→ Modulo Multiplicative Inverse:

Modulo Multiplicative Inverse of a number N, under modulo P is defined to be a number X such that

$$N * X \equiv 1 \pmod{P}$$

Modulo multiplicative inverse of 5, under modulo 7 is 3 since

$$5 * 3 \equiv 1 \pmod{7}$$

$$(6/2) \%5 = ((6\%5) * (3\%5)) \%5$$
$$= (1 * 3) \%5$$
$$= 3\%5 = 3$$

Q) Do all the numbers have modulo inverse?

NO ↓ 12 has no modulo inverse under modulo 6. Ex:

Imp. Modulo inverse of N, under modulo P exist iff $\gcd(N, P) = 1$.

There are 2 ways to calculate modulo inverse efficiently Using,

1) Fermet's little Theorm
2) Extended Euclidean Theorm

1) Fermet's little Theorm:

$$a^{m-2} = a^{-1} \pmod{m}$$