1. Write the correct partial fraction expansion. Do not solve for unknown constants.

   a) $\dfrac{x^5 + +2x^4 - x^3 + 3x^2 + x - 1}{x^3 + x^4}$

   b) $\dfrac{x}{x^2 + x - 6}$

   c) $\dfrac{1 + 16x}{(2x - 3)(x^2 + 4)(x + 5)^2}$

2. Evaluate the integral.

   a) $\displaystyle\int \frac{5x + 1}{(2x + 1)(x - 1)}\, dx$

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

   c) $\displaystyle\int \frac{x^2\, dx}{x^4 - 81}$

   d) $\displaystyle\int \frac{x^2\, dx}{\sqrt{9 - 25x^2}}$

   e) $\displaystyle\int \frac{x^5 - x^4 - 2x^2 + 2x + 5}{x^4 + x^3}\, dx$

3. Evaluate the improper integral or show that it is divergent.

   a) $\displaystyle\int_{-\infty}^{\infty} \frac{dx}{x^2 + 25}$

   b) $\displaystyle\int_0^{\infty} \frac{dx}{(x + 2)(x + 3)}$

   c) $\displaystyle\int_1^{\infty} \frac{\ln x}{x^3} dx$

   d) $\displaystyle\int_{\pi/4}^{\pi/2} \tan^2 x\, dx$

   e) $\displaystyle\int_3^{10} \frac{dx}{x^2 - 9}$

   f) $\displaystyle\int_1^{\infty} \sin(\pi x)\, dx$

   g) $\displaystyle\int_0^{5} \frac{dx}{x - 5}$

4. Use the Comparison Test to determine whether the following integral is divergent or convergent.

   a) $\displaystyle\int_1^{\infty} \frac{dx}{\sqrt[3]{x^3 + 1}}$

   b) $\displaystyle\int_1^{\infty} \frac{\cos^2 x}{x^2} dx$

   c) $\displaystyle\int_1^{\infty} \frac{2 + \cos x}{\sqrt{x^4 + x^2}} dx$

   d) $\displaystyle\int_1^{\infty} \frac{1 + e^{-x}}{x}\, dx$