

Math 302 Final Exam

Monday, December 10

Name: _____

This is the final exam. There are two parts. For Part I, worth 70 points, do all seven questions. For Part II, with 30 points, do your choice of two of the four problems. Clearly indicate which two problems of Part II you want me to grade. If you don't, then it will be my choice which two to grade, and you won't like that ;)

No electronic devices are permitted besides a calculator. Carefully read each question and understand what is being asked before you start to solve the problem. Please show all your work and circle or mark in some way your final answers.

Some formulae and Laplace transforms:

$$\begin{aligned}y_1 u_1' + y_2 u_2' &= 0 \\ y_1' u_1 + y_2' u_2 &= b(x)/a_2\end{aligned}$$

$$u = \frac{x}{y}; \quad dx = u dy + y du \quad \text{OR} \quad u = \frac{y}{x}; \quad dy = u dx + x du$$

$$f(x) = \sum_{n=0}^{\infty} a_n (x - x_0)^n = \sum_{n=0}^{\infty} \frac{f^{(n)}(x_0)}{n!} (x - x_0)^n$$

$f(x)$	$L[f]$
1	$\frac{1}{s}$
x^n	$\frac{n!}{s^{n+1}}$
e^{ax}	$\frac{1}{s - a}$
$\sin(ax)$	$\frac{a}{s^2 + a^2}$
$\cos(ax)$	$\frac{s}{s^2 + a^2}$
$y'(x)$	$sL[y] - y(0)$