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- 17 mod 23:

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

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

$$\therefore -17 \bmod 23 = 6$$

Multiplicative Inverse of -13 mod 23:

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

$$ax \equiv 1 \bmod m$$

In our case, we are looking for a number x. such that:

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

To simplify, we first convert -13 into a positive equivalent modulo 23:

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

So, the equivale equation becomes:

$$10x \equiv 1 \mod 23$$

Now, we find the integer x such that

$$10x \equiv 1 \mod 23$$

If $x = 1$, $10 \times 1 \equiv 10 \not\equiv 1 \mod 23$

If $x = 2$, $10 \times 2 = 20 \not\equiv 1 \mod 23$

If $x = 3$, $10 \times 3 = 30 \equiv 7 \mod 23$

If $x = 4$, $10 \times 4 = 40 \equiv 17 \mod 23$

we found it : $10 \cdot 7 = 70 \equiv 1 \mod 23$.

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

we conclude -

The multiplicative inverse of $-13 \mod 23$ is 7.