Math 1206 Class Test #2 - sample

Name:

Student Number:

(1) (a) Find the Taylor expansion of $f(x) = \ln(x)$ centred at $x_0 = 1$.

(b) Find the Maclaurin expansion for $g(x) = xe^x$.

(c) Using your result from (a), use the third partial sum of the series you found to estimate $\ln(1/2)$. How accurate is your answer in comparison to the calculator?

(2) Consider the region lying between and the two curves $f(x) = x^2$ and $g(x) = \frac{1}{x^2}$ over the interval $[1, 2]$. Find the area of this region.

(3) Consider the solid S obtained by spinning the region between x^2 and x^3 over $[0, 2]$ about the horizontal line $y = -1$. Find the volume of S using the washer method.

(4) You have designed a table leg created by spinning the graph of $\frac{1}{9}x^3$ about the x-axis over the interval $[1/2, 3]$ with all measurements in inches. If paint costs .75 per square inch, how much will you need to spend on paint per leg? (You may assume one coat of paint is sufficient)

(5) Evaluate each of the following integrals.

(a) $\int \frac{1}{\sqrt{9x^2 - 36x + 37}}\, dx$ (Hint: Complete the square under the root.)

(b) $\int \frac{\sqrt{x^2 + 16}}{x^4}\, dx$

(6) (a) Find a partial fraction decomposition for $f(x) = \dfrac{3x^2 + 4x + 4}{x(x+1)^2}$.

(b) Using your answer above, find $\displaystyle\int f(x)\, dx$.