**Digital Image Processing**

**HW2**

**Blind Super Resolution**

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Question 1

From definition of convolution using the notations from the third paragraph:

Question 2

From down sampling and convolution definition:

Question 3

By plugging in the results from q1 and q2 we get:

Since this is holds for all :  
making sampling in as needed.

Question 4

By q3:

Using Fourier transform:

Question 5

For we will get:

Assume by contradiction that hold, hence it will hold for any , specifically for . Plugging in this we get:

No can satisfy this equation- thus does not hold.

Trying for .

Thus, calculating the Fourier transform: