MIXED NUMBER MULTIPLICATION AND DIVISION

When we add or subtract mixed numbers we first deal with the whole numbers and then deal with the fractions. This approach does not work for multiplication and division of mixed numbers.

Consider $\quad 2\frac{1}{2} \times 2\frac{1}{2}$

Multiplying the whole numbers $\qquad 2 \times 2 = 4$

Multiplying the fractions $\qquad \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

But the answer is not $4\frac{1}{4}$

$$2\frac{1}{2} \times 2 = 5 \qquad !!$$

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

so the answer should be $6\frac{1}{4}$

What we need to do is write the mixed numbers as improper fractions, multiply or divide the improper fractions, then convert the answer back to a mixed number.

Eg $\quad 2\frac{1}{2} \times 2\frac{1}{2} \quad = \frac{5}{2} \times \frac{5}{2}$

$$= \frac{5 \times 5}{2 \times 2} = \frac{25}{4} = 6\frac{1}{4}$$

MIXED NUMBER MULTIPLICATION AND DIVISION   TRANSCRIPT

Multiplication

Ex1

$$2\frac{2}{5} \times 1\frac{3}{4}$$

$$= \frac{\overset{3}{\cancel{12}}}{5} \times \frac{7}{\underset{1}{\cancel{4}}}$$

$$= \frac{3 \times 7}{5 \times 1}$$

$$= \frac{21}{5}$$

$$= 4\frac{1}{5}$$

Ex3

$$2\frac{2}{3} \times 2\frac{1}{4}$$

$$= \frac{\overset{2}{\cancel{8}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{4}}}$$

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

$$= \frac{6}{1}$$

$$= 6$$

Ex2

$$3\frac{3}{4} \times 1\frac{1}{5}$$

$$= \frac{\overset{3}{\cancel{15}}}{\underset{2}{\cancel{4}}} \times \frac{\overset{3}{\cancel{6}}}{\underset{1}{\cancel{5}}}$$

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

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

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

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Division

Important points:

1. You cannot cancel while there is a `÷` sign, only when there is a `×` sign.

2. To divide by a fraction you turn it upside down and multiply.

Ex5
$$2\frac{4}{5} \div 1\frac{3}{4}$$
$$= \frac{14}{5} \div \frac{7}{4}$$
$$= \frac{^2\cancel{14}}{5} \times \frac{4}{\cancel{7}_1}$$
$$= \frac{2 \times 4}{5 \times 1}$$
$$= \frac{8}{5}$$
$$= 1\frac{3}{5}$$

Ex4
$$7\frac{1}{2} \div 1\frac{2}{3}$$
$$= \frac{15}{2} \div \frac{5}{3}$$
$$= \frac{^3\cancel{15}}{2} \times \frac{3}{\cancel{5}_1}$$
$$= \frac{3 \times 3}{2 \times 1}$$
$$= \frac{9}{2}$$
$$= 4\frac{1}{2}$$

Ex6
$$3\frac{3}{5} \div 1\frac{2}{5}$$
$$= \frac{18}{5} \div \frac{7}{5}$$
$$= \frac{18}{\cancel{5}_1} \times \frac{\cancel{5}^1}{7}$$
$$= \frac{18 \times 1}{1 \times 7}$$
$$= \frac{18}{7}$$
$$= 2\frac{4}{7}$$