

INTEGRALS

1. a) $\int_0^1 \int_0^2 4xy \, dx \, dy$

e) $\int_{-2}^2 \int_0^{\sqrt{4-x^2}} \sin(x^2+y^2) \, dy \, dx$

b) $\int_0^1 \int_0^x x^2 e^{xy} \, dy \, dx$

f) $\int_0^1 \int_y^1 xy \, dx \, dy$

c) $\int_0^1 \int_{\sqrt{x}}^1 \frac{3}{4+y^3} \, dy \, dx$

g) $\iint_R y \, dA$, R is bounded by $r=2-\cos\theta$

d) $\int_0^1 \int_y^1 3xe^{x^3} \, dx \, dy$

h) $\iint_R e^{-\sqrt{x^2+y^2}} \, dA$, R is the disk $x^2+y^2 \leq 1$

2. a) $\iiint_E 2x^2+y^3 \, dV$, $E = \{(x,y,z) \mid 0 \leq x \leq 3, -2 \leq y \leq 1, 1 \leq z \leq 2\}$

b) Find the volume of the solid bounded by: $z=x^2$, $z=x+2$, $y+z=5$, $y=0$

c) Find the volume of the solid bounded by: $z=4-x^2-y^2$ and $z=0$.

d) Rewrite the integral by finding limits:

• $\int_0^1 \int_0^{2-2y} \int_0^{2-x-2y} f(x,y,z) \, dz \, dx \, dy = \int_{?}^{?} \int_{?}^{?} \int_{?}^{?} f(x,y,z) \, dx \, dy \, dz$

• $\int_0^2 \int_0^{\sqrt{4-z^2}} \int_{\sqrt{y^2+z^2}}^2 f(x,y,z) \, dx \, dy \, dz = \int_{?}^{?} \int_{?}^{?} \int_{?}^{?} f(x,y,z) \, dy \, dz \, dx$

3. a) $\iint_R \frac{e^{y-\sqrt{x}}}{2\sqrt{x}} \, dA$, R is bounded by: $y=\sqrt{x}$, $y=\sqrt{x}+2$, $y=4-\sqrt{x}$, $y=6-\sqrt{x}$

b) $\iint_R 2(y-2x)e^{y+4x} \, dA$, R is bounded by: $y=2x$, $y=2x+1$, $y=3-4x$, $y=1-4x$

c) $\iint_R y^2 \, dA$, R is bounded by: $y=x+1$, $y=x+2$, $x^2-2xy=-1$, $x^2-2xy=-2$