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1/22/2025

HW #1: Binary Number Representations

Question 1

1. $(1111\ 1011)_{2cns} \Rightarrow (0000\ 0101)_2 \Rightarrow \boxed{(-5)_{10}}$
2. $(0110\ 0100)_{2cns} \Rightarrow \boxed{(100)_{10}}$
3. $(1001\ 1010)_2 \Rightarrow \boxed{(154)_{10}}$

Question 2 Hint: $2^{b-1} \leq n \leq 2^b - 1$

1. $(65437)_{10} \Rightarrow 2^{15} < 65437 < 2^{16}$, so $\boxed{b=16}$
2. $(10361)_{10} \Rightarrow 2^{13} < 10361 < 2^{14}$, so $\boxed{b=14}$

Question 3

1. $(1011\ 1001\ 1001\ 1100)_2 \Rightarrow \boxed{(B99C)_{16}}$
2. $(1101\ 0110\ 0111\ 0011)_2 \Rightarrow \boxed{(D673)_{16}}$
3. $(0011\ 0110\ 0001\ 1001)_2 \Rightarrow \boxed{(3619)_{16}}$

Question 4

1. $(4024)_{16} \Rightarrow 4\times16^0 + 2\times16^1 + 0 + 4\times16^3 \Rightarrow \boxed{(16420)_{10}}$
2. $(FEE)_{16} \Rightarrow 14\times16^0 + 14\times16^1 + 15\times16^2 \Rightarrow \boxed{(4078)_{10}}$
3. $(10F3)_{16} \Rightarrow 3\times16^0 + 15\times16^1 + 0 + 1\times16^3 \Rightarrow \boxed{(4339)_{10}}$

Question 5

1. $(-619)_{10} \rightarrow$

16	619	
16	38	11 (B)
16	2	6
	0	2

$\Rightarrow -(26B)_{16} \rightarrow$ FFFF − 26B = FD94 + 1 = $\boxed{(FD95)_{16,2cns}}$

2. $(-312)_{10} \rightarrow$

16	312	
16	19	8
16	1	3
	0	1

$\Rightarrow -(138)_{16} \rightarrow$ FFFF − 138 = FEC7 + 1 = $\boxed{(FEC8)_{16,2cns}}$

3. $(+1947)_{10} \rightarrow$

16	1947	
16	121	11 (B)
16	7	9
	0	7

$\Rightarrow \boxed{(79B)_{16}}$

Question 6

1. $(-35)_{10} \Rightarrow -(0010\ 0011)_2 \Rightarrow \boxed{(1101\ 1101)_{2cns}}$
2. $(+103)_{10} \Rightarrow \boxed{(0110\ 0111)_{2cns}}$
3. $(-114)_{10} \Rightarrow -(0111\ 0010)_2 \Rightarrow \boxed{(1000\ 1110)_{2cns}}$

Question 7

1. "ROSE" $\Rightarrow \boxed{(52\ 4F\ 53\ 45)_{16, ASCII}}$

Question 8

1. $0 \le n \le 2^b - 1 \Rightarrow 0 \le n \le 2^7 - 1$, so $\boxed{0 \text{ to } 127}$
2. $-2^{b-1} \le n \le 2^{b-1} - 1 \Rightarrow -2^6 \le n \le 2^6 - 1$, so $\boxed{-64 \text{ to } 63}$