



Precalculus Workbook

Partial fractions

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M A T H

FRACTION DECOMPOSITION

- 1. Find the form of partial fractions decomposition of the rational function.

$$f(x) = \frac{6x + 16}{x^2 + 10x + 21}$$

- 2. Identify the repeated factors in the denominator of rational function.

$$f(x) = \frac{3x + 7}{(x - 1)(x^2 - 1)(x^2 + 1)^3(x^2 - 2x - 3)}$$

- 3. How many fractions will exist in the partial fractions decomposition of the function?

$$f(x) = \frac{1}{(x^2 + 1)(x^4 + 5x^2 + 6)}$$

- 4. Find the form of the partial fractions decomposition of the function, without solving for the constants.

$$f(x) = \frac{1}{(x^2 + 1)(x^4 - 1)}$$

- 5. Find the form of the partial fractions decomposition of the function, without solving for the constants.

$$f(x) = \frac{x^2}{(x^2 + 2x)(x^2 + 2x + 2)}$$

- 6. Find the form of the partial fractions decomposition of the function, without solving for the constants.

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

DISTINCT LINEAR FACTORS

- 1. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{4}{(3x - 1)(x + 1)}$$

- 2. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{24}{x(x + 4)(x - 2)}$$

- 3. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{3x}{(x + 2)(x + 5)}$$

- 4. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{6x}{(x^2 - 1)(x - 2)}$$

- 5. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x+1}{9x^3 - x}$$

■ 6. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{6x - 24}{(x^2 - 1)(x^2 - 4)}$$



REPEATED LINEAR FACTORS

- 1. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^3 - 2x^2 + 2x - 3}{(x - 2)^4}$$

- 2. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^3 + 3x^2 + 3x + 3}{(x + 1)^4}$$

- 3. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x}{(x + 2)^3}$$

- 4. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{2x + 5}{x^2 - 2x + 1}$$

- 5. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^2 - 21x + 100}{(x - 10)^3}$$

■ 6. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^2 + 8x}{(x + 8)^3}$$



DISTINCT QUADRATIC FACTORS

■ 1. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{3x^3 + 3}{(x^2 + 2)(x^2 + 5)}$$

■ 2. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{4x^2 + 4x}{(2x^2 + 2)(3x^2 + 1)}$$

■ 3. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{6x^3 - 13x^2 + 4x - 3}{(4x^2 + 1)(x^2 + x + 1)}$$

■ 4. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^3 + 1}{(x^2 + 1)(x^2 + x + 2)}$$

■ 5. Rewrite the function as its partial fractions decomposition.



$$f(x) = \frac{x+3}{(x^2+x+1)(x^2+2x+2)}$$

■ 6. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{3x^4 + 3x^3 + 3x^2}{(x^2 + 1)(2x^2 + 5)(x^2 + x + 1)}$$

REPEATED QUADRATIC FACTORS

■ 1. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{10x^3 - 7}{(5x^2 + 3)^2}$$

■ 2. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{3x^3 + 2x^2 + 30x + 16}{(x^2 + 9)^2}$$

■ 3. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^3 - 3x^2 - 11}{(x^2 + x + 2)^2}$$

■ 4. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{9x^4 + 6x^2 + x + 3}{(3x^2 + 1)^3}$$

■ 5. Rewrite the function as its partial fractions decomposition.



$$f(x) = \frac{x^3 + 5x^2 + 13x + 2}{(x^2 + 4x + 6)^2}$$

■ 6. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x^7}{(x^2 + 1)^4}$$

MIXED FACTORS

- 1. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{2x^4 + 16}{x(x^2 + 2)^2}$$

- 2. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{4x + 8}{(x^2 - 1)(2x + 2)(2x + 1)}$$

- 3. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{2x^3 + 7x^2 - 2x + 5}{x^4 - 1}$$

- 4. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{36}{(x + 2)(x^2 - 1)^2}$$

- 5. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{4x^4 + 7x^3 + 4x^2 + 3x - 2}{x^3(x^2 + x + 1)}$$

■ 6. Rewrite the function as its partial fractions decomposition.

$$f(x) = \frac{x + 1}{(x^2 + 1)(x^2 + x + 1)}$$

