

Due Date: July 19, 2010, Monday

NAME:.....

Time: 10:30

Ali Sinan Sertöz

STUDENT NO:.....

Math 102 Calculus II – Homework II

1	2	3	4	TOTAL
25	25	25	25	100

Please do not write anything inside the above boxes!

PLEASE READ:

Check that there are 4 questions on your booklet. Write your name on the top of every page. Show your work in reasonable detail. A correct answer without proper reasoning may not get any credit.

Q-1) For any $h \geq 0$ consider the region R_h in \mathbb{R}^3 bounded by the surfaces $z = (y + 1)x^2$, $y = 0$, $y = 1$ and $z = h$. Find the volume of R_h .

NAME:

STUDENT NO:

Q-2) Let R be the region in \mathbb{R}^3 in the first octant bounded by the coordinate planes and the unit sphere. Evaluate the integral of the function $e^{(x^2+y^2+z^2)^{3/2}}$ on R .

NAME:

STUDENT NO:

Q-3) Consider the vector field $\vec{F} = \left(\frac{1}{x + y^2 + z^3}, \frac{2y}{x + y^2 + z^3} + 1, \frac{3z^2}{x + y^2 + z^3} + 2z \right)$.

Calculate the work done by \vec{F} along the path $C = C_1 + C_2 + C_3$.

C_1 is along the semicircle in the yz -plane with center at the origin and radius 2. C_1 follows this semicircle from $(0, -2, 0)$ towards $(0, 2, 0)$ with $z \geq 0$.

C_2 goes from $(0, 2, 0)$ towards the point $(2, 1, 0)$ along the ellipse $\frac{3x^2}{16} + \frac{y^2}{4} = 1$ in the xy -plane.

C_3 goes from the point $(2, 1, 0)$ towards the point $(2, 1, 1)$ along a straight line.

NAME:

STUDENT NO:

- Q-4)** Consider the curve of intersection of the surfaces $z = y$ and $z = x^2 + y^2$, and let C be the path on this curve from the origin to the point $(0, 1, 1)$ lying in the first octant. Calculate the work done by the vector $\vec{F} = (x, x^2, y + z)$ on the path C .