3. $g = h * f$

Taking Fourier transforms,

$$G = HF, \quad \text{or} \quad F = \frac{G}{H}$$

From this expression, it is clear that we will run into problems when $H = 0$.

In general, for both 1D and 2D images, the gradients are differences between intensities at adjacent points. Given only these, one cannot determine the original image, except upto a constant offset.