1.

a.

i) $(93)_{10} = (64+16+8+4+1)_{10} = (1011101)_2$ işaret biti $\Rightarrow$ $(93)_{10} = (01011101)_2$

ii) $(-93)_{10}$ = two's complement of $(01011101)_2$ = $(10100011)_2$

iii) $(37)_{10} = (32+4+1)_{10} = (100101)_2$ işaret biti $\Rightarrow$ $(37)_{10} = (01001101)_2$

iv) $(213)_{10} = (128+64+16+4+1)_{10} = (11010101)_2$ sign bit $\Rightarrow$ $(213)_{10} = (011010101)_2$

v) $(134)_{10} = (128+4+2) = (10000110)_2$ sign bit $\Rightarrow$ $(134)_{10} = (010000110)_2$

$(-134)_{10}$ = two's complement of $(10000110)_2$ = $(10111010)_2$

b.

i) $\begin{array}{r} 0111111111 \\ +\ 1111111111 \\ \hline *0\ 1111111110 \end{array}$ $\Rightarrow (0111111110)_2 = (510)_{10}$

ii) $\begin{array}{r} 0000011101 \\ +\ 0101111010 \\ \hline 0110010111 \end{array}$ $\Rightarrow (0110010111)_2 = (407)_{10}$

iii) $\begin{array}{r} 1011001100 \\ +\ 1100111010 \\ \hline *1\ 0000000110 \end{array}$ $\Rightarrow (1000000110)_2 = (-506)_{10}$

iv) $\begin{array}{r} 0000010100 \\ +\ 1110111111 \\ \hline 1111010011 \end{array}$ $\Rightarrow (1111010011)_2 = (-45)_{10}$

v) $\begin{array}{r} 0010001001 \\ +\ 1101110111 \\ \hline *0000000000 \end{array}$ $\Rightarrow (0000000000)_2 = (0)_{10}$

c. N bit kullanılan ikiye tümleyen gösterimindeki en küçük sayı

$-(2)^{N-1}$ 'dir.

2.

a.

i) $(13)_{10} = (8+4+1)_{10} = (1101)_2$ $\quad (0,25)_{10} = (0,01)_2$

$\Rightarrow (13,25) = (1101,01)_2 = (1,10101 \cdot 2^3)$

0/10000010/10101000000000000000000

ii) $(235)_{10} = (128+64+32+8+2+1) = (11101011)_2$

$(,875)_{10} = (,111)_2$ $\quad \Rightarrow (235,875)_{10} = (11101011,111)_2 = (1,11010111 \cdot 2^7)_2$

$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$

0/10000110/11010111100000000000000

iii) $(76)_{10} = (64+8+4)_{10} = (1001100)_2$

0,1875 . 2 = 0,375
0,375 . 2 = 0,750
0,750 . 2 = 1,5
0,5 . 2 = 1

$\Rightarrow (,1875)_{10} = (,0011)_2$

$\Rightarrow (76,1875)_{10} = (1001100,0011)_2 = (1,00110001 \cdot 2^6)_2$

0/10000101/00110001000000000000000

iv) $(768)_{10} = (512+256)_{10} = (1100000000)_2$

$(0,3125)_{10} = (0,0101)_2$

$\frac{1}{4}+\frac{1}{16}$

$\Rightarrow (768,3125)_{10} = (1100000000,0101)_2 = (1,1000000000101 \cdot 2^9)_2$

1/10001000/10000000010100000000000

v) $(855)_{10} = (512+256+64+16+4+2+1)_{10} = (1101010111)_2$

0,515625 . 2 = 1,03125
0,03125 . 2 = 0,0625
0,0625 . 2 = 0,125
0,125 . 2 = 0,25
0,25 . 2 = 0,5
0,5 . 2 = 1

$\Rightarrow (855,515625)_{10} = (1101010111,100001)_2 = (1,1010101111000001 \cdot 2^9)$

1/10001000/10101011110000100000000

b.

i) $(1.2^{-127+127})_2 = (1)_2 = (1,0)_{10}$

ii) $(1,00010001 . 2^{\overbrace{-127+128+4}^{5}}) = (1\underset{32}{000}\underset{2}{1},0,001)_2 = (34,125)_{10}$

iii) $-(1,10101101 . 2^{\overbrace{-127+128+4}^{5}}) = (-1\,10110,101)_2 = (-54,625)_{10}$

iv) $-(1,11011010011 . 2^{\overbrace{-127+128+8}^{9}}) = (-111011010,0011)_2 = (-954,1875)_{10}$

v) $-(1,0111 . 2^{\overbrace{-127+126}^{-1}}) = (-0,10111)_2 = (-0,71875)_{10}$

c. En küçük pozitif sayı → 0 olmaz özel durum

0/00000001/00000000000000000000000

↓

$+(2^{-127+1} . 1,00)_2 = \boxed{2^{-126}}$