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Question 1a) overflow conditions → $p+p=n$, $n+n=p$

If we choose X as positive number, maximum it can get is (0111 1111) which will cause overflow but with 8 bits. Therefor, X must be negative. Max. negative value Result can get is -128 so X can get up to -64 without overflow. Largest value X can get is $-65_{(10)} = (1011\ 1111)_2$.

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 1011  1111
 1011  1111
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10111  1110
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ignored → sign is positive, overflow.

Question 1b) unsigned ⇒ A > B → most significant bit is 1.
signed ⇒ B > A

i) R = A − B → unsigned ⇒ As A > B there will be no borrow and 9th bit will be 1. For 8th bit to be 1, result should be greater than or equal to 128. As both A and B's MSB is 1, it is impossible.
8th bit = 0, 9th bit = 1.

→ Signed ⇒ As B > A and they are negative numbers |B| < |A| and result is negative. In signed subtraction carry bit is ignored for sign so 8th bit is 1. 9th bit is same as 8th = 1.

ii) There will be no difference in signed and unsigned comparison between A and B if they were both positive numbers. As the comparison changed we can say that they are negative.