Homework 3 – Written Portion

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Question 1

With $\sigma = 4$, the background contains a bit of noise left from the gradient magnitude process, as the derivatives of an image amplify it's noise. When sigma is increased to 8, the pre-smoothing filter smooths more of this noise out, reducing noise in the final image.

Question 2

After applying the Laplacian filter with $\sigma = 4$, pixels around image edges are highlighted. On top of the cow's head, the edge is hard to notice, as the edge was not particularly steep in the first place. The grey background has a value of approximately 95.0f, whereas the head itself is about 140.0f. This edge has a step height of about 45, resulting in a low-intensity edge.

The area above the cow's ears, however, has a step intensity of about 60, resulting in a stronger response. There is also less blurring around the ears, resulting in a sharper edge, and therefore a higher second derivative.

Question 3

Question 4