

# Multiplying and dividing mixed numbers

We can multiply and divide mixed numbers. We just change them to improper fractions, and then multiply or divide as usual, converting the final answer back into a mixed number.

Remember, to convert a mixed number to an improper fraction, we just multiply the denominator of the fraction by the whole number, then add the result to the numerator of the fraction, then put that whole thing over the original denominator.

Let's try an example with multiplication of mixed numbers.

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## Example

Find the product.

$$2\frac{2}{3} \times 5\frac{3}{7}$$

First, we'll convert both mixed numbers to improper fractions.

$$\frac{3 \cdot 2 + 2}{3} \times \frac{7 \cdot 5 + 3}{7}$$

$$\frac{6 + 2}{3} \times \frac{35 + 3}{7}$$

$$\frac{8}{3} \times \frac{38}{7}$$

Then, to multiply the fractions, we multiply the numerators together to get the new numerator, and we multiply the denominators together to get the new denominator.

$$\frac{8 \times 38}{3 \times 7}$$

$$\frac{304}{21}$$

We can leave the answer as an improper fraction, but If we want to convert it back into a mixed number, we can say that 21 goes into 304 fourteen times, with 10 left over, so

$$\frac{304}{21} = 14\frac{10}{21}$$

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Let's try an example with division of mixed numbers.

### Example

Find the quotient.

$$4\frac{1}{6} \div 3\frac{1}{3}$$

First, we'll convert both mixed numbers to improper fractions.

$$\frac{6 \cdot 4 + 1}{6} \div \frac{3 \cdot 3 + 1}{3}$$

$$\frac{24 + 1}{6} \div \frac{9 + 1}{3}$$

$$\frac{25}{6} \div \frac{10}{3}$$

Then, to divide the fractions, we'll invert the divisor (flip the second fraction upside down), and multiply instead.

$$\frac{25}{6} \times \frac{3}{10}$$

$$\frac{75}{60}$$

We'll reduce the fraction by dividing by 15, the greatest common factor. This doesn't change the fraction, it just reduces it.

$$\frac{75 \div 15}{60 \div 15}$$

$$\frac{5}{4}$$

We can leave the answer as an improper fraction, but If we want to convert it back into a mixed number, we can say that 4 goes into 5 one time, with 1 left over, so

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

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