

MA 114 Worksheet #03: Integration by Partial Fractions

1. Write out the general form for the partial fraction decomposition but do not determine the numerical value of the coefficients.

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

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

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

(d) $\frac{2x + 5}{(x^2 + 1)^3(2x + 1)}$

2. Compute the following integrals.

(a) $\int \frac{x - 9}{(x + 5)(x - 2)} dx$

(b) $\int \frac{1}{x^2 + 3x + 2} dx$

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

(d) $\int \frac{x^3 + 4}{x^2 + 4} dx$

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

3. Compute

$$\int \frac{1}{\sqrt{x} - \sqrt[3]{x}} dx$$

by first making the substitution $u = \sqrt[6]{x}$.