

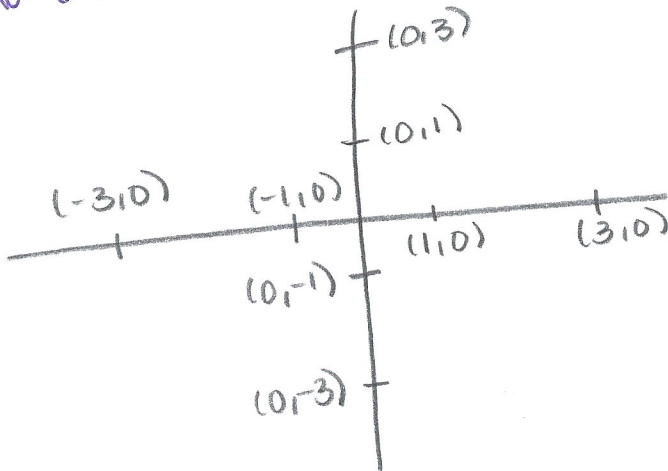
"QUIZ" for Lecture 17

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q17FirstLast.pdf) ASAP BUT NO LATER THAN Nov. 5, 8:00pm

1. Sketch the vector planar vector field
- Not sure how to complete*

$$F = \langle x, y^2 \rangle$$



$(x, y)$	$F$
(1, 0)	$\langle 1, 0 \rangle$
(0, 1)	$\langle 0, 1 \rangle$
(-1, 0)	$\langle -1, 0 \rangle$
(0, -1)	$\langle 0, 1 \rangle$
(3, 0)	$\langle 3, 0 \rangle$
(0, 3)	$\langle 0, 9 \rangle$
(-3, 0)	$\langle -3, 0 \rangle$
(0, -3)	$\langle 0, 9 \rangle$
(-2, 2)	$\langle -2, 4 \rangle$

2. Find a potential function for the vector field  $F$

Find  $u$

$$\text{curl } f = \begin{vmatrix} \mathbf{i} & \mathbf{j} \\ \frac{d}{dx} & \frac{d}{dy} \\ y \cos(xy) & x \cos(xy) \end{vmatrix}$$

$$F = \langle y \cos(xy), x \cos(xy) \rangle$$

$$F = (y \cos(xy)) \mathbf{i} + (x \cos(xy)) \mathbf{j}$$

$$= (\cos(xy) + (-y \sin(xy) \cdot x)) \mathbf{i} - (\cos(xy) - xy \sin(xy)) \mathbf{j}$$

*equals 0 so keep going*

$$= (\cos(xy) - xy \sin(xy)) \mathbf{i} - (\cos(xy) - xy \sin(xy)) \mathbf{j} = 0$$

Solve for  $g(y)$  and  $h(x)$

$$f_x = y \cos(xy) \quad \int f_x dx = \sin(xy) + g(y)$$

$$f_y = x \cos(xy) \quad \int f_y dy = \sin(xy) \Rightarrow x \cos(xy) + g_y = x \cos(xy)$$