This assignment has the weight of an ordinary quiz for your course grade and is due the Friday recitation of week 7.

You must use correct Maple commands to do the calculation. No hand written document is permitted.

We assume a minimal understanding of Maple commands. In case difficulties you may visit our home pages wherein a lot of Maple demonstrations can be found.

No collaboration is allowed, although discussing ideas is permitted. This assignment must be strictly a personal work.

No late homework will be accepted.

1. **(Verifying Green’s theorem)**
   
   Let \( P(x,y) = x^2y, \) \( Q(x,y) = \frac{e^x}{y^2+1}, \) and the contour \( C : \) Start from the origin \((0,0)\) going along the parabola \( y = x^2 \) to reach the point \((1,1)\), then return to the origin by moving along the parabola \( y = \sqrt{x} \).

   (a) Compute the line integral \( \oint_C P\,dx + Q\,dy \) by direct evaluation. The contour \( C \) is decomposed into the path \( C_1 \) from the origin to \((1,1)\) along \( y = x^2 \) followed by path \( C_2 \) which is the remaining part of \( C \). You must parametrize \( C_1 \) and \( C_2 \) first. Convert \( \int_{C_1} P\,dx + Q\,dy \) into an ordinary integral and then call Maple for its evaluation. Do the same for the line integral \( \int_{C_2} P\,dx + Q\,dy \). The integral \( \oint_C P\,dx + Q\,dy \) is just the sum of \( \int_{C_1} P\,dx + Q\,dy + \int_{C_2} P\,dx + Q\,dy \).

   (b) Using Green’s theorem to obtain the double integral and then convert the double integral into an iterated integral. Then call Maple for its evaluation. Note that you should get the same numerical answer as in part (a).

2. **(Mass of a Cone)**
   
   Consider a thin cone that is defined as \( x^2 + y^2 = z^2 \), between \( z = 0 \) and \( z = 1 \). Assuming that the mass density \( \sigma \) (mass per unit surface area) is \( \sigma(x,y,z) = e^{xyz} \).

   (a) Express the total mass of the cone as an surface integral.

   (b) Parametrize the cone. Convert the integral in (a) into an iterated integral and then call Maple for its evaluation.