Math 193 – Test 2: Version A

February 24, 2017 **Name:** _____

Instructor: Patricia Wrean

Total: 25 points

1. (4 points) Solve the following differential equation with the given condition.

$$(x^2+1)^2 y' + 4x = 0 \qquad \text{if} \quad y(1) = 3$$

2. (5 points) Solve the linear differential equation. Give an explicit solution.

$$x^2 dy - e^{2x} dx + 2y\, x\, dx = 0$$

3. (5 points) For the function $z = y^2 e^{3x} - \sin y$, evaluate the following.

(a) $\dfrac{\partial z}{\partial x}$

(b) $\dfrac{\partial^2 z}{\partial y^2}$

(c) $\dfrac{\partial^2 z}{\partial x \partial y}$

4. (3 points) Evaluate.

$$\int_0^1 \int_y^{\sqrt{y}} 8x^3 dx\, dy$$

5. (3 points) Set up but DO NOT EVALUATE the first-octant volume under the plane $x + y + z - 4 = 0$.

6. (5 points) The rate of change in the intensity I of light below the surface of the ocean with respect to the depth y is proportional to I. Let I_0 be the intensity of light at the surface of the ocean. If the intensity at 5.0 m is 50% of I_0, what is the intensity at a depth of 18 m?

   Start with an appropriate DE and show all of your work.