Name:
UMS ID:
Note: You must turn in a hardcopy at the beginning of class. Please show all the steps for your work to get maximum points.

1. Convert the decimal number 705 to binary.

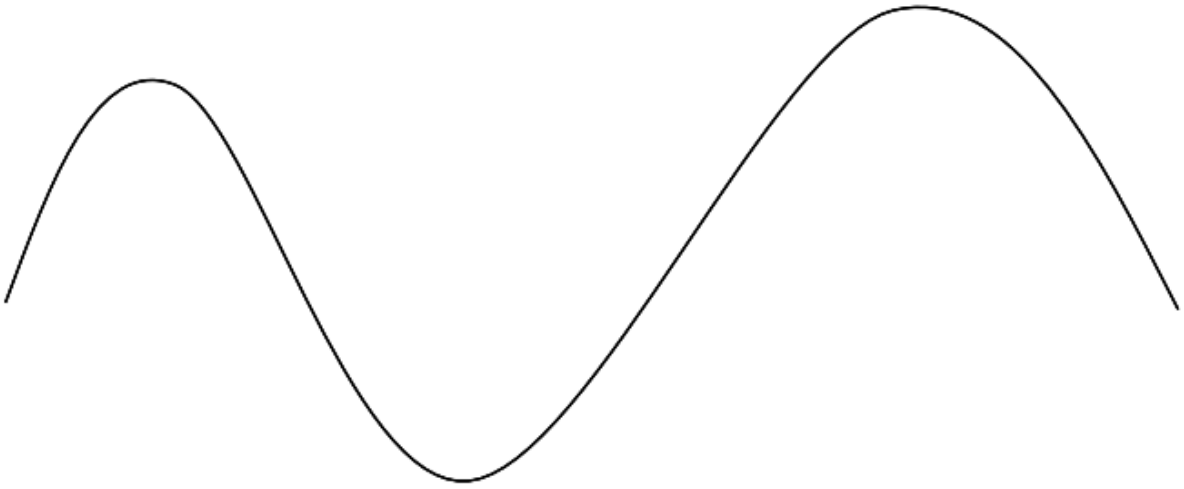
2. Convert the binary number 101101 to decimal.

3. What is the binary string for the color with RGB value [146, 81, 0] given that 8 bits are used to represent each color? (Hint: The binary string should be 24 bits long).

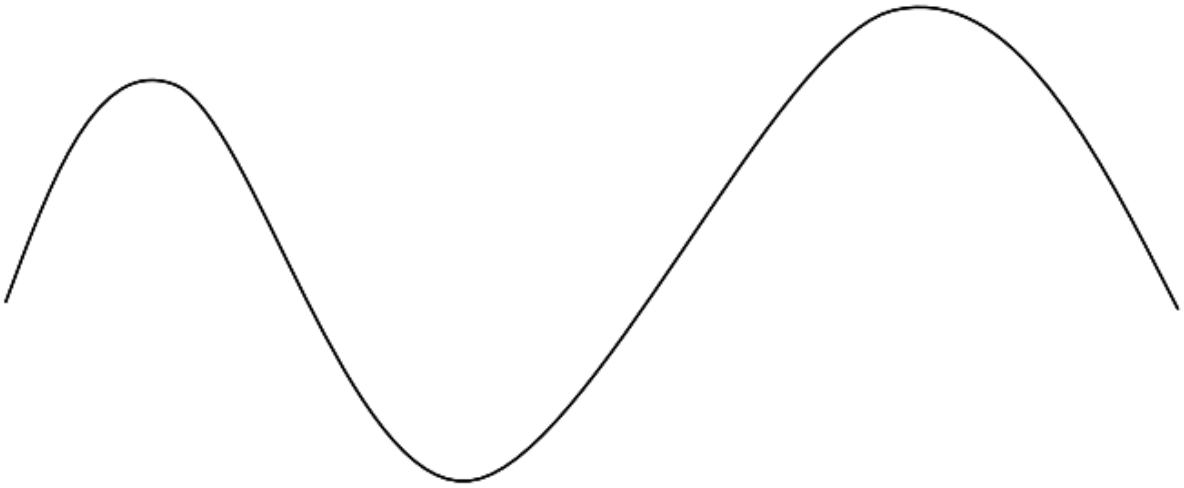
4. Compute the following binary multiplication: $1111 \cdot 1111$. The answer should be in binary form.

5. The following graphs shows a wave, please use (a) 2 bits (b) 3 bits in each time interval to convert this wave to a digital signal. It is up to you to decide what could be the best way to quantize or select levels to digitize the graph and capture maximum information. Draw the two digital signals in the graphs below with labels. Please label levels and sampling intervals.

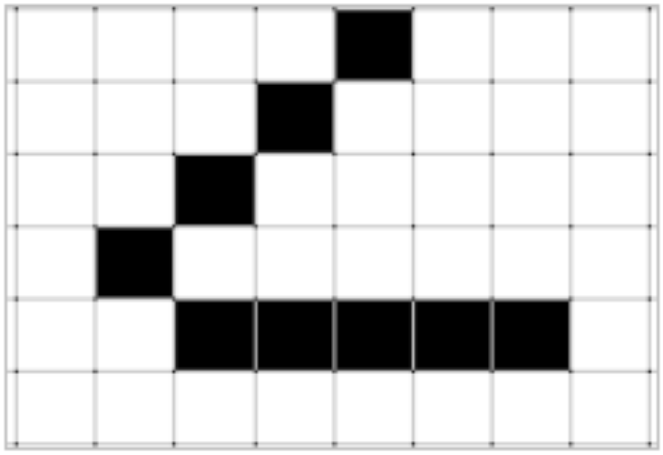
(a)



(b)



6. The following is an 8x6 image and each pixel is made up of 1 bit (either black or white).



(a) Calculate the total number of bits used to represent this image:

(b) The number of bytes used to represent this image:

(c) The number of kilobytes used to represent this image:

(d) You have decided to store this image in your hard drive and the image needs to be compressed. The method you choose to use must be lossless. What kind of compression technique would you use? Please explain your choice. (Hint: Since this is a simple black and white image, think about the text compression methods).