ID#:_____   NAME:_____

(1) Evaluate each of the following integrals.

(a) $\int \frac{dx}{2\sqrt{x}+2x}$.

(b) $\int \tan^5 x \sec^5 x \ dx$.

(c) $\int \frac{\sec x}{\ln(\sec x+\tan x)} \ dx$.

(d) $\int\limits_0^{\ln 2} 4e^x \sinh x \; dx$.

(e) $\int \frac{\tan^{-1} x}{x^2} \; dx$.

(f) $\int\limits_0^{\pi/12} \frac{3^{\tan 3x}}{\cos^2 3x} \; dx$.

(g) $\int \frac{e^x}{e^{4x} - 2e^{3x} + 2e^{2x} - 2e^x + 1} \, dx$. Hint: $u^4 - 2u^3 + 2u^2 - 2u + 1 = (u-1)^2(u^2+1)$

(h) $\int \frac{(\ln(\ln x))^2 \ln x^x}{x^2} \, dx$.

(i) $\int \frac{1}{2 + \cos x} \, dx$.

(j) $\int\limits_{0}^{63} \frac{dx}{\sqrt{x+1}+\sqrt[3]{x+1}}$.

(k) $\int \sin(3\ln x)\ dx$.

(l) $\int \frac{dx}{\sqrt{2x^2-4x+3}}$.

(m) $\int \sin^{-1} x\ dx$.

(2) (a) Set up, BUT DO NOT EVALUATE, an integral or sum of integrals that gives the area of the region R in the first quadrant enclosed by $y = x^2$, $y = 2 + x$, and $x = 0$.

(i) integrate with respect to x.   (ii) integrate with respect to y.

(b) Set up, BUT DO NOT EVALUATE, an integral or sum of integrals that gives the volume generated by revolving the region enclosed by $x = 9$ and $x = y^2$ about x-axis.

(i) integrate with respect to x.   (ii) integrate with respect to y.

(3) (a) Set up the partial fraction decompostion of $\frac{1}{x^8 - x^2}$.

(DO NOT CALCULATE THE CONSTANTS)

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(b) Find the length of the curve $y = 2x^{3/2}$ from $x = 0$ to $x = 1$.

(c) Determine if the integral $\int_0^2 \frac{2(x-2)}{x^2 - 4x + 3}$ converges or diverges.

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