

Math 1100 Test 3

Name: _____

Created: Fri Apr 07 11:56:21 MDT 2006

Directions: Work all problems included. If you need more room use the back of the page to complete the problem. You may use a calculator for computing numerical values. However, you may not use calculators for symbolic calculations unless the problem indicates this can be done. For full credit you must show all work including algebraic steps.

Problem 1: Find the first partial derivatives of the function

$$w = 4x^3y^2 - 3xyz + 7yz^2$$

Problem 2: Compute the following indefinite integral

$$\int_0^4 x(x+5)^4 dx$$

Problem 3: Compute the general solution of the following equation via separation of variables.

$$\frac{dy}{dx} = \frac{x^2 + 3}{y^2 - 1}$$

Leave the solution in an implicit relationship for x and y .

Problem 4: Use integration by parts to compute the following indefinite integral.

$$\int x e^{2x} dx$$

Problem 5: Determine whether the function

$$y = e^{3t}$$

is a solution for the following differential equation

$$y^{(3)} - 27y = 0$$

Problem 6: Determine whether or not the improper integral converges. If it does, evaluate the integral.

$$\int_2^{\infty} \frac{2x}{\sqrt{3x^2 - 4}} dx$$

Problem 7: For the function

$$f(x, y, z) = \frac{\sqrt{2x + z}}{2y}$$

find the function values $f(1, -1, 4)$ and $f(2, 1, -3)$.

Problem 8: Evaluate the definite integral.

$$\int_2^4 3xe^{-x^2} dx$$

Problem 9: Compute the following indefinite integral using partial fraction decomposition.

$$\int \frac{3x^2 - 5}{(x + 3)^2} dx$$

Problem 10: Find all critical points of the function

$$f(x, y) = x^2 - 4xy - y^3 - 4x - 9y + 17$$

Classify the critical point as a relative minimum, relative maximum, or saddle point using the second derivative test.