Math 32B Practice Problems I

Written by Victoria Kala
vtkala@math.ucla.edu
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1. Evaluate the following integrals:
   (a) $\int_1^4 \int_1^2 \left(\frac{x}{y} + \frac{y}{x}\right) dydx$
   (b) $\int_0^1 \int_0^1 \sqrt{s+t}\, dsdt$
   (c) $\iint_D (x+y)dA$ where D is bounded by $y = \sqrt{x}, y = x^2$
2. Evaluate the integral by reversing the order of integration:
$$\int_0^1 \int_{3y}^3 e^{x^2} dxdy$$
3. Evaluate $\iint_R (x+y)dA$ where R is the region that lies to the left of the y-axis between the circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$.
4. Evaluate $\iiint_E xydV$ where E is bounded by the parabolic cylinders $y = x^2$ and $x = y^2$, and the planes $z = 0$ and $z = x + y$.
5. Evaluate $\iiint_E (x^3 + xy^2)dV$ where E is the solid in the first octanct that lies beneath the paraboloid $z = 1 - x^2 - y^2$.
6. Evaluate $\iiint_E e^z dV$ where E is enclosed by the paraboloid $z = 1 + x^2 + y^2$, the cylinder $x^2 + y^2 = 5$, and the xy-plane.
7. Evaluate $\iiint_E xyzdV$ where E lies between the spheres $\rho = 2$ and $\rho = 4$ and the cone $\phi = \frac{\pi}{3}$.