

MATH 126 Last Day Practice Problems

1. Let R be the triangle in the xy -plane with vertices $(0, 0)$, $(0, 2)$, and $(2, 2)$. Find the volume under the graph $z = 4 - y^2$ and above the triangle R .
2. Approximate the function $f(x) = \sqrt{x}$ by a Taylor polynomial of degree 2 at $a = 4$. Use the approximation to estimate $\sqrt{4.1}$.
3. Find the angle between the vectors $\langle 2, 4, 2 \rangle$ and $\langle 3, -1, 5 \rangle$.
4. Find an equation of the tangent plane to the surface given by $z = e^x \cos(y) + x + 2$ at the point $(0, 0, 3)$.
5. Find the maximum rate of change of the function $f(x, y) = x^2y + \sqrt{xy}$ at the point $(2, 2)$. In which direction does it occur?
6. Find the volume below the surface $z = 2x^2 + y^2 - 2xy$ and above the region $R = [0, 2] \times [0, 1]$.
7. Evaluate the indefinite integral: $\int x^2 \sin(2x) dx$
8. The triangular region bounded by the y -axis, the line $y = x$, and the line $y = 1$ is revolved around the x -axis. Find the volume of the resulting solid.
9. Evaluate $\iint_R 3x dA$, where R is the region in the xy -plane determined by $0 \leq y \leq x \leq 1$.
10. *Spicy!* For which positive integers k is the following series convergent? $\sum_{n=1}^{\infty} \frac{(n!)^2}{(kn)!}$