

Starting with binary conversions:

$$\frac{47}{2} = \frac{23}{2} = \frac{11}{2} = \frac{5}{2} = \frac{2}{2} = \frac{1}{2} = 0 \Rightarrow 47 = \boxed{00101111}$$

$$\frac{82}{2} = \frac{41}{2} = \frac{20}{2} = \frac{10}{2} = \frac{5}{2} = \frac{2}{2} = \frac{1}{2} = 0 \Rightarrow 82 = \boxed{01010010}$$

$$\frac{127}{2} = \frac{63}{2} = \frac{31}{2} = \frac{15}{2} = \frac{7}{2} = \frac{3}{2} = \frac{1}{2} = 0 = \boxed{01111111}$$

$$\frac{124}{2} = \frac{62}{2} = \frac{31}{2} = \frac{15}{2} = \frac{7}{2} = \frac{3}{2} = \frac{1}{2} = 0 = \boxed{10000001}$$

$$\frac{243}{2} = \frac{121}{2} = \frac{60}{2} = \frac{30}{2} = \frac{15}{2} = \frac{7}{2} = \frac{3}{2} = \frac{1}{2} = 0 = \boxed{11110011}$$

-23 \Rightarrow Start with 23 & use 2's complement

$$\Rightarrow \frac{23}{2} = \frac{11}{2} = \frac{5}{2} = \frac{2}{2} = \frac{1}{2} = 0 \Rightarrow 00010111 \Rightarrow 11101000$$

2's comp.

$$\text{add } 1 \Rightarrow \boxed{11101001} = -23$$

$$-67 \Rightarrow \frac{67}{2} = \frac{33}{2} = \frac{16}{2} = \frac{8}{2} = \frac{4}{2} = \frac{2}{2} = \frac{1}{2} = 0$$

$$\Rightarrow 01000011 \Rightarrow 10111100, \text{ add } 1 \Rightarrow \boxed{10111101} = -67$$

2's comp.

$$-255 \Rightarrow \frac{255}{2} = \frac{127}{2} = \frac{63}{2} = \frac{31}{2} = \frac{15}{2} = \frac{7}{2} = \frac{3}{2} = \frac{1}{2} = 0$$

$$\Rightarrow 1111\ 1111 \Rightarrow 0000\ 0000, \text{ and } 1 \Rightarrow 1111\ 1111\ 0000\ 0001$$

2's comp,

Now doing conversions from decimal to hex:

$$\frac{47}{16} = \frac{15}{16} = 0 \Rightarrow 15 = F \Rightarrow 2\ 15 \Rightarrow 2F_H = 47$$

$$\frac{82}{16} = \frac{5}{16} = 0 = 52_H = 82$$

$$\frac{127}{16} = \frac{7}{16} = 0 \Rightarrow 7F_H = 127$$

$$\frac{129}{16} = \frac{8}{16} = 0 = 81_H = 129$$

$$\frac{243}{16} = \frac{15}{16} = 0 = F3_H = 243$$

-23, starting with previously found binary rep. & converting to hex

$$\Rightarrow 1110\ 1001, \quad 1110\ 1001 \Rightarrow F9_H = -23$$

14 → E 9

$$-67 = 1011\ 1101 \text{ (found previously)} \Rightarrow 1011\ 1101 \Rightarrow BD_H = -67$$

11 → B 13 → D

-255 = 1111 1111 0000 0001 (found previously)

$$\Rightarrow \begin{array}{cccc} 1111 & 1111 & 0000 & 0001 \\ 15 \text{ FF} & 15 \text{ FF} & 0 & 1 \end{array} = \boxed{\text{FF01}_H = -255}$$

converting hex to decimal for both signed & unsigned #s:

0X33

$$\Rightarrow 3 \times 16^1 + 3 \times 16^0 = 48 + 3 = \boxed{51 \text{ for unsigned \#}}$$

in binary, $\frac{51}{2} = \frac{25}{2} = \frac{12}{2} = \frac{6}{2} = \frac{3}{2} = \frac{1}{2} = 0 \Rightarrow 0011 0011$, since

the MSB is 0, the signed number is also 51

$$0X19 \Rightarrow 1 \cdot 16^1 + 9 \cdot 16^0 = 16 + 9 = \boxed{25}$$

in binary, $\frac{25}{2} = \frac{12}{2} = \frac{6}{2} = \frac{3}{2} = \frac{1}{2} = 0 = 0001 1001$, MSB is 0,

so signed number is also 25

$$0X64 \Rightarrow 6 \cdot 16^1 + 4 \cdot 16^0 = 96 + 4 = \boxed{100 \text{ for unsigned number}}$$

in binary, $\frac{100}{2} = \frac{50}{2} = \frac{25}{2} = \frac{12}{2} = \frac{6}{2} = \frac{3}{2} = \frac{1}{2} = 0 = 011 00100$,

MSB is 0, so signed number is also 100

$$0X4C \Rightarrow 4 \cdot 16^1 + 12 \cdot 16^0 = 64 + 12 = \boxed{76 \text{ for unsigned number}}$$

in binary, $\frac{76}{2} = \frac{38}{2} = \frac{19}{2} = \frac{9}{2} = \frac{4}{2} = \frac{2}{2} = \frac{1}{2} = 0 = 0100 1100$,

MSB is 0 so signed number is also 76

$$0xAB = >10 \cdot 16^1 + 11 \cdot 16^0 = 160 + 11 = 171 \text{ for unsigned number}$$

$$\text{in binary, } \frac{171}{2} = \frac{85}{2} = \frac{42}{2} = \frac{21}{2} = \frac{10}{2} = \frac{5}{2} = \frac{2}{2} = \frac{1}{2} = 0$$

$= >10101011$, since MSB is 1, subtract 1 & invert,

$$= >10101010 = >01010101 = >2^6 + 2^4 + 2^2 + 2^0 = 64 + 16 + 4 + 1 = 85$$

$$= >-85 \text{ for signed number}$$