

Aim: How do we decompose fractions with repeated factors in the denominator?

I. Do Now:

Find the partial fraction decomposition.

1. $\frac{x-3}{x^2-5x+6}$

II. Note: *Repeated* factors in the denominator result in decompositions as shown in the examples below:

<u>Repeated Linear Factors</u>	<u>Repeated Quadratic Factors</u>
$\frac{2}{(x+1)^3} = \frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{(x+1)^3}$	$\frac{x-1}{(x^2+3)^4} = \frac{Ax+B}{x^2+3} + \frac{Cx+D}{(x^2+3)^2} + \frac{Ex+F}{(x^2+3)^3} + \frac{Gx+H}{(x^2+3)^4}$

Note that the exponent increases in every fraction.

III. Decompose:

2. $\frac{3x-4}{x^2-4x+4}$

3. $\frac{8x^2-x-3}{x^3+x^2}$

4. $\frac{2x^3+2x-4}{(x^2+1)^2}$

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1. Write the form of the partial fraction decomposition.

Do not solve for the constants.

(a) $\frac{x^2-3x+2}{4x^3+11x^2}$

(b) $\frac{4x^2+3}{(x-5)^3}$

2. Decompose.

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

(b) $\frac{x^2+13x+12}{x^3-4x^2}$