(Chapter 7)

100 POINTS

NAME: _____

Find the value of the following improper integrals. Be sure to use all appropriate notation.

(1) $\displaystyle\int_0^4 \frac{1}{(x-2)^3}\,dx$

(2) $\displaystyle\int_1^\infty \frac{1}{\sqrt{x}\,(x+4)}\,dx$

(3)   (a) Use Simpson's Rule with n=10 to approximate the area under the curve $y = e^{-x^2}$, $0 \leq x \leq 1$.
                * Use your calculator efficiently to prevent round-off error.
         (b) Estimate the error involved in the above approximation.
         (c) If you want to guarantee that the Simpson's Rule approximation is accurate to within 0.00001, how
              large must n be?.

FOR PROBLEMS 5 - 13, INTEGRATE AND SIMPLIFY

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(5) $\int \sin^{3/2} x \, \cos^3 x \, dx$

(6) $\int \dfrac{4x+1}{2x^2+x-10}dx$

(7) $\int \sqrt{x}\ln x\,dx$

(8) $\displaystyle\int \frac{1}{1+ \sqrt[3]{x}}\, dx$

(9) $\displaystyle\int \frac{dx}{x^2 \sqrt{x^2 -16}}$

(10) $\displaystyle\int x^2 \cos(3x)\, dx$

(11) $\displaystyle\int \frac{x}{\sqrt{3 - 2x - x^2}}\, dx$

(12) $\displaystyle\int \frac{5x^3 - 3x^2 + 7x - 3}{(x^2 + 1)^2}\,dx$

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(13) The region under the curve y = cos²x, $0 \le x \le \frac{\pi}{2}$, is rotated about the y axis. Find the volume of the

resulting solid.