Assignment-03

-17 mod 23

$$23)-17(-1$$
$$-23$$
$$\overline{6}$$

$-17 = (-1 \times 23) + 6$

$-17 \bmod 23 = 6$

Multiplicative Inverse of -13 mod 23

The multiplicative inverse of a number a mod m is a number x such that:

$$a_x \equiv 1 \bmod m$$

In outcase, we are looking for a number x such that:

$$-13x \equiv 1 \bmod 23$$

To simplifying, we first convert -13 into a ~~position~~ ~~-13~~ ~~position~~ positive equivalent module 23.

$-13 \bmod 23 = -13 + 23 = 10$

So, the equation become 3:

$$10x \equiv 1 \bmod 23$$

if $x=1$, $10\times1 = 10 \not\equiv 1 \bmod 23$

if $x=2$, $10\times2 = 20 \not\equiv 1 \bmod 23$

if $x=3$, $10\times3 = 30 \not\equiv 7 \bmod 23$

if $x=4$, $10\times4 = 40 \equiv 17 \bmod 23$

if $x=5$, $10\times5 = 50 \equiv 4 \bmod 23$

if $x=6$, $10\times6 = 60 \equiv 14 \bmod 23$

if $x=7$, $10\times7 = 70 \equiv 1 \bmod 23$

~~if~~ we found it: $10\times7 = 70 \equiv 1 \bmod 23$

since $-13 \equiv 10 \bmod 23$ and $10^{-1} \bmod 23 = 7$

We conclude,

The multiplicant inverse of $-13 \bmod 23$ is 7