1) Evaluate the iterated integral.

a) $\int_0^1 \int_0^{x^2} (x+2y)\ dy\,dx$

b) $\int_0^1 \int_y^{e^y} \sqrt{x}\ dy\,dx$

c) $\int_0^{\pi/2} \int_0^{\cos y} e^{\sin y}\ dx\,dy$

a) $\boxed{\frac{9}{20}}$

b) $\boxed{\frac{4}{9}e^{3/2} - \frac{32}{45}}$

c) $\boxed{e-1}$

2) Evaluate the double integral.

a) $\iint_D x\cos y\ dA$, D is bounded by $y=0,\ y=x^2,\ x=1$

b) $\iint_D y^3\ dA$, D is the triangular region with vertices $(0,2),\ (1,1),\ (3,2)$

c) $\iint_D (2x-y)\ dA$, D is bounded by the circle with center at the origin and radius 2.

a) $\boxed{\frac{1}{2}(1-\cos 1)}$

b) $\boxed{\frac{147}{20}}$

c) $\boxed{0}$

3) Find the volume of the given solid:

   a) Enclosed by the paraboloid $z = x^2 + 3y^2$ and the planes $x = 0$, $y = 1$, $y = x$, $z = 0$.

   b) Bounded by the cylinder $x^2 + y^2 = 1$ and the planes $y = z$, $x = 0$, $z = 0$ in the first octant.

a) $\boxed{\frac{5}{6}}$

b) $\boxed{\frac{1}{3}}$

4) Find the volume of the solid by subtracting two volumes. The solid enclosed by the parabolic cylinders $y = 1 - x^2$, $y = x^2 - 1$ and the planes $x + y + z = 2$, $2x + 2y - z + 10 = 0$.

$\boxed{\frac{64}{3}}$

5) Evaluate the integral by reversing the order of integration:

a) $\int_0^3 \int_{y^2}^9 y\cos\left(x^2\right)\,dx\,dy$

b) $\int_0^1 \int_{\arcsin y}^{\pi/2} \cos x\sqrt{1+\cos^2 x}\;dx\,dy$

a) $\boxed{\frac{1}{4}\sin 81}$

b) $\boxed{\frac{1}{3}\left(2\sqrt{2}-1\right)}$

6) Find the average value of $f(x,y)=e^{x+y}$ over the region R represented by the triangle with vertices $(0,0),\ (0,1),\ (1,1)$.

$$\boxed{(e-1)^2}$$