Recommended problems (Not to turn in)

Section 7.3: 4,6,8,10,16,18,24,26,30,32,38
Section 7.4: 4,8,10,12,16,20,22,30,34,36,40,52,54

Problems to turn in

Problem #1. (Section 7.3)
Evaluate the integral \( \int \frac{dx}{(x^2 - 4)^{3/2}}. \)

Problem #2. (Section 7.3)
Evaluate the integral \( \int_{1}^{2} x^7 \sqrt{16 - x^4} \, dx. \)

Problem #3. (Section 7.3)
Evaluate the integral \( \int e^x \sqrt{e^{2x} - 9} \, dx. \)

Problem #4. (Section 7.4)
Consider the integral
\[
\int \frac{x^7 + 2x^6 - 5x^5 - 10x^4 - 26x^3 - 62x^2 - 47x - 43}{x^5 - x^4 - 3x^3 - 5x^2 - 10x - 6} \, dx.
\]

a. Use polynomial long division to reduce the degree of the numerator. Hint: The remainder should be
\( 5x^4 + 2x^3 - 21x^2 - 19x - 37. \)

b. Factor the denominator. Hint: Rational root theorem; there should be one quadratic factor, one repeated linear factor, and one non-repeated linear factor.

c. What form should the partial fraction decomposition take? (I.e. set it up.)

d. Compute the partial fraction decomposition. Hint: The substitution trick helps, but it won’t completely solve the problem.

e. Compute the integral. Don’t forget the quotient from part a.

Problem #5. (Section 7.4)
Compute the integral
\[
\int_{0}^{1} \frac{x^3 - 7x^2 + 2x - 9}{(x - 2)(x^2 + 1)^2} \, dx.
\]

Hint: You will also need a trig substitution.