Math 1720 Homework 12, due Friday April 20.
Explain all answers and show all calculations.

8.3: 49, 52
8.4: 30(note), 33, 50, 51(note), 63
8.7: 6, 7, 9, 10, 14, 15, 19, 52; possibly a couple more Monday.
Problem A

Notes:
8.4: 30: This has the following partial fraction form:

$$\frac{1/4}{x} + \frac{(3/4)x - (5/4)}{x^2 + 5x + 8}.$$

If you already computed the above form on the previous homework, you may just compute the integral from the form, there's no need to recompute the partial fraction form.

8.4: 51: Don't actually compute the integral; just do the long division and rewrite the integral in the form

$$\int Q(x) + \frac{r(x)}{q(x)} dx$$

with polynomials $Q(x), r(x), q(x)$, with the degree of r strictly less than the degree of q.

Problem A: Find the following integrals.

(a)

$$\int_{-\infty}^{\infty} |x| e^{-x^2} dx.$$

(Hint: by definition, you need to break the integral into the sum of two integrals, by choosing some real number c, and taking one interval over $-\infty < x \leq c$ and one over $c \leq x < \infty$. Try to choose a convenient value for c.)

(b)

$$\int_{-\infty}^{\infty} \frac{x^3 + 1}{x^2} dx$$

(c)

$$\int_{-\infty}^{\infty} \frac{x}{(x^2 + 1)(x^2 + x + 1)} dx$$

(Hint: Use partial fractions.)