

A Shortcut in Partial Fractions

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Excerpt

The basic technique to find partial fractions for a rational function is based on the method of undetermined coefficients. However, the computation involved in this method is often tedious. The following is a simple shortcut to expanding certain rational functions in partial fractions. We believe it is worthwhile to include this method in the texts.

Shortcut. Let $p(x)$ be a function and a, b distinct scalars. Then

$$\frac{1}{(p(x) + a)(p(x) + b)} = \left(\frac{1}{p(x) + a} - \frac{1}{p(x) + b} \right) \frac{1}{b - a}.$$

This is a special case of a general algebraic identity, and it is really useful. Let us look at some applications.