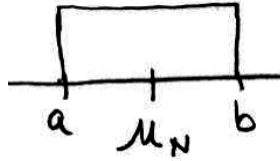


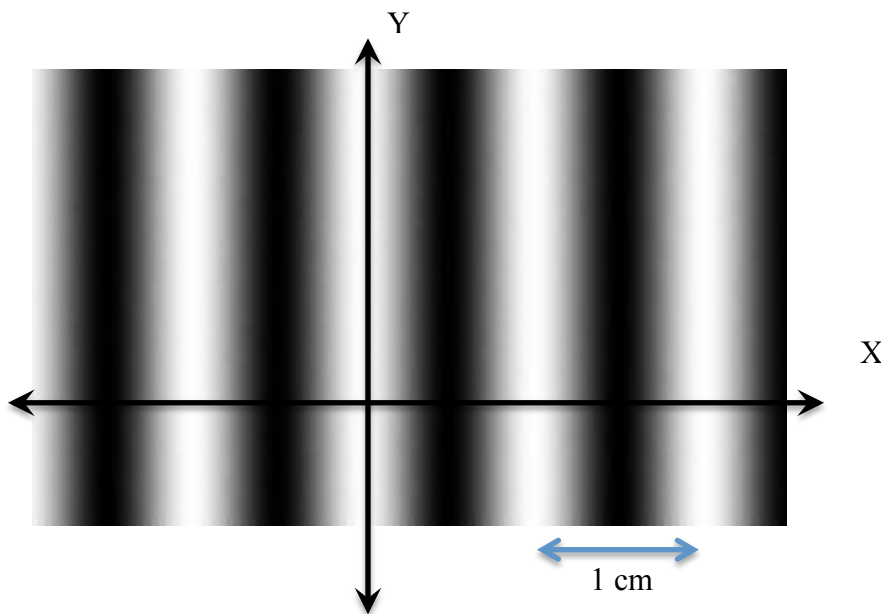
1. For the following probability density function (pdf)



Using the formula for the mean of any probability function defined in Eq. 3.38, prove that for this particular pdf,

$$\mu_N = \frac{a + b}{2}$$

2. Assume that the image below represents a sinusoidal variation orthogonal to the x -axis with an amplitude of 10 and period of 1 cm, that repeats infinitely in all directions within the plane. Further assume an average intensity of 10.



- A. Sketch the 2D Fourier Transform (magnitude only) of this image on the (u,v) plane in units of cycles per cm, using "x" to denote an impulse in the frequency domain. (Recall that the Fourier transform of a sinusoid is an impulse in the frequency domain).
- B. Sketch the projection of the image on the x -axis, graphing pixel intensity as a function of x . (note: since the image repeats infinitely, this should be the average pixel intensity along each projection)
- C. Sketch the projection of the image on the y -axis, graphing pixel intensity as a function of y . (note: same as in B).
- D. What frequency is (or frequencies are) present in the x projection?
- E. What frequency is (or frequencies are) present in the y projection?
- F. Describe how the answers to D and E are evident from the sketch in A.

Homework #2

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3. Repeat the steps in Question 2 for the same image rotated 10 degrees clockwise (shown below).

