

Lesson 6.8: Partial Fractions, Mixed Integration

We have often simplified an expression like $\frac{1}{x-4} - \frac{1}{x-3}$ by getting a common denominator and combining the two fractions into one.

By a reverse process, we can sometimes split a single fraction in two to make integration easier.

Examples:

1. $\int \frac{1}{x^2-7x+12} dx$

2. $\int \frac{5x-3}{x^2-2x-3} dx$

3. $\int \frac{2x-2}{x^2-2x-3} dx$

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

5. Integrate these four “look-alike” integrals. Although they have similar appearances, they will require you to use three completely different integration formulas.

a. $\int \frac{dx}{1+x^2}$

b. $\int \frac{dx}{1+x}$

c. $\int \frac{x dx}{1+x^2}$

d. $\int \frac{dx}{(1+x)^2}$

6. Integrate the following two “look-alikes”.

a. $\int \frac{dx}{x \ln(x)}$

b. $\int \frac{\ln(x)}{x} dx$