Name _____ Date _____

Add With Unlike Denominators

Find $2\frac{3}{8} + \frac{2}{3}$.

Step 1: Find the least common multiple (LCM) of the denominators.

Multiples of 8: 8, 16, (24) 32, 40, . . .

Multiples of 3: 3, 6, 9, 12, 15, 18, 21, (24) . . .

LCM = 24

Step 2: Write equivalent fractions with the LCM as the denominator.

$\frac{3}{8} = \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$ $\quad \frac{2}{3} = \frac{2 \times 8}{3 \times 8} = \frac{16}{24}$

Step 3: Add the numerators and the whole numbers.

$$2\tfrac{3}{8} = 2\tfrac{9}{24}$$
$$+\ \tfrac{2}{3} = \tfrac{16}{24}$$
$$2\tfrac{25}{24}$$

Step 4: Write the answer in simplest form.

$\frac{25}{24} = 1\frac{1}{24}$

$2\frac{25}{24} = 2 + 1\frac{1}{24} = 3\frac{1}{24}$

$2\frac{3}{8} + \frac{2}{3} = 3\frac{1}{24}$

Find each sum. Write your answer in simplest form.

1. $\frac{3}{4} + \frac{1}{6}$
2. $\frac{2}{3} + \frac{2}{5}$
3. $\frac{1}{2} + \frac{2}{3}$
4. $\frac{4}{7} + \frac{5}{6}$
5. $\frac{1}{2} + \frac{3}{4} + \frac{1}{8}$
6. $4\frac{5}{6} + 3\frac{1}{2}$
7. $2\frac{1}{6} + 7\frac{1}{18}$
8. $5\frac{5}{6} + \frac{1}{12} + \frac{3}{4}$
9. $1\frac{2}{9} + 3\frac{1}{6}$
10. $4\frac{1}{4} + 6\frac{5}{14}$
11. $7\frac{3}{5} + 4\frac{5}{9}$
12. $5\frac{1}{8} + 12\frac{7}{12}$

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Subtract With Unlike Denominators

Find $4\frac{1}{4} - 2\frac{5}{6}$.

Step 1: Find the least common multiple (LCM) of the denominators.

Multiples of 4: 4, 8, (12) 16, 20, . . .

Multiples of 6: 6, (12) 18, 24, 30, . . .

LCM = 12

Step 2: Write equivalent fractions with the LCM as the denominator.

$\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$

$\frac{5}{6} = \frac{5 \times 2}{6 \times 2} = \frac{10}{12}$

Step 3: Compare the numerators and rename if needed.

Since $3 < 10$, rename $4\frac{3}{12}$ as $3\frac{15}{12}$.

$$4\tfrac{1}{4} = 4\tfrac{3}{12} = 3\tfrac{15}{12}$$
$$-2\tfrac{5}{6} = 2\tfrac{10}{12} = 2\tfrac{10}{12}$$

Step 4: Subtract the numerators and the whole numbers. Then write the answer in simplest form.

$$4\tfrac{1}{4} = 4\tfrac{3}{12} = 3\tfrac{15}{12}$$
$$-\ 2\tfrac{5}{6} = 2\tfrac{10}{12} = 2\tfrac{10}{12}$$
$$1\tfrac{5}{12}$$

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

Find each difference. Write your answer in simplest form.

1. $\frac{7}{8} - \frac{5}{16}$
2. $\frac{2}{3} - \frac{4}{9}$
3. $\frac{3}{4} - \frac{1}{2}$
4. $\frac{4}{9} - \frac{1}{6}$
5. $\frac{5}{12} - \frac{1}{6}$
6. $\frac{5}{8} - \frac{1}{12}$
7. $6\frac{7}{9} - 2\frac{1}{3}$
8. $5\frac{4}{5} - 1\frac{1}{2}$
9. $7\frac{3}{5} - 4\frac{7}{10}$
10. $8\frac{3}{4} - 3\frac{1}{3}$
11. $6\frac{1}{3} - 2\frac{5}{6}$
12. $11\frac{3}{8} - 6\frac{5}{6}$

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Multiply Mixed Numbers

Multiply. $6\frac{7}{8} \times 4 = \square$

Step 1: Write $6\frac{7}{8}$ as an improper fraction.

$$6\frac{7}{8} = \frac{(8 \times 6) + 7}{8} = \frac{48 + 7}{8} = \frac{55}{8}$$

Step 2: Write 4 as a fraction.

Write whole numbers over a denominator of 1.

$$4 = \frac{4}{1}$$

Step 3: Write a product fraction.

Multiply the numerators and the denominators.

$$6\frac{7}{8} \times 4 =$$

$$\frac{55}{8} \times \frac{4}{1} =$$

$$\frac{55 \times 4}{8 \times 1}$$

Step 4: Find a factor that can evenly divide into the numerator and the denominator.

4 and 8 can both be divided by 4.

$$\frac{55 \times \cancel{4}^{1}}{\cancel{8}_{2} \times 1}$$

Write the product in simplest form.

$$\frac{55}{2} = 27\frac{1}{2}$$

Multiply. Write each product in simplest form.

1. $4 \times 2\frac{2}{3}$ _____
2. $5\frac{5}{9} \times 2\frac{1}{4}$ _____
3. $2\frac{3}{7} \times 7$ _____
4. $3\frac{3}{4} \times \frac{1}{5}$ _____
5. $2\frac{1}{2} \times 4\frac{2}{3}$ _____
6. $4\frac{1}{5} \times 1\frac{1}{3}$ _____
7. $5 \times 2\frac{3}{10}$ _____
8. $1\frac{1}{3} \times 3\frac{1}{2}$ _____

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Divide Mixed Numbers

Divide. $3\frac{1}{4} \div 1\frac{1}{12} = \square$

Step 1: Write mixed numbers as improper fractions.

$$3\frac{1}{4} = \frac{(4 \times 3) + 1}{4} = \frac{13}{4}$$

$$3\frac{1}{4} = \frac{13}{4}$$

$$1\frac{1}{12} = \frac{13}{12}$$

Step 2: Find the reciprocal of the divisor.

$$\frac{13}{4} \div \frac{13}{12}$$

The reciprocal of $\frac{13}{12}$ is $\frac{12}{13}$.

Step 3: Rewrite as a multiplication problem.

$$\frac{13}{4} \div \frac{13}{12}$$

$$= \frac{13}{4} \times \frac{12}{13} = \frac{(13 \times 12)}{(4 \times 13)}$$

Step 4: Simplify if possible. 12 and 4 can be divided by 4. Then multiply.

$$\frac{\cancel{13}^{1}}{\cancel{4}_{1}} \times \frac{\cancel{12}^{3}}{\cancel{13}_{1}} = \frac{3}{1} = 3$$

So $3\frac{1}{4} \div 1\frac{1}{12} = 3$.

Divide. Express each quotient in simplest form.

1. $6\frac{2}{3} \div \frac{5}{8}$ _____
2. $1\frac{3}{8} \div \frac{3}{4}$ _____
3. $3\frac{2}{5} \div \frac{9}{10}$ _____
4. $4\frac{1}{8} \div 2\frac{3}{4}$ _____
5. $10 \div 3\frac{1}{3}$ _____
6. $12 \div 6\frac{3}{4}$ _____
7. $1\frac{5}{9} \div 6\frac{2}{3}$ _____
8. $4\frac{4}{7} \div 8$ _____
9. $3\frac{1}{12} \div 1\frac{1}{3}$ _____
10. $4\frac{2}{3} \div 2\frac{1}{3}$ _____
11. $2\frac{1}{3} \div 4\frac{1}{2}$ _____
12. $5\frac{5}{6} \div \frac{7}{8}$ _____