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1. Show that if the motion of a camera is only a translation along the line of sight (by convention the Z axis), then the vanishing point known as the focus of expansion (or contraction) is at the center of the imaging plane, in image coordinates.
2. Suppose a plane in 3D with relative instantaneous motion $\vec{T}=(1,1,1)^T$ and $\vec{\omega}=(0.1,0.1,0)^T$, with unit normal $\vec{n}=(0,0,1)^T$ and $d=10$. Find the other plane (and its motion) that generates the same image motion field, by computing the dual solution.
3. What is the normal velocity of an image region for which $\nabla I=(1,1)^T$ and $I_t=1$? Why cannot we compute full velocity with only the provided data?
4. Compute the derivative of the following Gaussian:

$$\frac{1}{\sqrt{2\pi}\sigma} \exp\left\{\frac{-x^2}{2\sigma^2}\right\}$$

5. What would you be computing by creating a kernel with the result of the previous question and performing a convolution on an image area? Justify your answer.