

# Distributive property with fractions

First remember that the distributive property is a method you can use to simplify expressions and to multiply the term outside of the parentheses by each term inside the parentheses.

It's the same thing with fractions, just remember to multiply the outside numerator (top) with the numerators of the terms inside parentheses and the outside denominator (bottom) with the denominators of the inside terms.

Distributive Property for fractions:

$$\frac{a}{b} \left( \frac{c}{d} + \frac{e}{f} \right) = \frac{ac}{bd} + \frac{ae}{bf}$$

$$\frac{a}{b} \left( \frac{c}{d} - \frac{e}{f} \right) = \frac{ac}{bd} - \frac{ae}{bf}$$

When you're learning to distribute with fractions, first write out the multiplication and then reduce.

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## Example

Use the distributive property to expand the expression.

$$\frac{3a}{b^2} \left( \frac{4c}{5b} + \frac{a^3}{3b^2} \right)$$



Multiply the outside term  $3a/b^2$  with each term inside the parentheses

$$\frac{3a}{b^2} \left( \frac{4c}{5b} \right) + \frac{3a}{b^2} \left( \frac{a^3}{3b^2} \right)$$

Multiply the numerators and then multiply the denominators.

$$\frac{12ac}{5b^3} + \frac{3a^4}{3b^4}$$

Reduce if possible.

$$\frac{12ac}{5b^3} + \frac{a^4}{b^4}$$

Let's try another example of the distributive property with fractions.

### Example

Use the distributive property to expand the expression.

$$\frac{xy^2}{z} \left( xz^2 - \frac{x^2y^3}{z^2} \right)$$

Multiply the outside term  $xy^2/z$  with each term inside the parentheses.

$$\frac{xy^2}{z} (xz^2) - \frac{xy^2}{z} \left( \frac{x^2y^3}{z^2} \right)$$



Multiply the numerators and then multiply the denominators (remember that if there's no denominator, then the denominator is 1).

$$\frac{x^2y^2z^2}{z} - \frac{x^3y^5}{z^3}$$

Reduce if possible.

$$x^2y^2z - \frac{x^3y^5}{z^3}$$

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