UCLA: Math 32B **Quiz 1 (Thursday)** **Winter, 2017**

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You will receive one point for attempting the quiz, and one point for each correct answer. Please do your working in the space provided (or on the back) and place your solution in the box.

1. (1 point) Calculate the cross product $(1,0,1) \times (0,4,0)$.

$$(1,0,1)\times(0,4,0) = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 0 & 1 \\ 0 & 4 & 0 \end{vmatrix} = \hat{i}\begin{vmatrix} 0 & 1 \\ 4 & 0 \end{vmatrix} - \hat{j}\begin{vmatrix} 1 & 1 \\ 0 & 0 \end{vmatrix} + \hat{k}\begin{vmatrix} 1 & 0 \\ 0 & 4 \end{vmatrix}$$

$$= \hat{i}\cdot -4 - \hat{j}\cdot 0 + \hat{k}4$$

$$= -4\hat{i} + 4\hat{k}$$

$$= \boxed{(-4,0,4)}$$

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2. (1 point) Calculate the directional derivative $\partial_{\mathbf{u}}(\sin x + \sin x)$ where $\mathbf{u} = (1,-1)$.

$$\langle 2\cos x, 0\rangle \cdot \left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right) = \boxed{\left(\frac{2\cos x}{\sqrt{2}}, 0\right)}$$

$e_u = \frac{1}{\sqrt{2}}(1,-1)$

dot product gives a scalar, not a vector.

$$\boxed{\left(\frac{2\cos x}{\sqrt{2}}, 0\right)}$$