1. (i) $(1100001)_2 - (101010)_2 = (110111)_2$

(ii) $(110101)_2 + (1001011)_2 = (10000000)_2$

(iii) $(1111)_2 - (1001)_2 = (110)_2$

2. (i) $(24.4)_{10} = (11000.01100110)_2$

(ii) $(1101.01)_2 = (13.25)_{10}$

(iii) $(C6)_{16} = (198)_{10}$

3. (i) $(126)_{10} - (67)_{10}$

$(126)_{10} = (01111110)_2$

$(67)_{10} = (01000011)_2$

01000011	------ +67
10111100	------ 1's complement
+ 1	------ 1 added
10111101	------ 2's complement

$(-67)_{10} = (10111101)_2$

Therefore , the subtraction 126 – 67 can be replaced by the addition of 126 + (- 67).

$$
\begin{array}{r}
01111110 \\
+10111101 \\
\hline
100111011
\end{array}
$$

Since the bit number is 8, the 9th digit resulting from the carry is ignored.

Ans. $(111011)_2$ or $(59)_{10}$

(ii) $(58)_{10} - (127)_{10} = (198)_{10}$

$(58)_{10} = (111010)_2$

$(127)_{10} = (1111111)_2$

```
 01111111        ------- +127
 10000000        ------- 1's complement
+       1        ------- 1 added
-----------
 10000001        ------- 2's complement
```

$(-127)_{10} = (10000001)_2$

Therefore , the subtraction 58 - 127 can be replaced by the addition of 58 + (- 127).

```
   10000001
 + 00111010
 -----------
   10111011      -------- the result is negative.
         -1
 -----------
   10111010      -------- 1 subtracted
   01000101      -------- All the "0" and "1" bits of the original bit string
                          are switched.
```

Ans. $(10111011)_2$ or $(-69)_{10}$