You have to turn in the printout of your Maple worksheet

Due: Friday, 7/26, before class

Rules for the take-home exam

1 I will turn in this sheet, along with a **printout of your Maple worksheet**, before my class on Friday, 07/26/2019.

2 I know there is ABSOLUTELY NO EXTENSIONS and late submission will be severely penalized.

3 I solved all solutions completely by myself and did not show it or discuss it with anybody.

4 I will show much more work in my Maple worksheet than what I have done in my Maple homework assignment. **Be creative and thorough**)

5 I may have used my class notes, textbook, and publicly available materials, including books, online resources, etc.

By signing my name below, I certify that I have read, understood and complied with the above rules.

Name :_____   ID : 850_____

1. Let $f(x) = xe^x$ and denote by A the area bounded by $f(x) = xe^x$, x-axis and the line $x = 1$.

   (a) Graph the function f over the interval $[-1, 1]$.

   (b) Shade/Color the area A.

   (c) Find the numeric value, round to 8 decimal places, of A by calculating $\int_0^1 f(x)\,dx$.

   (d) Find the numeric values of A by using Midpoint Rule, Trapezoidal Rule and Simpson's Rule for $n = 10, 50, 100, 1000$, and then, make a table for all these values.

   (e) Among all values of A you have gotten above, what are the best value and the second best value in terms of accuracy? Give a reason or two to justify your conclusions.

2. $\int_0^1 (x^2 + 4)\sqrt{x^2 + 1}\,dx$

   Note. more problems are in next page

3. Let $f(x) = \dfrac{3x^7 + 2}{x^3 + x^2 + x + 1}$.

   (a) Find a partial fraction of f.

   (b) Evaluate $\displaystyle\int f(x)dx$.

4. Plot the direction field of $y' = x^2 + \sin(y)$ for $-2 \le x \le 2$ and $-4 \le y \le 4$.

5. Use Euler's method with step size 0.1 to estimate $y(0.5)$, where $y(x)$ is the solution of the initial-value problem $y' = x^2 + \sin(y)$ with $y(0) = \pi$.