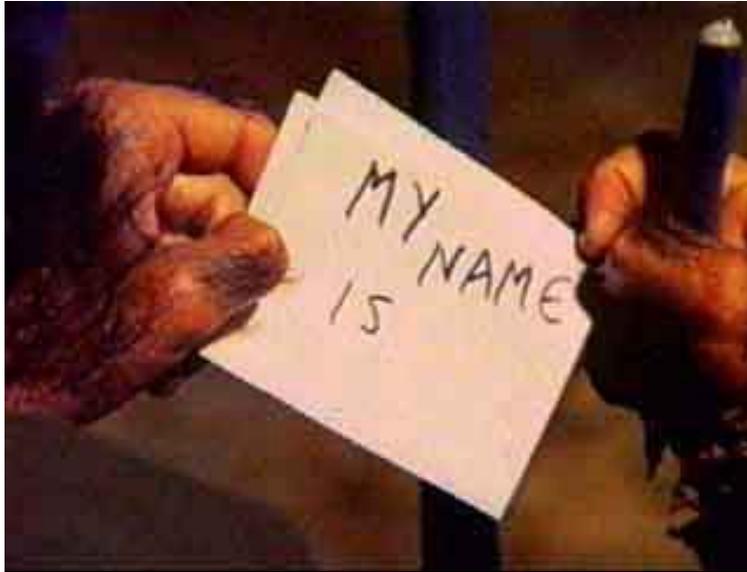
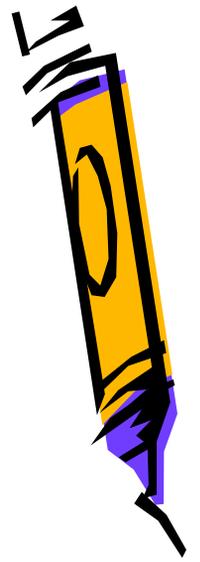


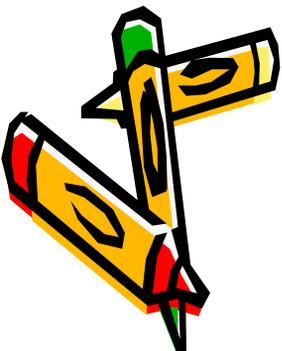
Math 204, Exam 2

April 2, 2009



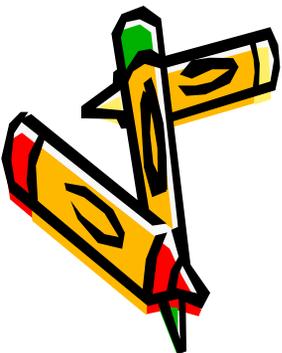
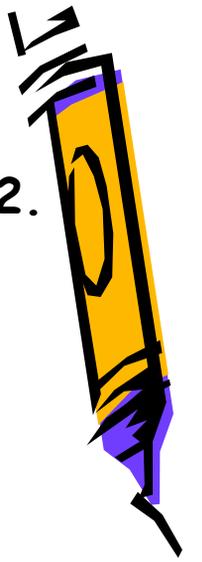
There are five problems. Each problem is worth twenty points. The total exam is worth hundred points. You may use a calculator, something to write and something to erase, but nothing else. Show all work. Full credit will be given only if work is shown which fully justifies your answer. Turn off your cell phone if you have one. Do not turn this page until told to do so. This is a fifty-minute exam.

#	1	2	3	4	5	Σ
P						
Σ	20	20	20	20	20	100



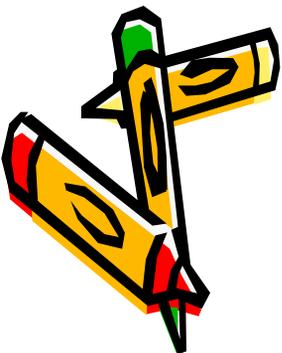
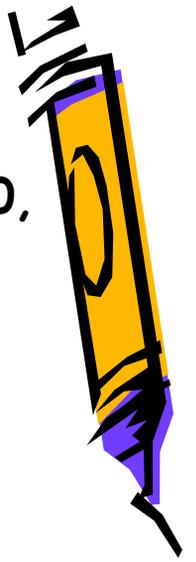
Problem 1

Use Laplace transforms to solve $y' + 6y = e^{4t}$, $y(0) = 2$.



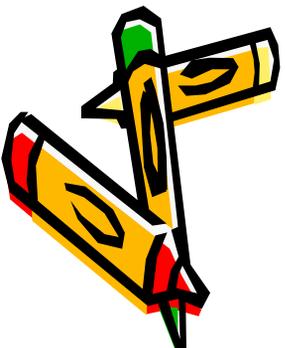
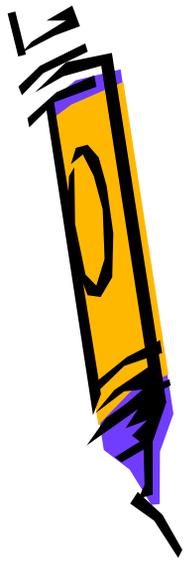
Problem 2

Use Laplace transforms to solve $y'+y=f(t)$, $y(0)=0$,
where $f(t)=0$ for $0 \leq t < 1$ and $f(t)=5$ for $t \geq 1$.



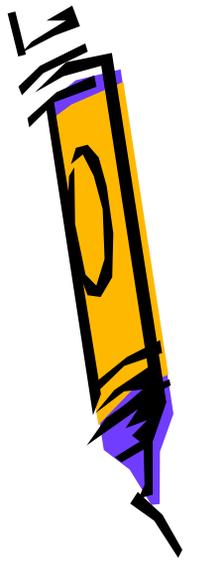
Problem 3

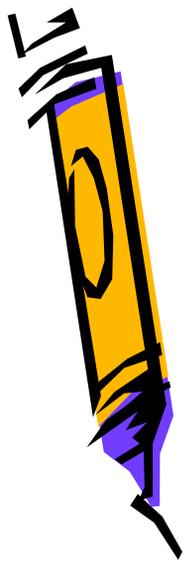
Find the general solution of $x^2y''+5xy'+4y=0$.



Problem 4

Solve $y''+y=\tan(x)$ by variation of parameters.





Problem 5



A mass of 1 slug, when attached to a spring, stretches it 2 feet and then comes to rest in the equilibrium position. Starting at $t=0$, an external force equal to $f(t)=8\sin(4t)$ is applied to the system. Find the equation of motion if the surrounding medium offers a damping force numerically equal to 8 times the instantaneous velocity.

**PLEASE NOTE THAT IN THIS PROBLEM
YOU ARE NOT ALLOWED TO USE
LAPLACE TRANSFORMS.**

