

Math 1552, Integral Calculus

Section 8.5: Partial Fractions

Evaluate the following integrals using any method we have learned.

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

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

3. $\int x^5 \ln(x) dx$

4. $\int \sqrt{25 - x^2} dx$

Answers

1. $4 \ln \left| \frac{x-1}{x-2} \right| - \frac{5}{x-2} + C$ (partial fractions)

2. $4 \ln |x| - 2 \ln(x^2 + 1) + \tan^{-1}(x) + C$ (partial fractions)

3. $\frac{x^6 \ln x}{6} - \frac{x^6}{36} + C$ (by parts)

4. $\frac{25}{2} \sin^{-1} \left(\frac{x}{5} \right) + \frac{x\sqrt{25-x^2}}{2} + C$ (trig sub)