

Calc 3 - Assignment 27

Note Title

11/17/2011

① The figure below shows the vector field

$$\vec{F} = \langle 2xy, x^2 \rangle$$

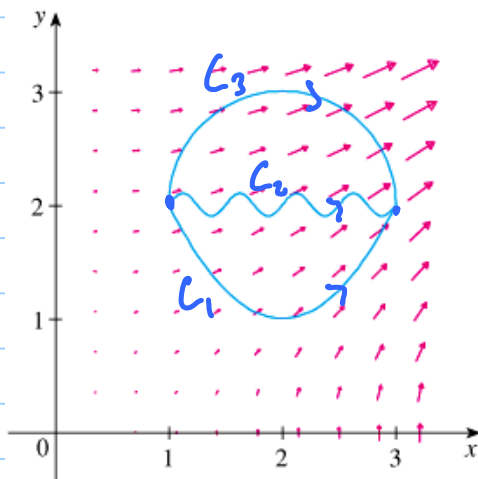
and three curves from $(1, 2)$

to $(3, 2)$. Explain why $\int_C \vec{F} \cdot d\vec{r}$ has the

same value for all

three curves C_1, C_2, C_3 ,

and find that value.



② Evaluate $\int_C \vec{F} \cdot d\vec{r}$ where $\vec{F} = \langle x^2, y^2 \rangle$

and C is the part of the parabola $y = 2x^2$ from

$(-1, 2)$ to $(2, 8)$ using (a) line integration,

and (b) the Fund. Theorem.

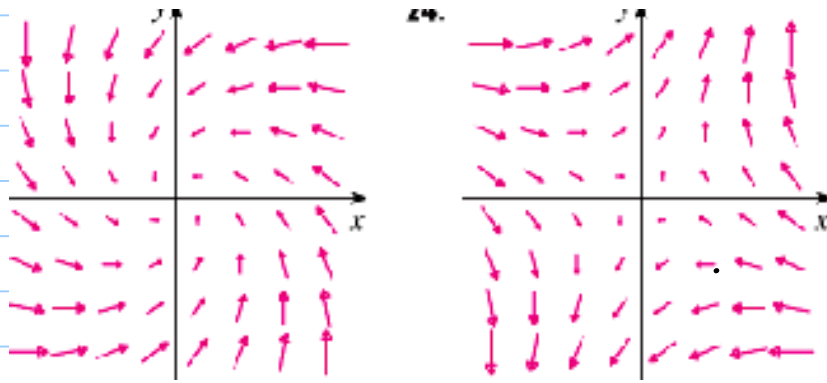
③ Evaluate $\int_C yz \, dx + xz \, dy + (xy + 2z) \, dz$, where

C is the line segment from $(1, 0, -2)$ to $(4, 6, 3)$

using (a) line integration, and (b) the Fund. Theorem.

④ Find $\int_C \tan(y) \, dx + x \sec^2(y) \, dy$, C any path from $(1, 0)$ to $(2, \pi/4)$

⑤ Which vector field is conservative?



⑥ Is $\int_C y dx + x dy + xy z dz$ independent of the path?

⑦ Find the value of the work integral

$$\int_C (3x^2 y^2 + \sin(y^2)) dx + (2x^3 y + x \cos(y^2)) dy$$

where C is $\langle 2\cos(t), 3\sin(t) \rangle$, $t \in [0, 2\pi]$.

(there is an easy trick for this!)