Additional problems on number representation in different bases

Quiz on Friday, September 7, 2012.

1. Beginning with the numeral $(101)_{two}$, list the next twelve numerals in the base-two system.

2. Convert the following numbers to the decimal system:

   (a) $(101010)_{two}$ (b) $(1000000)_{two}$ (c) $(1111111)_{two}$ (d) $(321)_{eight}$ (e) $(777)_{eight}$
   (f) $(1000)_{eight}$ (g) $(16)_{sixteen}$ (h) $(FF)_{sixteen}$ (i) $(A5)_{sixteen}$ (j) $(100)_{sixteen}$

3. Convert each of the following decimal numerals to binary (base two), octal (base eight) and hexadecimal (base sixteen) system:

   (a) 10 (b) 38 (c) 125 (d) 856 (e) 3485 .

4. How many digits are needed in a base-sixteen numeration system? Why? What is the largest number that can be written with two digits in this base?

5. In computer terminology, 1 byte is equal to eight bits, and one K (as in 1K bytes) is defined as 2^{10} (decimal notation), or 1024 bytes. Determine, both approximately and precisely, how many bytes and bits are described by the given phrase:

   (a) 16K bytes (b) 64K bytes (c) 128K bytes (d) 1024K bytes*.

   * the number in part (d) is known as 1M bytes.