

Review for Math 252 Test 3

1. Evaluate $\iint_D \frac{1}{1+x^2} dA$ if D is the triangular region with vertices (0, 0), (1, 1) and (0, 1).
2. Use a triple integral to find the volume of the region in the first octant below the sphere $x^2 + y^2 + z^2 = 16$, and inside the cylinder $x^2 + y^2 = 4$.
3. Find the surface area of the part of the sphere $x^2 + y^2 + z^2 = 8$ that is cut out by the cone $z = \sqrt{x^2 + y^2}$.
4. Evaluate $\iint_D \frac{y}{1+x^2} dx dy$, where D is bounded by $y = \sqrt{x}$, $y = 0$ and $x = 1$.
5. Evaluate $\int_C (x^2 + y^2) dx - x dy$, where C is the quarter-circle $x^2 + y^2 = 1$ from (1, 0) to (0, 1).
6. Give two other iterated integrals that are equivalent to $\int_0^2 \int_0^{y^3} \int_0^{y^2} f(x, y, z) dz dx dy$.
7. Evaluate $\int_0^3 \int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}} (x^2 + y^2) dy dx$.
8. Evaluate $\int_C xy^3 ds$, where C is given by $x = 4 \sin t$, $y = 4 \cos t$, $z = 3t$, $0 \leq t \leq \frac{\pi}{2}$.