

Maple Questions

Here are some sample Maple assessment questions for this chapter.

1. Use Maple and the definition of the triple integral to evaluate the integral

$$\iiint_{[0,1] \times [0,1] \times [0,1]} (4xy + 3z^2) dV$$

2. Create a worksheet which illustrates and utilizes the trapezoidal rule in both the x and y directions to estimate the volume of the solid under the graph of a non-negative function $z = f(x, y)$ over a type I region.
3. Implement the following in Maple: Here is a way to estimate a double integral of the form

$$\int_0^1 \int_0^1 f(x, y) dy dz$$

where $0 \leq f(x, y) \leq 1$ for all (x, y) in the unit square. Choose x, y, z uniformly randomly between 0 and 1, and then evaluate $f(x, y)$. Count all those points (x, y, z) for which $z \leq f(x, y)$ and ignore the others. The total count divided by 1,000 will thus be an estimate of the value of the double integral.

4. Create a worksheet which estimates and illustrates the center of mass of a given solid assuming uniform density. The worksheet should plot both the solid as a wireframe (or using transparency) and its center of mass.
5. Create a worksheet which first allows a user to supply 4 points and then computes the volume of the tetrahedron whose vertices are the 4 given points.