

$$U(12)$$

$$U(n) = \{x ; \gcd(x, n) = 1\}$$

$$U(12) = \{1, 5, 7, 11\}$$

Now $(U(12), \cdot_{12})$ is a group

$$\because 1^1 = 1 \Rightarrow o(1) = 1$$

1 is an identity element hence by definition of ~~element~~ of ~~an~~ or order of an element

$$15 \quad 1^1 = 1 \Rightarrow o(1) = 1$$

$$5^2 = 25 \equiv 1 \pmod{12}$$

$$\Rightarrow 5^2 \equiv 1 \pmod{12}$$

$$\Rightarrow o(5) = 2$$

$$\begin{array}{r} \cdot 2 \\ 12 \overline{) 25} \\ \underline{24} \\ 1 \end{array} \quad \text{--- remainder}$$

Now $7^1 = 7$

$$7^2 = 49 \equiv 1 \pmod{12}$$

$$\Rightarrow o(7) = 2$$

Now

$$11^1 = 11$$

$$11^2 = 121 \equiv 1 \pmod{12}$$

$$\Rightarrow o(11) = 2$$

So $o(1) = 1$ and $o(5) = o(7) = o(11) = 2$