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Complete all of the problems in class. You may work in pairs and use the textbook.

Name and section: _____

Weekly Summary:

- Approximate Integration: (§8.8)
  Let $\{x_1, x_2, ..., x_n\}$ be a partition of $[a, b]$ into n subintervals of equal length.

  Midpoint Rule:

$$\int_a^b f(x)dx = \Delta x[f(\bar{x_1}) + f(\bar{x_2}) + f(\bar{x_3}) + ... + f(\bar{x_n})]$$

  where: $\Delta x = \frac{b-a}{n}$ and $\bar{x_i} = \frac{1}{2}(x_{i-1} + x_i)$ = midpoint of $[x_{i-1}, x_i]$

  Trapezoidal Rule:

$$\int_a^b f(x)dx = \frac{\Delta x}{2}[f(x_0) + 2f(x_1) + 2f(x_2) + ... + 2f(x_{n-1}) + f(x_n)]$$

  where: $\Delta x = \frac{b-a}{n}$ and $x_i = a + i\Delta x$

  Simpson's Rule:

$$\int_a^b f(x)dx = \frac{\Delta x}{3}[f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3)... + 2f(x_{n-2}) + 4f(x_{n-1}) + f(x_n)]$$

  where: $\Delta x = \frac{b-a}{n}$ and n is even.

Workout Problems:

1. Using each of the above methods of approximate integration, approximate the given integrals with the specified value of n.
   - $\int_0^1 e^{-x^2} dx$, $n = 10$
   - $\int_0^3 \frac{1}{1+x^4} dx$, $n = 6$