Multiplying Fractions and Whole Numbers

Any whole number can be written as a fraction with a denominator of 1. For example, 5 is the same as $\frac{5}{1}$. To check, divide 5 by 1.

EXAMPLE $9 \times \frac{5}{6} =$

STEP 1 Write 9 as a fraction. $9 = \frac{9}{1}$

STEP 2 Cancel 9 and 6 by 3.

STEP 3 Multiply across by the new numbers.

STEP 4 Change the improper fraction to a mixed number (see page 19).

$$\frac{\cancel{9}^{3}}{1} \times \frac{5}{\cancel{6}_{2}} = \frac{15}{2} = 7\frac{1}{2}$$

Multiply and reduce.

1. $4 \times \frac{3}{7} =$ $\quad 9 \times \frac{1}{4} =$ $\quad \frac{2}{3} \times 10 =$ $\quad 3 \times \frac{4}{5} =$

2. $15 \times \frac{2}{3} =$ $\quad \frac{5}{9} \times 18 =$ $\quad \frac{4}{21} \times 7 =$ $\quad \frac{8}{15} \times 45 =$

3. $\frac{7}{8} \times 24 =$ $\quad \frac{11}{40} \times 20 =$ $\quad 32 \times \frac{7}{16} =$ $\quad 12 \times \frac{15}{16} =$

4. $35 \times \frac{7}{30} =$ $\quad 16 \times \frac{5}{24} =$ $\quad \frac{7}{12} \times 36 =$ $\quad 2 \times \frac{9}{10} =$

Multiplying Mixed Numbers

To multiply with mixed numbers, change every mixed number to an improper fraction. (See page 21.)

EXAMPLE $4\frac{1}{2} \times \frac{5}{6} =$

STEP 1 Change $4\frac{1}{2}$ to an improper fraction.

$4\frac{1}{2} = \frac{9}{2}$

STEP 2 Cancel 9 and 6 by 3.

STEP 3 Multiply across.

STEP 4 Change the improper fraction to a mixed number (see page 19).

$\frac{\overset{3}{\cancel{9}}}{2} \times \frac{5}{\cancel{6}_{2}} = \frac{15}{4} = 3\frac{3}{4}$

Multiply and reduce.

1. $1\frac{1}{2} \times \frac{1}{4} =$ $\quad 1\frac{2}{3} \times \frac{2}{7} =$ $\quad 2\frac{1}{4} \times \frac{7}{8} =$ $\quad \frac{3}{10} \times 5\frac{1}{2} =$

2. $\frac{4}{9} \times 3\frac{3}{4} =$ $\quad \frac{2}{7} \times 2\frac{5}{8} =$ $\quad 4\frac{2}{3} \times \frac{15}{16} =$ $\quad 6\frac{3}{7} \times \frac{4}{5} =$

3. $2\frac{1}{3} \times 1\frac{1}{5} =$ $\quad 6\frac{2}{3} \times 3\frac{3}{4} =$ $\quad 3\frac{5}{7} \times 4\frac{3}{8} =$ $\quad 16\frac{1}{3} \times 2\frac{5}{14} =$

4. $3\frac{3}{4} \times \frac{8}{9} \times 1\frac{1}{5} =$ $\quad 2\frac{2}{5} \times 3\frac{3}{8} \times 2\frac{7}{9} =$ $\quad 2\frac{2}{15} \times 5\frac{1}{4} \times 7\frac{1}{2} =$

Rounding and Estimating

To estimate a multiplication problem with mixed numbers, round each mixed number to the nearest whole number. Then use the whole numbers to multiply.

For a mixed number with a fraction of $\frac{1}{2}$ or more, round to the next whole number.

EXAMPLES $5\frac{3}{4} \rightarrow 6$ $2\frac{5}{9} \rightarrow 3$ $8\frac{1}{2} \rightarrow 9$

For a mixed number with a fraction less than $\frac{1}{2}$, drop the fraction and use the whole number.

EXAMPLES $7\frac{3}{8} \rightarrow 7$ $10\frac{1}{3} \rightarrow 10$ $1\frac{2}{7} \rightarrow 1$

EXAMPLE Estimate the answer to $5\frac{3}{4} \times 2$.

STEP 1	Round $5\frac{3}{4}$ to the nearest whole number.	$5\frac{3}{4} \rightarrow 6$
STEP 2	Multiply the rounded numbers.	$6 \times 2 = 12$
STEP 3	Find the exact answer. Notice how close the estimate, 12, is to the exact answer, $11\frac{1}{2}$.	$5\frac{3}{4} \times 2 =$ $\frac{23}{\cancel{4}_2} \times \frac{\overset{1}{\cancel{2}}}{1} = \frac{23}{2} = \mathbf{11\frac{1}{2}}$

First round each mixed number to the nearest whole number. Next, find the product of the rounded numbers. Then find the exact answer.

1. $6 \times 2\frac{3}{4} =$ $3\frac{1}{8} \times 4 =$ $5\frac{1}{3} \times 9 =$ $1\frac{5}{6} \times 8 =$

2. $4\frac{3}{5} \times 5 =$ $3 \times 6\frac{2}{9} =$ $12 \times 1\frac{7}{8} =$ $10\frac{1}{4} \times 6 =$

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

4. $2\frac{1}{4} \times 2\frac{2}{3} =$ $3\frac{3}{4} \times 4\frac{4}{9} =$ $5\frac{5}{6} \times 1\frac{13}{20} =$ $3\frac{3}{8} \times 2\frac{5}{9} =$