

# Number and Sum of factors

By [BrushMyQuant](#)



YouTube Video Link to this Post is [Here](#)

Following is covered in the video

- ▣ How to find Number of Factors of a number.
- ▣ Solved Problems: Number of Factors
- ▣ How to find Sum of Factors of a number.
- ▣ Solved Problems: Sum of Factors

## How to find Number of Factors of a number.

**To find number of factors of a number we need to write the number as product of power of prime number and add one to the powers and multiply the powers.**

Example : Find the number of factors of 72.

$$\text{Sol: } 72 = 2^3 * 3^2$$

$$\Rightarrow \text{Number of factors of } 72 = (3+1) * (2+1) = 4 * 3 = 12$$

We can list down the factors as

- 1 \* 72
- 2 \* 36
- 3 \* 24
- 4 \* 18
- 6 \* 12
- 8 \* 9

## Solved Problems: Number of Factors

Q1 : Find number of factors of 100 and list the factors?

$$\text{Sol: } 100 = 2^2 * 5^2$$

$$\Rightarrow \text{Number of factors of } 100 = (2+1) * (2+1) = 3 * 3 = 9$$

We can list down the factors as

- 1 \* 100
- 2 \* 50
- 4 \* 25
- 5 \* 20
- 10 \* 10

Q2 : Find number of factors of 8?

$$\text{Sol: } 8 = 2^3$$

$$\Rightarrow \text{Number of factors of } 8 = (3+1) = 4$$

We can list down the factors as 1, 2, 4, 8

## How to find Sum of Factors of a number

Sum of factors of an integer  $n$ , where  $n = p^a q^b r^c$  ( $p, q, r$  being prime number) is given by

$$(p^{a+1} - 1) (q^{b+1} - 1) (r^{c+1} - 1)$$

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$$(p-1) (q-1) (r-1)$$

## Solved Problems: Sum of Factors

Q1 : Find the sum of Factors of 60.

$$\text{Sol: } 60 = 2^2 \cdot 3^1 \cdot 5^1$$

$$\text{Sum of factors of } 60 = \frac{(2^{2+1} - 1) (3^{1+1} - 1) (5^{1+1} - 1)}{(2-1) \cdot (3-1) \cdot (5-1)} = \frac{7 \cdot 8 \cdot 24}{1 \cdot 2 \cdot 4} = 168$$

Hope it helps!  
Good Luck!