

MATH 314

Asst # 1

12. $\iint_T \sqrt{a^2 - y^2} dA$, where T is the triangle with vertices $(0, 0)$, $(a, 0)$, and (a, a)

14. $\iint_T \frac{xy}{1+x^4} dA$, where T is the triangle with vertices $(0, 0)$, $(1, 0)$, and $(1, 1)$

In Exercises 15–18, sketch the domain of integration and evaluate the given iterated integrals.

15. $\int_0^1 dy \int_y^1 e^{-x^2} dx$

~~16. $\int_0^{\pi/2} \int_x^{\pi/2} \sin x dx$~~

18. $\int_0^1 dx \int_x^{x^{1/3}} \sqrt{1-y^4} dy$

In Exercises 19–28, find the volumes of the indicated solids.

22. Find the volume lying inside both the sphere $x^2 + y^2 + z^2 = a^2$ and the cylinder $x^2 + y^2 = ax$.

26. Find the volume of the region lying inside the circular cylinder $x^2 + y^2 = 2y$ and inside the parabolic cylinder $z^2 = y$.

34. Evaluate $\iint_R (x^2 + y^2) dA$, where R is the region in the first quadrant bounded by $y = 0$, $y = x$, $xy = 1$, and $x^2 - y^2 = 1$.

35. Let T be the triangle with vertices $(0, 0)$, $(1, 0)$, and $(0, 1)$.

Evaluate the integral $\iint_T e^{(y-x)/(y+x)} dA$.

(a) by transforming to polar coordinates, and

~~(b) by using the transformation $u = x - y$, $v = x + y$~~

36. Use the method of Example 7 to find the area of the region inside the ellipse $4x^2 + 9y^2 = 36$ and above the line $2x + 3y = 6$.