Math 204, Exam 2
November 4, 2008

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.

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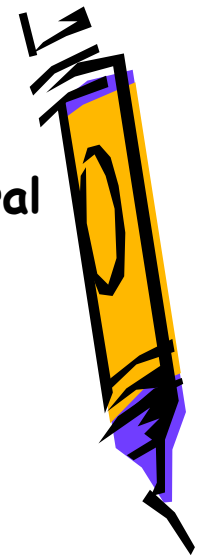
$\sum$	20	20	20	20	20	100

Problem 1

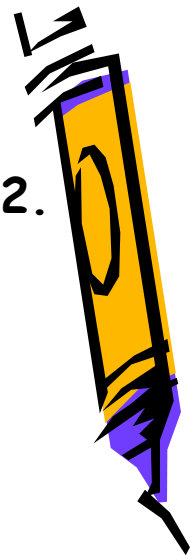


Use variation of parameters to find the general solution of $y''+3y'+2y=1/(1+e^x)$.

Problem 2

Use the definition of the Laplace transform to find the Laplace transform of f, where $f(t)=t$ for $0 \le t < 1$ and $f(t)=1$ for $t \ge 1$.

Problem 3

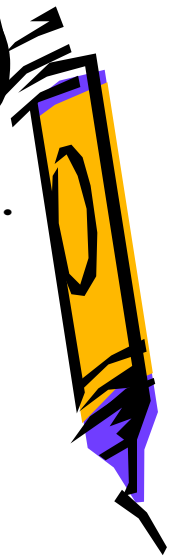


Use Laplace transforms to solve $y'+6y=e^{4t}$, $y(0)=2$.

Problem 4, part (a)

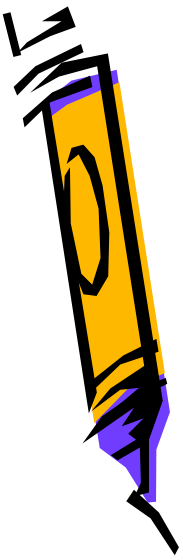
A 4-pound weight stretches a spring 2 feet. The weight is released from rest 18 inches above the equilibrium position, and the resulting motion takes place in a medium offering a damping force numerically equal to 7/8 times the instantaneous velocity. Formulate an IVP that serves to find the equation of motion.

Problem 4, part (b)



Use Laplace transforms to solve the IVP from (a).

Problem 5



Find the general solution of $x^2y''-2y=0$.