Changing base 2 to base 8:

A. This method works because $2^3 = 8$.

    1. Since, $2^3 = 8$, we separate the number into groups of 3's starting from the right working to the left.

    2. Find the number each triplet would be equal to in base 10 and write them down in order. See the table below:

Base 2	Base 10	Base 2	Base 10
000	0	100	4
001	1	101	5
010	2	110	6
011	3	111	7

    3. There is no need to memorize these, since they can be evaluated easily.   See *base b to 10*.

B. Examples:

    Ex [1] $1101110111_2 = $_____$_8$.

        a. Separate the number into triplets: 1 101 110 111.

        b. Evaluating each triplet we get: 1 5 6 7.

        c. The answer is 1567.

    Ex [2] $101010110_2 = $_____$_8$.

        a. Separate the number into triplets: 101 010 110.

        b. Evaluating each triplet we get: 5 2 6.

        c. The answer is 526.

C. Notice if you are asked to go from base 4 to base 2, the method would be simple:

    1. Simply take each digit and write its base 2 equivalent. Refer to the table above.

        Ex [1] $720_8 = $_____$_2$.

            a. Using the table above we know $7 = 111$, $2 = 010$, and $0 = 000$.

            b. The answer is 111010000.

Ex [2] $1273_8 = $_____$_2$.

    a. Using the table above we know 1 = 001, 2 = 010, 7 = 111, 3 = 011.

    b. Since the first number is represented by 001, we only write 1, since
       we cannot use 0's at the beginning of numbers.

    c. The answer is 1010111011.