AP Computer Science Name _____ Per ____
Number System Worksheet

There are infinite ways to represent a number. The four commonly associated with modern computers and digital electronics are: **decimal**, **binary**, **octal**, and **hexadecimal**.

Decimal (base 10) is the way most human beings represent numbers. Decimal is sometimes abbreviated as *dec*.

Binary (base 2) is the natural way most digital circuits represent and manipulate numbers. Binary numbers are sometimes represented by preceding the value with `'0b'`, as in `0b1011`. Binary is sometimes abbreviated as *bin*.

Octal (base 8) was previously a popular choice for representing digital circuit numbers in a form that is more compact than binary. Octal is sometimes abbreviated as *oct*.

Hexadecimal (base 16) is currently the most popular choice for representing digital circuit numbers in a form that is more compact than binary. Hexadecimal numbers are sometimes represented by preceding the value with '`0x`', as in `0x1B84`. Hexadecimal is sometimes abbreviated as *hex*.

There is not a standard way to "say" each number in the different number systems. It is acceptable to say each digit or the decimal equivalent. For example the hex number '`1E`' could be pronounced "one" "e" or "thirty" which is the decimal equivalent.

Decimal (base 10) 0,1,2,3,4,5,6,7,8,9	Binary (base 2) 0 or 1	Octal (base 8) 0,1,2,3,4,5,6,7	Hexadecimal (base 16) 0,1,2,3,4,5,6,7, 8,9,A,B,C,D,E,F
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Convert the following numbers to their decimal equivalent:

`2B` (hex) `45` (oct) `1011` (bin)

`3FFF` (hex) `1277` (oct) `10011001` (bin)

Convert the following decimal numbers to binary, octal and hexadecimal equivalents:

`56` binary: _____ octal: _____ hexadecimal: _____

`409` binary: _____ octal: _____ hexadecimal: _____