

# Addition by Signed 2's Complement Form

- The addition of two signed binary numbers represented in Signed 2's-complement form is obtained by adding the two numbers including their sign bits.
- A carry out of the sign-bit position is discarded.

**Example 1:**  $(+6) + (+13) = ?$

$$\begin{array}{rcl}
 (+6) & \longrightarrow & 00000110 \\
 + (+13) & \longrightarrow + & 00001101 \\
 \hline
 +19 & & 00010011
 \end{array}$$

**Example 2:**  $(-6) + (+13) = ?$

$$\begin{array}{rcl}
 (-6) & \longrightarrow & 11111010 \longrightarrow (2's \text{ complement of } +6) \\
 + (+13) & \longrightarrow + & 00001101 \\
 \hline
 +7 & & 00000111
 \end{array}$$

### Example 3: $(+6) + (-13) = ?$

$$\begin{array}{rcl}
 (+6) & \longrightarrow & 00000110 \\
 + (-13) & \longrightarrow & + 11110011 \longrightarrow (2's \text{ complement of } +13) \\
 \hline
 -7 & & 11111001
 \end{array}$$

As result is –ve  
 So, for final answer, take 2's  
 complement of (11111001)  
 accept the sign bit  
 = 10000111 =  $(-7)_{10}$

### Example 4: $(-6) + (-13) = ?$

$$\begin{array}{rcl}
 (-6) & \longrightarrow & 11111010 \longrightarrow (2's \text{ complement of } +6) \\
 + (-13) & \longrightarrow & + 11110011 \longrightarrow (2's \text{ complement of } +13) \\
 \hline
 -19 & & 11101101
 \end{array}$$

As result is –ve  
 So, for final answer, take 2's  
 complement of (11101101)  
 accept the sign bit  
 = 10010011 =  $(-19)_{10}$