University of Saskatchewan Department of Mathematics and Statistics Math 224 (02) (04) (06)

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January 13, 2006

Quiz #1

30 minutes

Fully answer the following questions in the space provided. The points for each problem are indicated in the right margin.

Permitted resources: None. Closed book. No calculators.

This is an formal assessment. Cheating on an assessment is considered a serious offense by the University and can be met with disciplinary action, including suspension or expulsion. Candidates shall not make use of any books, resources or papers except at the discretion of the examiner or as indicated on the assessment paper. Candidates shall hold no communication of any kind with other candidates within the assessment room.

Print your name here:	Craig Block-Hansen	
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Print your student number here: 147742

Question 1. Show that each function in the family

$$y(x) = C_1 \cos(2 \ln x) + C_2 \sin(2 \ln x) + rac{1}{4}$$

satisfies the differential equation

$$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + 4y = 1.$$

dg = (1-Sin (2lnx)) 4/2 + (2 cos (2 lnx)) 4/2

 $\frac{d^2 g}{dx^2} = \frac{C_1 (2 \log (2 \ln x)) + C_1 (4 \sin (2 \ln x)) + C_2 (-5 \sin (2 \ln x)) + C_2 (-5 \sin (2 \ln x)) + C_3 (-5 \sin (2 \ln x)) + C_4 (-5 \cos ($

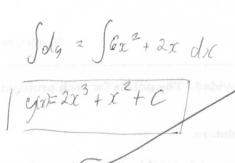
 $\frac{1}{2^{2}} \left\{ 8C_{2} \left(-65 \left(2 \ln x \right) \right) + 3e^{-\left(-5 \ln \left(2 \ln x \right) \right) + 1 + \left(2 \cos \left(2 \ln x \right) \right) + 2e^{-\left(-5 \ln \left(2 \ln$

C2 Sin(2 (nx) + 1 =]

$$=\frac{4}{4}=1$$

$$1=1$$
 $Q_{i}E_{i}D_{i}$

$$\frac{dy}{dx} = 6x^2 + 2x.$$



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Question A. Show that each function in the family

 $y(x) = C_1 \cos(2 \ln x) + C_3 \sin(2 \ln x)$

Question 3. Find the solution of the differential equation

$$(xy+y)\,dx-(xy-x)\,dy=0$$

that also satisfies the condition y(1) = 2.

$$\frac{y(x+1)dx}{x^2} = x(y-1)dy$$

$$\frac{2t+1}{x}dx = \frac{y-1}{y}dy$$

$$\int 1 + \frac{1}{x} dx = \int 1 - \frac{1}{y} dy$$

