

PARTIAL FRACTION DECOMPOSITION

Describe the following cases

Case I: The Denominator is a product of distinct linear factors.

Decompose $\frac{x + 5}{x^2 + x - 2}$

Case II: The Denominator is a product of linear factors, some of which are repeated.

Decompose $\frac{x^2 + 1}{(x - 3)(x - 2)^2}$

Case III: The Denominator is a product of distinct irreducible quadratic factors.

Decompose $\frac{x - 2}{x(x^2 + 1)}$

Case IV: The Denominator is a product of irreducible quadratic factors, some of which are repeated.

Decompose $\frac{1}{x(x^2 + 4)^2}$

Two Questions:

1. What do you do if the denominator has degree larger than the numerator?
2. What are rationalizing substitutions?