<u>Iterated Integrals</u>

For problems 1 – 3 evaluate the following integrals.

1. $\int_{1}^{-3}\int_{0}^{2} x^2 y^7 \cos\left(x^3 y^4\right) dxdy$

2. $\iint\limits_R x^2 \cos^2\left(\frac{y}{2}\right) + \frac{4x^3}{x^4+1} dA, \qquad R = [-1,2]\times[0,4]$

3. $\iint\limits_R y\mathbf{e}^{3y-x}\, dA, \qquad R = [1,2]\times[-1,0]$

<u>Double Integrals over General Regions</u>

For problems 4 – 6 evaluate the following integrals.

4. $\int_{0}^{1}\int_{\sqrt{y}}^{2+y} x^3 + \frac{1}{\sqrt{y}} - 4\, dx\, dy$

5. $\iint\limits_D \frac{\mathbf{e}^{x^4+1}}{\sqrt{y}} dA, \qquad D = \left\{(x,y)\,|\, 0 \le x \le 1, 0 \le y \le x^6\right\}$

6. $\iint\limits_D \sqrt[3]{1-\cos(y)}\, dA,$ $\quad D$ is the region bounded by $x = \sin(y)$, $y = 0$, $y = \frac{\pi}{2}$, y-axis

7. Evaluate $\iint\limits_D 12y\, dA$ where *D* is the triangle in the *xy*-plane with vertices (0,0), (6,0) and (2,4) in the order given,

(a) Integrate with respect to ***y*** first and then ***x*.**

(b) Integrate with respect to ***x*** first and then ***y***.

8. Find the volume behind $y = 8 - 2x^2 - 2z^2$ and in front of the region in the *xz*-plane bounded by $z = x$ and $z = x^2$.

Note that we probably only looked at the volume under a function in the form $z = f(x,y)$ and above a region in the *xy*-plane. However, you can take that knowledge and modify it appropriately to arrive at a formula/method for working this problem.

Continued on Back $\Rightarrow$

For problems 9 and 10 evaluate the integral by reversing the order of integration.

9. $\int_0^1 \int_{-y}^{y} 8y\,x^3\,dx\,dy$

10. $\int_0^2 \int_{y^2}^{4} y^7 \mathbf{e}^{2+x^5}\,dx\,dy$

11. Evaluate $\iint\limits_D 4x+1\,dA$ where D is the shaded region shown below.