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