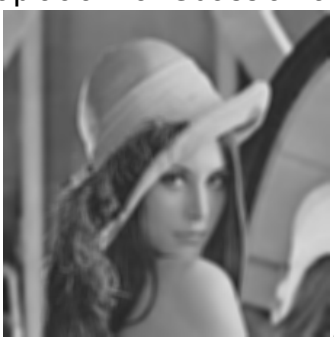
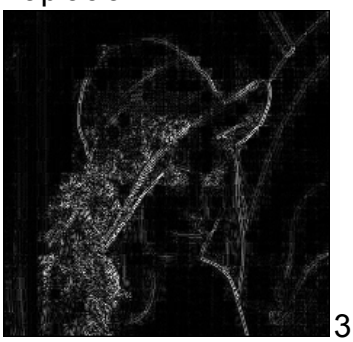
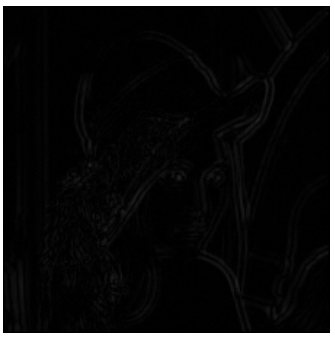
The changes of using Laplacian filter with and without Guassian filter are interesting and explainable. The result are shown in the images below: 1: Only Gaussian. 2: Only Laplacian. 3: Guassian and Laplacian.

1.  2.  3. 

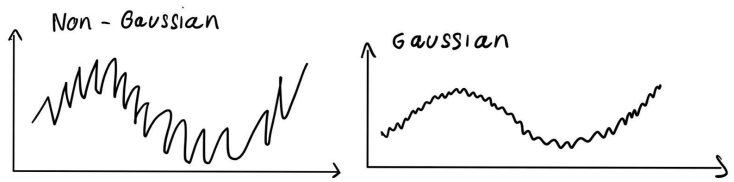
The third image is dark and when minimized to this level a bit diffucult to see. Though it is still possible to see the details. On the second image you can also see the details though much rougher. The first image is a smoothened image also knows as blurred.

To answer the question we can clearly see the difference between image 2 and 3. When viewing the edges (details) that has been drawed they are of different quality. Image 2 has brighter edges, but they are rough and noisy. Image 3 is not as bright but when looking closely you can see that the details are more defined. This is because of how the Laplacian filter works. It is a second order derivative. For each pixel it is calculated by this formula:

$$-4f(i,j) + f(i,j+1) + f(i,j-1) + f(i+1,j) + f(i-1,j)$$

f = image, f(i, j) = coordinate in image.

As you can see this is the second derivative. This can result in the value 0 for a pixel. When going from a first to second derivative the edges results in this. And this again is called the zero crossing (crossing the 0 line in a graph .. zero crossing). So these details you see are the zero crossings. As we now understand this it is simpler to describe why there is a difference in image 2 and 3. This is because when doing operation of second derivative the function is very exposed to noise. Noise in this case is variance in the pixel values in the image. When there is too much noise the details cant be found (or more presicly i marked and as in image 2 is shown as rough edges). Because it is exactly what the second derivative does, finding variance in the pixel values. So when there are variance in pixel values everywhere the function will mark them all as edges. This is why we make it grayscale because we remove some variance. And because it is simpler to calculate. So the difference in image 2 and 3 is that image 3 has been smoothened by a Gaussian filter. Which is a filter that blurs the image. Which is the same as removing some noise or variance in the pixel values (flattening basicly). So when the Gaussian filter has removed the noise what we are left with is variance in the pixel values that are actually the egdes. And this is what the Laplacian finds and therefore makes marks more clearly. Just like a graph:



To sum it all up. The difference between image 2 and 3 is that noise has been removed in image 3. And therefore the edges (details) are more define.