

**Problem 1.** Write out the form of the partial fraction decomposition. (Do not find the numerical values of the coefficients.)

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

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

(c)  $\frac{5}{x(x^2 - 4)}$

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

**Problem 2.** Evaluate the integral.

(a)  $\int \frac{dx}{x^2 - 3x - 4}$

(b)  $\int \frac{dx}{x^2 - 6x - 7}$

(c)  $\int \frac{11x + 17}{2x^2 + 7x - 4} dx$

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

(e)  $\int \frac{x^2 - 8}{x + 3} dx$

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

(g)  $\int \frac{3x^2 - 10}{x^2 - 4x + 4} dx$

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

**Problem 3.** Evaluate the integral by making a substitution that converts the integrand to a rational function.

(a)  $\int \frac{\cos \theta}{\sin^2 \theta + 4 \sin \theta - 5} d\theta$

(b)  $\int \frac{e^t}{e^{2t} - 4} dt$