Ch 16 practice test

Calculate the iterated integral.

$$\int_0^1 \int_1^4 \frac{4xe^x}{y}\, dy\, dx =$$

$$\int_0^1 \int_0^1 15(u-v)^5\, du\, dv =$$

$$\int_0^4 \int_0^\pi 2r(\sin(\theta))^2\, d\theta\, dr =$$

$$\int_0^1 \int_0^1 5xy\sqrt{x^2+y^2}\, dy\, dx =$$

Calculate the double integral.

$$\iint_R (6x^2y^3 - 5y^4)\, dA\ ,\ R = \{(x,y)|0 \le x \le 1, 0 \le y \le 1\}$$

$$\iint_R 3\cos(x+2y)\, dA\ ,\ R = \{(x,y)|0 \le x \le \pi, 0 \le y \le \frac{\pi}{2}\}$$

$$\iint_R \frac{xy^2}{x^2+1}\, dA\ ,\ R = \{(x,y)|0 \le x \le 1, -1 \le y \le 1\}$$

$$\iint_R \frac{5(1+x^2)}{1+y^2}\, dA\ ,\ R = \{(x,y)|0 \le x \le 1, 0 \le y \le 1\}$$

$$\iint_R x\sin(x+y)\, dA, \quad R = \left[0, \frac{\pi}{6}\right] \times \left[0, \frac{\pi}{3}\right]$$

$$\iint_R \frac{7x}{1+xy}\, dA, \quad R = [0,7] \times [0,1]$$

Find the volume of the solid that lies under the plane 3x + 2y + z = 12 and above the rectangle.

$$R = \{(x,y)|0 \le x \le 1, -4 \le y \le 2\}$$

Find the volume of the solid that lies under the hyperbolic paraboloid $z = 2 + x^2 - y^2$ and above the rectangle.

$$R = [-4, 4] \times [0, 1]$$

Find the volume of the solid in the first octant bounded by the parabolic cylinder $z = 36 - x^2$ and the plane $y = 1$.

Find the volume of the solid enclosed by the paraboloid $z = 5 + x^2 + (y - 2)^2$ and the planes $z = 1$, $x = -1$, $x = 1$, $y = 0$, and $y = 1$.

Evaluate the double integral.

$$\iint_D \frac{8y}{2x^5+1}\, dA,\ D = \{(x,y)\ |0 \le x \le 1, 0 \le y \le x^2\}$$

$$\iint_D 7y^2e^{xy}\, dA,\ D = \{(x,y)\ |0 \le y \le 7, 0 \le x \le y\}$$

$$\iint_D 7x\cos y\, dA,\ D \text{ is bounded by } y = 0,\ y = x^2,\ x = 7$$

$$\iint_D (7x + 7y)\, dA,\ D \text{ is bounded by } y = \sqrt{x} \text{ and } y = x^2$$

$\iint_D 2xy^2\, dA$, D is enclosed by $x = 0$ and $x = \sqrt{1-y^2}$

$\iint 2xy dA$, D is the triangular region with vertices $0,0$, $1,2$, and $0,3$.

$\iint\ 7x - 7y\ \ dA$, D is bounded by the circle with center the origin and radius 1.

Find the volume of the solid under the plane $7x + 7y - z = 0$ and above the region bounded by $y = x$ and $y = x^4$.

Find the volume of the solid enclosed by the paraboloid $z = x^2 + 3y^2$ and the planes $x = 0$, $y = 5$, $y = x$, $z = 0$.

Find the volume of the solid under the surface $z = x + 4y^2$ and above the region bounded by $x = y^2$ and $x = y^3$.

Find the volume of the solid bounded by the planes $z = x$, $y = x$, $x + y = 4$ and $z = 0$.

Find the volume of the solid bounded by the cylinders $z = 4x^2$, $y = x^2$ and the planes $z = 0$, $y = 1$.

Find the volume of the solid bounded by the cylinder $y^2 + z^2 = 4$ and the planes $x = 2y$, $x = 0$, $z = 0$ in the first octant.

Sketch the region of integration and change the order of integration. $\int_0^9 \int_0^{\sqrt{x}} f(x,y)dydx$

Evaluate the integral by reversing the order of integration.

$\int_0^2 \int_{3y}^6 6e^{x^2} dxdy$

$\int_0^{\sqrt{3\pi}} \int_y^{\sqrt{3\pi}} \cos\left(6x^2\right) dxdy$

$$\int_0^4 \int_{\sqrt{x}}^2 \frac{6}{y^3+1}\, dydx$$

$\int_0^2 \int_x^2 6e^{\frac{x}{y}} dydx$

$\int_0^1 \int_{\arcsin(y)}^{\frac{\pi}{2}} \cos(x)\sqrt{5+(\cos(x))^2}\, dxdy$

Sketch the region whose area is given by the integral and evaluate the integral.

$$\int_{\pi}^{2\pi} \int_4^5 4r\, dr\, d\theta =$$

$$\int_0^{\pi/2} \int_0^{14\cos\theta} r\, dr\, d\theta =$$

Evaluate the given integral by changing to polar coordinates. $\iint_R (x+y)\, dA$,

where R is the region that lies to the left of the y-axis between the circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 16$.

Evaluate the given integral by changing to polar coordinates. $\iint_R \sqrt{81 - x^2 - y^2}\ dA,$

where $R = \{(x,y) | x^2 + y^2 \leq 81, x \geq 0\}.$

Evaluate the given integral by changing to polar coordinates. $\iint_D x\, dA,$

where D is the region in the first quadrant that lies between the circles $x^2 + y^2 = 100$ and $x^2 + y^2 = 10x$.

Use a double integral to find the area of the region. One loop of the rose $r = 9\cos(3\theta)$.

Find the area of the surface.
The part of the plane $2x + 5y + z = 10$ that lies inside the cylinder $x^2 + y^2 = 9$.

The part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the plane $z = 1$.

The part of the sphere $x^2 + y^2 + z^2 = 4z$ that lies inside the paraboloid $z = x^2 + y^2$.

Evaluate the triple integral.
$\iiint_E 6xy\,dV$, where E lies under the plane $z = 1 + x + y$ and above the region in the xy-plane bounded by the curves $y = \sqrt{x},\ y = 0, \text{ and } x = 1.$

$\iiint_T 7x^2\,dV$, where T is the solid tetrahedron with vertices $(0, 0, 0),\ (1, 0, 0),\ (0, 1, 0)$, and $(0, 0, 4)$.

$\iiint_T 8xyz\,dV$, where T is the solid tetrahedron with vertices (0,0,0), (1,0,0), (1,1,0), and (1,0,3).

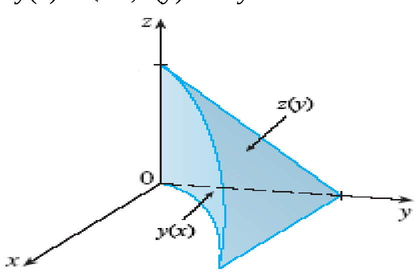
$\iiint_E 8x\,dV$, where E is bounded by the paraboloid $x = 5y^2 + 5z^2$ and the plane $x = 5$.

$\iiint_E 6z\,dV$, where E is bounded by the cylinder $y^2 + z^2 = 9$, and the planes $x = 0,\ y = 5x$, and $z = 0$ in the first octant.

Use a triple integral to find the volume of the given solid.
The tetrahedron enclosed by the coordinate planes and the plane $9x + y + z = 4.$

The solid bounded by the parabolic cylinder $y = x^2$ and the planes $z = 0$, $z = 10$, $y = 16$.

The figure shows the region of integration for the integral: $\int_0^{64} \int_{\sqrt{x}}^{8} \int_0^{8-y} f(x, y, z)\,dz\,dy\,dx$
Choose five other iterated integrals that are equal to the given iterated integral.
Assume $y(x) = \sqrt{x}$, $z(y) = 8 - y$.



Evaluate the integral, where E is the region that lies inside the cylinder $x^2 + y^2 = 4$ and between the planes $z = -2$ and $z = 4$. Use cylindrical coordinates. $\iiint_E \sqrt{x^2 + y^2}\, dV =$

Evaluate the integral, where E is the solid in the first octant that lies beneath the paraboloid $z = 4 - x^2 - y^2$. Use cylindrical coordinates. $\iiint_E 3(x^3 + xy^2)\, dV =$

Evaluate the integral, where E is enclosed by the paraboloid $z = 4 + x^2 + y^2$, the cylinder $x^2 + y^2 = 4$, and the xy-plane. Use cylindrical coordinates. $\iiint_E e^z\, dV =$

Evaluate the integral, where E is enclosed by the planes $z = 0$ and $z = x + y + 6$ and by the cylinders $x^2 + y^2 = 4$ and $x^2 + y^2 = 9$. Use cylindrical coordinates. $\iiint_E x\, dV =$

Find the volume of the solid that lies within both the cylinder $x^2 + y^2 = 4$ and the sphere $x^2 + y^2 + z^2 = 25$. Use cylindrical coordinates.

Evaluate the integral below, where E is bounded by the xz-plane and the hemispheres $\sqrt{25 - x^2 - y^2}$ and $\sqrt{64 - x^2 - y^2}$.

Evaluate the integral by changing to spherical coordinates.

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{2-x^2-y^2}} xy\ dz\, dy\, dx =$$

$$\int_{-5}^{5} \int_{-\sqrt{25-y^2}}^{\sqrt{25-y^2}} \int_{-\sqrt{25-x^2-y^2}}^{\sqrt{25-x^2-y^2}} (x^2 z + y^2 z + z^3)\ dz\, dx\, dy =$$

Use spherical coordinates to find the volume of the solid that lies above the cone $z = \sqrt{x^2 + y^2}$ and below the sphere $x^2 + y^2 + z^2 = 2z$.