

EXAM 2
Math 232
July 13, 2007

Name _____

1. Let $z = \cos(x^2 + y^2)$ and $x = u \cos(v)$, $y = u \sin(v)$. Find $\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$.

2. Compute the quadratic Taylor polynomial for the function $f(x, y) = \sqrt{x + 2y + 1}$ at the point $(1, 1)$. Use this to estimate the value of $f(.5, 1.5)$.

3. Find and classify all the critical points of the function $f(x, y) = 8xy - \frac{1}{4}(x + y)^4$.

4. Find the shortest distance from the surface $xy + 3x + z^2 = 9$ to the origin.

5. Find $\int_{-2}^0 \int_{-\sqrt{9-x^2}}^0 2xy \, dy \, dx$

6. Find $\int_0^1 \int_y^1 e^{x^2} \, dx \, dy$

7. Set up the triple integral needed to find the volume of the region bounded by the plane $z = x$ the surface $z = x^2$ and the planes $y = 0$ and $y = 4$.

8. Find $\int_R (x^2 - y^2) dA$ where R is the region in the first quadrant between the circles radius 1 and radius 2.

9. Find $\int_0^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \int_{-\sqrt{1-x^2-z^2}}^{\sqrt{1-x^2-z^2}} \frac{1}{(x^2 + y^2 + z^2)^{\frac{1}{2}}} dy dz dx$

10. Find the parameterization of the line intersecting the x -axis at $x = 3$ and the z -axis at $z = -5$.

11. Find the parameterization of the line perpendicular to the surface $z = x^2 + y^2$ at the point $(1, 2, 5)$.