1. Write each of the following rational functions as a polynomial plus a proper rational function with a fully factored denominator.

a) $\dfrac{x - 9}{x^2 + 3x - 10}$

b) $\dfrac{x^3 + 1}{x^2 - 4}$

c) $\dfrac{2x + 7}{2x^2 + 5}$

2. Compute the antiderivative $\int \dfrac{x^3 + 4}{x^2 + 4}\, dx$.

3. Given that
$$\frac{4x + 1}{(x - 2)(x + 2)} = \frac{9/4}{x - 2} + \frac{7/4}{x + 2},$$
compute $\int \dfrac{x^3 + 1}{x^2 - 4}\, dx$. (Use 1b and the given equation.)