Approximating the Value of Integrals- HW Problems

Use the trapezoidal rule, the midpoint rule, and Simpson's rule to approximate the value of each of the integrals to 5 decimal places with the specified n.

1. $\int_0^2 \frac{1}{1+x^4} dx$, $\quad n = 8$.

2. $\int_1^2 \sqrt{x^3 - 1} \, dx$, $\quad n = 10$.

3. $\int_0^4 e^{-x^2} dx$, $\quad n = 8$.

4. $\int_2^4 \ln(x^2 + 1) \, dx$, $\quad n = 10$.

5. How large should n be to guarantee that the Simpson's rule approximation to $\int_0^1 e^{x^2} dx$ is accurate to within 0.0001?

6. How large does n have to be for the trapezoidal approximation to $\int_0^1 \cos(x^2) \, dx$ to be accurate to within 0.0001? How large does n need to be for the midpoint approximation to $\int_0^1 \cos(x^2) \, dx$ to be accurate to within 0.0001?