In-Class Exercise: Resolution of the Eye and Pixel Sizes

We want the image on a computer screen or a printed sheet to look continuous from distances of 25 cm or more.

1. Using a resolution angle of $\theta = 3 \times 10^{-4}$ radians and D = 25 cm, what is the maximum size of pixels to produce an image that is smooth to the human eye?

2. Consider an image that fills most of an A4 sheet, perhaps 18 cm x 26 cm. How many pixels will be needed?

3. If the image uses 24 bit colour, how many bytes of data is involved?

4. Using the pixel size you calculated in step one, find the number of pixels per inch along a line on the paper. 1 inch = 2.54 cm. Comment on your result in terms of printer specifications you have seen advertised.

5. Consider a data projector used to display an image that has XGA resolution (1024 x 768). Assuming the image on the screen is 2 meters wide and 1.5 meters tall, how close would you have to sit to resolve individual pixels? Hint: first find the size of one of the pixels on the screen.