

2. $\frac{23}{25} - \frac{8}{25}$

3. $\frac{5}{9} - \frac{2}{9}$

4. $\frac{3}{7} - \frac{5}{7}$

5. $\frac{4}{12} - \frac{7}{12}$

6. $\frac{14}{15} - \frac{9}{15}$

7. $\frac{4c}{8} + \frac{2c}{8}$

8. $\frac{8x}{21} - \frac{11x}{21}$

9. $\frac{9r}{p} - \frac{5r}{p}, p \neq 0$

10. $\frac{10m}{18} + \frac{5m}{18}$

11. $\frac{3t}{16} - \frac{7t}{16}$

12. $\frac{8g}{15} + \frac{g}{15}$

Evaluate each expression if $a = 6\frac{7}{20}$, $b = 3\frac{11}{20}$, and $c = 5\frac{3}{20}$.

13. $a - b$

14. $b - a$

15. $c - a$

16. $b - c$