

MATH 201 QUIZ 6

1. Compute

$$\iint_R \tan^{-1} \left(\frac{y}{x} \right) dA$$

where $R = \{(x, y) : 1 \leq x^2 + y^2 \leq 4, 0 \leq y \leq x\}$.

2. Find the volume of the region enclosed by the cylinder $y = x^2$ and the planes $z = 0$ and $y + z = 1$.

3. Use the cylindrical coordinates to compute

$$\iiint_E y \, dV,$$

where E is the region enclosed by planes $y = 0$ and $z = 1$ and the paraboloid $z = x^2 + y^2$.

4. Express the region E in the spherical coordinates, where E is defined by

$$E = \{(x, y, z) : 0 \leq x \leq 1, 0 \leq y \leq \sqrt{1 - x^2}, \sqrt{x^2 + y^2} \leq z \leq \sqrt{2 - x^2 - y^2}\}.$$