Problem 10.2.3.

Show that the form under the integral sign is exact in the plane and evaluate the integral. Show the details of your work.

$$\int_{(\pi/2,\pi)}^{(\pi,0)} \left(\frac{1}{2} \cos \frac{1}{2} x \cos 2y \ dx - 2 \sin \frac{1}{2} x \sin 2y \ dy \right)$$

Solution.

Problem 10.2.5.

Show that the form under the integral sign is exact in space and evaluate the integral. Show the details of your work.

$$\int_{(0,0,\pi)}^{(2,1/2,\pi/2)} e^{xy} (y \sin z \ dx + x \sin z \ dy + \cos z \ dz)$$

Solution.

Problem 10.2.13.

Check, and if independent, integrate from $(0,0,0)$ to (a,b,c).

$$2e^{x^2} (x \cos 2y \ dx - \sin 2y \ dy)$$

Solution.

Problem 10.2.16.

Check, and if independent, integrate from $(0,0,0)$ to (a,b,c).

$$e^y \ dx + (xe^y - e^z) \ dy - ye^z \ dz$$

Solution.

Problem 10.3.5.

Describe the region of integration and evaluate.

$$\int_0^1 \int_{x^2}^x (1 - 2xy) \ dy \ dx$$

Solution.

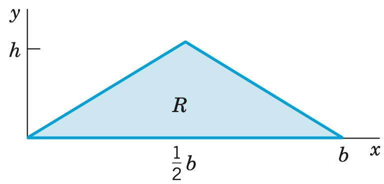
Problem 10.3.10.

Find the volume of the first octant region bounded by the coordinate planes and the surfaces $y = 1 - x^2$ and $z = 1 - x^2$. Sketch it.

Solution.

Problem 10.3.12.

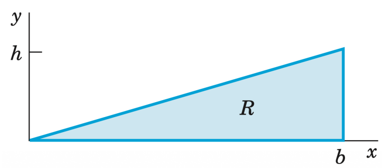
Find the center of gravity $(\bar{x}, \bar{y})$ of a mass of density $f(x, y) = 1$ in the given region R.



Solution.

Problem 10.3.17.

Find I_x, I_y, I_0 of a mass of density $f(x, y) = 1$ in the region R which the engineer is likely to need, along with other profiles listed in engineering handbooks.



Solution.