

Bcd AdditionRule →

8421

Valid → 0-9

$$\begin{array}{r}
 3 \rightarrow 0011 \\
 + 6 \rightarrow 0110 \\
 \hline
 9 \rightarrow 1001 \text{ Valid}
 \end{array}$$

$$\begin{array}{r}
 6 \rightarrow 0110 \\
 + 9 \rightarrow 1001 \\
 \hline
 15 \rightarrow 1111 \text{ Invalid}
 \end{array}$$

② Condition

① with Carry Invalid

② without Carry Invalid

without Carry  
correct

$$\begin{array}{r}
 \text{Ans} + 6 \\
 1111 \\
 + 0110 \\
 \hline
 00010101 \\
 \quad \quad \quad 1 \quad \quad \quad 5
 \end{array}$$

$$\begin{array}{r}
 9 \rightarrow 1001 \\
 + 8 \rightarrow 1000 \\
 \hline
 17 \rightarrow 10001 \text{ Invalid}
 \end{array}$$

Carry

$$\begin{array}{r}
 1,0001 \\
 6 \quad \quad \quad 5 \\
 1 \quad \quad \quad 1
 \end{array}$$

$$\begin{array}{r}
 \text{Ans} + 6 \\
 00010001 \\
 \quad \quad \quad 0110 \\
 \hline
 00010111 \\
 \quad \quad \quad \downarrow \quad \downarrow \\
 \quad \quad \quad 1 \quad \quad 7 \text{ Ans}
 \end{array}$$

example

$$\begin{array}{r}
 246 \\
 + 849 \\
 \hline
 1095
 \end{array}$$

$$\begin{array}{r}
 0010 \quad 0100 \quad 0110 \\
 1000 \quad 0100 \quad 1001 \\
 \hline
 1010 \quad 1001 \quad 1111 \\
 + 0110 \quad \quad \quad + 0110 \\
 \hline
 00010000 \quad \quad \quad 0101 \\
 \quad \downarrow \quad \quad \quad \downarrow \\
 \text{Ans} \quad 1 \quad 0 \quad 9 \quad 5
 \end{array}$$

Excess-3

↳ with Carry → Ans + (+3)

↳ with out Carry → Ans + (-3)



11 11

$$\begin{array}{r}
 P+3 \\
 Q+3 \\
 \hline
 Z+6
 \end{array}$$

4) with and Carry  $\rightarrow A + (-3)$

$$\begin{array}{r} 7 \leftarrow 1 \\ 2 \leftarrow 1 \\ \hline 9 \leftarrow 1 \end{array}$$

$$\begin{array}{r} 07 \leftarrow 1 \\ 03 \leftarrow 1 \\ \hline 10 \leftarrow 2 \end{array}$$

$$\begin{array}{r} \begin{array}{cc} 11 & 11 \\ 0011 & 1010 \\ 0011 & 0110 \\ \hline 0111 & 0000 \end{array} \\ - \begin{array}{cc} 0011 & 0011 \\ \hline 0100 & 0011 \end{array} \\ \downarrow \quad \downarrow \\ \underline{1} \quad \underline{0} \text{ Ans} \end{array}$$

$$\begin{array}{r} Q + 3 \\ Z + 6 \\ \hline \underline{(Z + 3)} - 3 \end{array}$$

$$\begin{array}{r} 1 \\ \rightarrow 24 \\ 68 \\ \hline 92 \end{array}$$

$$\begin{array}{r} \begin{array}{cc} 11 & 11 \\ 0101 & 0111 \\ 1001 & 1011 \\ \hline 1111 & 0010 \end{array} \\ - \begin{array}{cc} 0011 & 0011 + \\ \hline 1100 & 0101 \end{array} \\ \downarrow \quad \downarrow \\ \underline{9} \quad \underline{2} \text{ Ans} \end{array}$$