# Worksheets
10/12/2017

1. Let $R$ be the triangle with vertices (1,0), (1,1) and (3,1). Fill in the blanks

$$\iint_R f(x,y)dA = \int \quad \int \qquad dydx = \int \quad \int \qquad dxdy$$

   Then compute the double integral over $R$ of the function $f(x,y) = x$.

2. Let $R$ be the region on the $xy$ plane bounded by the graph of $y = x^2$, the $y$-axis, the line $y = 1$, in the first quadrant. Fill in the blanks

$$\iint_R f(x,y)dA = \int \quad \int \qquad dydx = \int \quad \int \qquad dxdy$$

   Then compute the double integral over $R$ of the function $f(x,y) = x^3\sqrt{1+y^3}$.

3. Let $W$ be the solid given by $0 \leq x \leq y \leq z \leq 1$. Fill in the blanks

$$\iiint_W f(x,y,z)dV = \int\int\int \qquad dzdydx = \int\int\int \qquad dxdzdy = \int\int\int \qquad dydxdz$$

Then compute the triple integral over $W$ of the function $f(x,y,z) = y$.

4. Sketch the region $W$ bounded by the planes $x = 0$, $y = 0$, $z = x+y$ and $z = 1$. Then compute

$$\iiint_W (x^2 + yz)dV$$

5. Sketch the region $W$ bounded by the planes $x = 0$, $y = 0$, $z = 1$, the paraboloid $z = x^2 + y^2$, in the octant $x, y, z \geq 0$. Then compute volume of $W$.

6. Sketch the region $W$ bounded by the planes $x = 0$, $y = 0$, $z = 0$, $z = 1$, the cylinder $x^2 + y^2 = 1$, in the octant $x, y, z \geq 0$. Then compute

$$\iiint_W z dV$$

7. Compute the length of the cycloid $c(t) = (t - \sin t, 1 - \cos t)$, $t \in [0, 2\pi]$.

8. Compute the length of the asteroid $c(t) = (\sin^3 t, \cos^3 t)$, $t \in [0, 2\pi]$.

9. Compute the length of the graph of $y = x^{\frac{2}{3}}$ from $x = 0$ to $x = 8$.