

Math 241, Sections BL1 and BL2

Quiz # 4

October 18, 2012

Solve both exercises. Show work to get credit.

1) [5pts.] Find the work done by the force field

$$\vec{F}(x, y) = x\vec{i} + (y + 1)\vec{j}$$

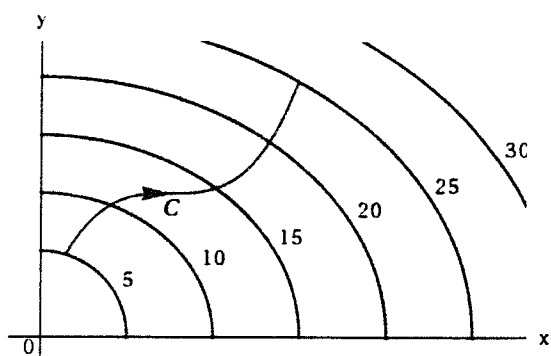
in moving an object along an arch of the cycloid

$$\vec{r}(t) = (t - \sin t)\vec{i} + (1 - \cos t)\vec{j}, \quad t \in [0, 2\pi].$$

2

2) [5pts.] (a) The figure below shows a curve C and a contour map of a function f whose gradient is continuous. Find

$$\int_C (\nabla f) \cdot d\vec{r}.$$



(b) A table of values of a function f with continuous gradient is given. Find

$$\int_C (\nabla f) \cdot d\vec{r},$$

where C has the parametric equations

$$x = t^4 + 1, \quad y = t^3 + t, \quad t \in [0, 1].$$

| $x \backslash y$ | 0 | 1 | 2 |
|------------------|---|---|---|
| 0 | 1 | 6 | 4 |
| 1 | 1 | 5 | 9 |
| 2 | 6 | 3 | 9 |