BRAC UNIVERSITY

Inspiring Excellence

Department of Mathematics and Natural Sciences
MAT120 : Integral Calculus and Differential Equations
Assignment-3

Name:

Section: **ID:**

Use this page as the cover page of your Assignment. **Total 10 $\times$ 10 = 100.**

1. Evaluate $\iint_R y \ \text{dA}$, R is the region in the first quadrant enclosed between the circle $x^2+y^2=25$ & the line $x+y=5$.
2. Evaluate $\iint_R xy \ \text{dA}$, R is the region enclosed by $y=\sqrt{x},\ y=6-x,\ y=0$.
3. Evaluate $\iint_R 2y \ \text{dA}$, R is the region in the first quadrant bounded above the circle $(x-1)^2+y^2=1$ & below by the line $y=x$.
4. Find the area of the region inside the circle $r=4\sin\theta$ and outside the circle r=2.
5. Evaluate the iterated integral by converting to polar co-ordinates
   a. $\int_0^2 \int_0^{\sqrt{2x-x^2}} \sqrt{x^2+y^2}\ \text{dy dx}$ b. $\int_{-4}^{0} \int_{-\sqrt{16-x^2}}^{-\sqrt{16-x^2}} 3xy\ \text{dy dx}$.
6. Find volume of the solid bounded by the surface $z=\sqrt{y}$ and the planes $x+y=1,\ x=0$ & $z=0$.
7. Evaluate $\iiint_G xyz \ \text{dV}$ where G is the solid in the first octant that is bounded by the parabolic cylinder $z=2-x^2$ and the planes$z=0,\ y=x$ &$y=0$.
8. Use cylindrical coordinates to find the volume of the solid that is bounded above by the sphere $x^2+y^2+z^2=1$ and below by the cone $z=\sqrt{x^2+y^2}$.
9. Use spherical coordinates to find the volume of the solid enclosed by the sphere $x^2+y^2+z^2=4a^2$ and the planes $z=0$ & $z=a$.
10. Use spherical coordinates to find the volume of the solid within the sphere $x^2+y^2+z^2=9$, outside the cone $z=\sqrt{x^2+y^2}$, and above the xy-plane.