Hexadecimal numbers

Computer programmers use hexadecimal numbers as a concise way of indicating the value of a byte in a memory location. A byte has 8 bits, each of which can be zero (0) or one (1). A binary (base 2) number that has 8 digits can count from zero (0) up to 255. To display this number in decimal, we'd need up to three digits to display the largest number (255). But if we display the number in hexadecimal (base 16) instead, we can display the number using only two digits. The largest number is FF. These digits look like letters because we need 16 different characters to display a hexadecimal (base 16) number. After using zero (0) through nine (9), we use six more letters for digits: A, B, C, D, E, and F.

Designers use hexadecimal numbers as a concise way of accurately describing colors. If we use a two-digit hexadecimal number for each of the colors red, green, and blue, we can describe 255 x 255 x 255 = 16,581,375 (16 million) different colors.

We will only use hexadecimal numbers that have two digits, so we only have to remember that the first digit is the number of 16s and the second digit is the number of 1s. The extra digits A through F have these values: →

A	10
B	11
C	12
D	13
E	14
F	15

To convert a number from hexadecimal to decimal is easy:

1. Write down the numerical equivalents of the letters A through F in the hexadecimal number.
2. Multiply the first digit by 16.
3. Add the second digit.

Example: Convert DC hexadecimal to decimal.

1. D = 13, C = 12
2. First digit is 13 x 16 = 208
3. 208 + 12 = 220

Converting a number from decimal to hexadecimal is a little more complicated.

1. Divide the decimal number by 16.
2. The result is the first digit. If greater than 9, look up the letter in the above chart.
3. The remainder is the second digit. If greater than 9, look up the letter.

Example: Convert 190 decimal to hexadecimal.

1. 190 / 16 = 11, with a remainder of 14
2. The first digit is 11, which becomes the letter B.
3. The remainder is 14, which becomes the letter E. The resulting answer is BE.

Name : _____ Score : _____

Teacher : _____ Date : _____

Converting Decimal and Hexadecimal Numbers

Convert the given Decimal number to its Hexadecimal equivalent. Show your work.

1) $248_{(10)}$ = _____ (16)

2) $146_{(10)}$ = _____ (16)

3) $30_{(10)}$ = _____ (16)

4) $129_{(10)}$ = _____ (16)

5) $69_{(10)}$ = _____ (16)

6) $224_{(10)}$ = _____ (16)

7) $82_{(10)}$ = _____ (16)

8) $217_{(10)}$ = _____ (16)

Convert the given Hexadecimal to its Decimal equivalent.

9) $4A_{(16)}$ = _____ (10)

10) $5F_{(16)}$ = _____ (10)

11) $F7_{(16)}$ = _____ (10)

12) $53_{(16)}$ = _____ (10)

13) $DD_{(16)}$ = _____ (10)

14) $49_{(16)}$ = _____ (10)

15) $E8_{(16)}$ = _____ (10)

16) $6A_{(16)}$ = _____ (10)

I completed this assignment by myself without using a calculator, internet, or any outside help.

Signed: _____