习题用到n个知识点：

无符号加减法：

$$result=\begin{cases}x+y & (x+y<2^n)\ \text{正常}\\ x+y & (2^n\le x+y<2^{n+1})\ \text{溢出}\end{cases}$$

$$result=\begin{cases}x-y & (x-y>0)\ \text{正常}\\ x-y+2^n & (x-y<0)\ \text{溢出}\end{cases}$$

带符号加减法：

$$result=\begin{cases}x+y-2^n & (2^{n-1}\le x+y)\ \text{正溢出}\\ x+y & (-2^{n-1}\le x+y<2^{n-1})\ \text{正常}\\ x+y+2^n & (x+y<-2^{n-1})\ \text{负溢出}\end{cases}$$

$$result=\begin{cases}x-y-2^n & (2^{n-1}\le x-y)\ \text{正溢出}\\ x-y & (-2^{n-1}\le x-y<2^{n-1})\ \text{正常}\\ x-y+2^n & (x-y<-2^{n-1})\ \text{负溢出}\end{cases}$$

做该题用时同学们可参考例题2.32

答案及过程：

① unsigned $X=0xB0 \Rightarrow$ 二进制：10110000 $\Rightarrow$ 十进制：$x=176$

$Y=0x8C \Rightarrow$ 二进制：10001100 $\Rightarrow$ 十进制：$y=140$.

$X+Y=10110000+10001100=(1)\,0011\,1100=0x3C$

$sub=\begin{cases}0 & \text{加法运算}\\ 1 & \text{减法运算}\end{cases}$

进行的是两个异号数相加，则结果一定不会发生溢出

$176+140=316>2^8 \Rightarrow x+y=316-256=60$.

进位符：$CF=sub\oplus C=0\oplus 1=1$，$SF=0$

$OF=1$（加法器中两个同号数相加，结果的符号数不同于加数的则发生溢出）

$X-Y=10110000+01110100=(1)\,0010\,0100=36=0x24$；$CF=sub\oplus C=1\oplus 1=0$，$SF=0$，$OF=0$

带符号：$X=0xB0 \Rightarrow$ 二进制：10110000 $\Rightarrow$ 真值 $x=-80=-0101\,0000$

$Y=0x8C \Rightarrow$ 真值 $y=-116=-0111\,0100$

10110000 为补码.

$x+y=-80+(-116)=-196<0$ 溢出 $x+y=-196+256=60$

$X+Y=+0011\,1100=60=0x3C$

$X-Y=+0010\,0100=36=0x24$

$x-y=-80-(-116)=36>0$，正常.

$CF=sub\oplus C=1\oplus 1=0$

② 无符号：$X = 0x7E = (0111\ 1110)_2 \Rightarrow$ 真值 $x = 126$

$Y = 0x5D = (0101\ 1101)_2 \Rightarrow$ 真值 $y = 93$.

$x+y = 126+93 = 219 < 256$ 正常

$X+Y = 0111\ 1110 + 0101\ 1101 = (0)1101\ 1011$

$CF = sub \oplus C = 0 \oplus 0 = 0$, $SF = 1$

$OF = 1$

$x-y = 126-93 = 33 > 0$.

$x-y = 0111\ 1110 + \underbrace{(-0101\ 1101)}_{=1010\ 0011} = (1)\ 0010\ 0001$

$CF = sub \oplus C = 1 \oplus 1 = 0$ $SF = 0$ $OF = 0$ (加法器中进行的是两个异号数相加，那么结果一定不会发生溢出)

带符号：$X = 0x7E = (0111\ 1110)_2 \Rightarrow x = 126$. $Y = 0x5D = (0101\ 1101)_2 \Rightarrow y = 93$

~~带符号~~：$126+93 = 219 > 2^{8-1} = 128$ 正溢出 $x+y = 129-256 = -37$

$X+Y = 1101\ 1011 = -101\ 1011$

$CF = sub \oplus C = 0 \oplus 0 = 0$ $SF = 1$ $OF = 1$

~~$x-y$~~：$x-y = 126-93 = 33$.

$X-Y = 0111\ 1110 + (-0101\ 1101) = (1)\ 0010\ 0001$

$CF = sub \oplus C = 1 \oplus 1 = 0$ $SF = 0$. $OF = 0$.