7.6

We set the real numbers standard deviation in this line:
`real = np.random.normal(5, 0.5, (bsz, 1))`

The GAN model has no pressure on it to learn the correct σ, because the descrimination feedback is primarily focused on whether the samples are realistic enough to be deemed 'real' as opposed to fake. The discriminator doesn't explicitly penalize the generator for a standard deviation that doesn't match the real data's σ.

The generator is optimizing to fool the discriminator, not match the target distribution's standard deviation. The generator might learn to produce data with a lower variance than the target distribution because it finding a regions of data space that particularly convincing to the descriminator and those regions are less dispersed than the real data.

7.2 Minist digits often have padding of zero value aronnd the edges. Which is a commonality acrors many of the images in the dataset. When the auto encoder learns to encode these digits, it will learn that the edges (which consistently have zeros) do not carry important information for the reconstruction of the digit in the center of the image. This because autoencoder tend to prioritize encoding features that are most relevant for reconstruction and ignore what is common or redundant.

Thus, if all else equal, since the edge pixels don't change much across different samples. The AE would learn that it doesn't need to change the weights corresponding to these pixels significantly to minimize the reconstruction error. These weight might becomes very small (closed to zero), effectively ignoring the edge pixel during the reconstruction phase.