

Foundation Batch

MATHS

Number System factors (गुणनखंड)

Part-01

LIVE 24-02-2024 07:00PM



MATHS Foundation Batch



SUNDAY SPECIAL

TOP 50 QUESTIONS

- Classification of Numbers
- Unit Digit
- Factors

LIVE

25-02-2024

09:00 AM

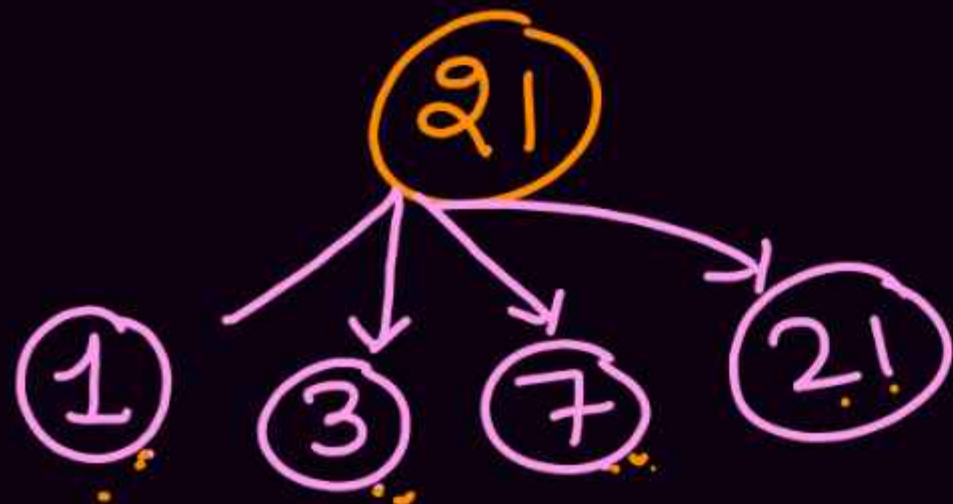


Deepak Bhati Sir
(SSC CGL-2019 Selected)

Factors - (3)

गुणनखण्ड

- ① No. of factor (गुणनखंडों की संख्या)
- ② No. of even factors (सम गुणनखंडों की संख्या)
- ③ No. of odd factors (विषम गुणनखंडों की संख्या)
- ④ Sum of factors (गुणनखंडों का योग)
- ⑤ Sum of even factors (सम गुणनखंडों का योग)
- ⑥ Sum of odd factors (विषम गुणनखंडों का योग)
- ⑦ Prime factors $\rightarrow$ अभाज्य गुणनखंड



Total = 4

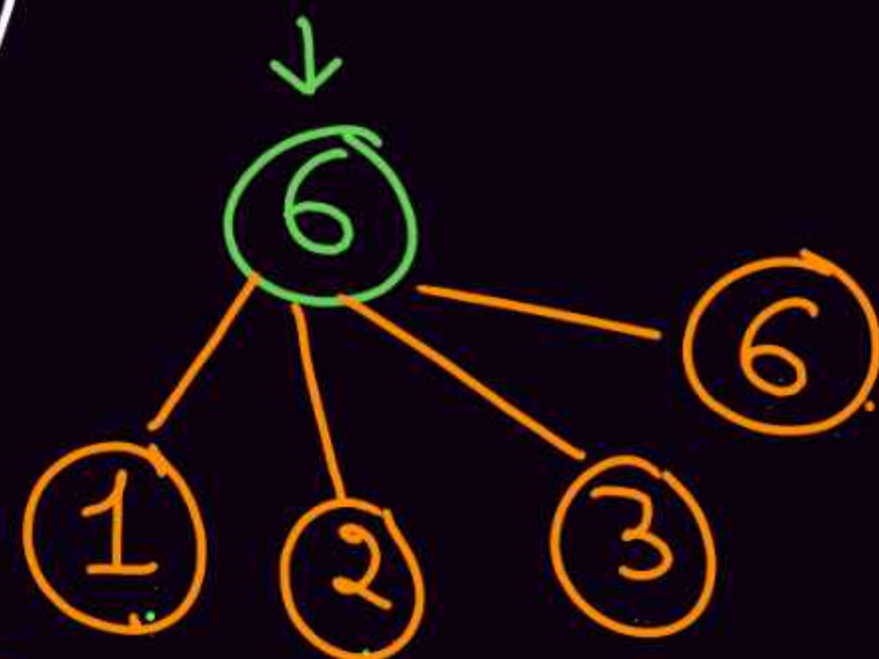
even/सम = 0

odd/विषम = 4



प्रत्येक संख्या का
गुणनखंड

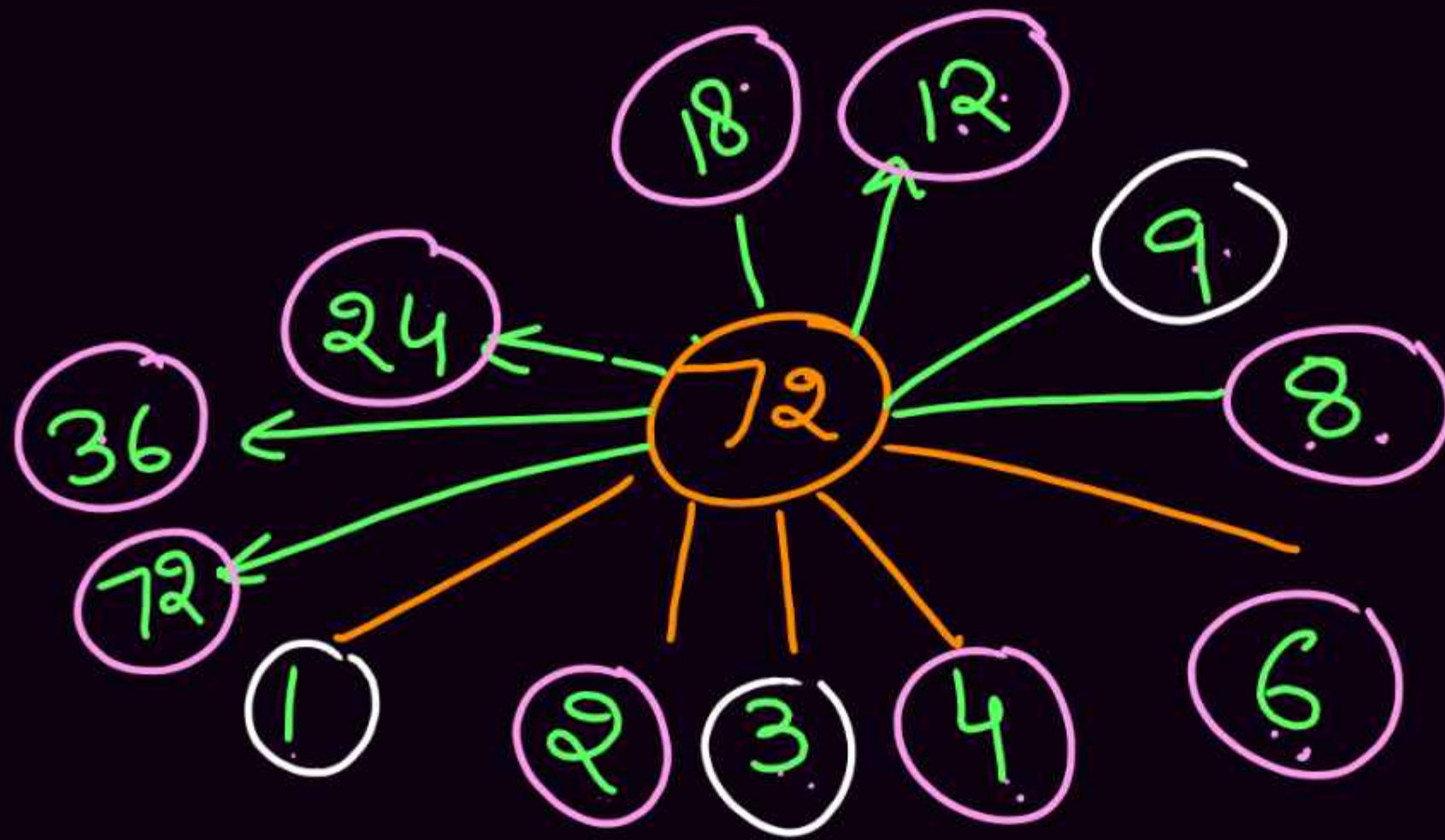
Factor
(गुणनखंड)



Total = 4

सम/even → 2

विषम/odd → 2



Total = 12

સમ/even = 9

વિષમ/odd = 3

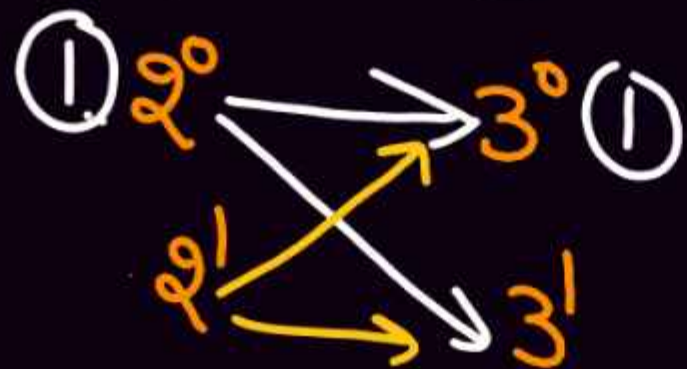
$a \rightarrow$ base
 $b \rightarrow$ power

$$\begin{array}{r|l} 2 & 6 \\ 3 & 3 \\ \hline & 1 \end{array}$$

$$6 = 2^1 \times 3^1$$

$$\boxed{2^0 = 1}$$

$$(\text{any number})^0 = 1$$



$$1, 3, 2, 6$$

$$12 = 2^2 \times 3^1$$

$$\left[\begin{array}{l} 2^2 \leftarrow 2^0 \\ 2^1 \\ 3^1 \end{array} \right]$$

$$3 \times 2 = 6$$

$$\begin{array}{r|l} 2 & 12 \\ 2 & 6 \\ 3 & 3 \\ \hline & 1 \end{array}$$

$$12$$

$$12 = 2^2 \times 3^1$$

① 2^0 → 3^0 ①
 2^1 → 3^1
 $4 = 2^2$ → 3^1

$$1, 3, 2, 6, 4, 12$$

$a^p \times b^q \times c^r \Rightarrow$ જાદો $a, b, c =$ પ્રિમ
અભાજ્ય

No. of factors
ગુણકોની સંખ્યા $= (p+1) \times (q+1) \times (r+1)$

$$(3+1) \times (2+1) \times (2+1)$$

$$4 \times 3 \times 3 = \underline{\underline{36}}$$

Any whole No.

किसी पूर्ण संख्या = 2^m
even

$$\begin{array}{r|l} 2 & 450 \\ \hline 3 & 225 \\ \hline 3 & 75 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\underline{\underline{2^3 \times 3^2 \times 5^2}}$$

$$1000 = 2^3 \times 5^3$$

$$1800$$

$$18 \times 100$$

$$2 \times 9 \quad \downarrow$$

$$2^1 \times 3^2 \times 2^2 \times 5^2$$

$$\underline{\underline{2^3 \times 3^2 \times 5^2}}$$

$$1800 = 2^3 \times 3^2 \times 5^2$$

$$(2 \times) (2^2 \times 3^2 \times 5^2)$$

↓↓

Total ગુણિતકરક =

$$(2+1) \times (2+1) \times (2+1)$$

$$3 \times 3 \times 3 = (27)$$

7200

↓
72 × 100

↓ ↓
8 × 9 2² × 5²
↓ ↓
2³ × 3² × 2² × 5²

2⁵ × 3² × 5²

સામે factors = 2 × (2⁴ × 3² × 5²)

(4+1) × (2+1) × (2+1)
5 × 3 × 3 = 45

2⁶ = 64

64000

↓
64 × 1000

↓ ↓
2⁶ × 2³ × 5³

2⁹ × 5³

સામે ગુણનસ્વંડ = 2 × (2⁸ × 5³)
(8+1) × (3+1)
9 × 4 = 36

$$\cancel{2^3} \times 3^2 \times 5^2$$

વિષમ ગુણાંકવર્ગ
odd factors = $(2+1) \times (2+1)$
 $3 \times 3 = 9$

$$3^2 \times 5^2$$

સમ ગુણાંકવર્ગ = 0

2	144
2	72
2	36
2	18
3	9
3	3
	1

$2^4 \times 3^2$

144

16×9

$2^4 \times 3^2$

$$144 = 2^4 \times 3^2$$

Total $\rightarrow (4+1) \times (2+1)$

$5 \times 3 = 15$

सम/even = $2 \times (2^3 \times 3^2)$

$(3+1) \times (2+1)$

$4 \times 3 = 12$

विषम/odd $\rightarrow 2^4 \times 3^2$

$(2+1) = 3$



$$\begin{array}{c} 4 \times 10 \\ \downarrow \quad \downarrow \\ 2^2 \times 2^1 \times 5^1 \end{array}$$

$$2^3 \times 5^1$$

$$(3+1) \times (1+1)$$

$$4 \times 2 = 8$$

$$\text{सम} = 2 \times (2^2 \times 5^1)$$

$$(2+1) \times (1+1)$$

$$3 \times 2 = 6$$

1. How many positive factors are there of 40?

40 के धनात्मक गुणखंड कितने हैं?

(a) 6

(b) 5

(c) 8

(d) 10

$$\text{Odd} = \cancel{2^3} \times 5^1$$

विषम

$$(1+1) = 2$$



$$\begin{array}{r|l} 2 & 288 \\ 2 & 144 \\ 2 & 72 \\ 2 & 36 \\ 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$$

$$= 2^5 \times 3^2$$

$$(5+1) \times (2+1)$$

$$6 \times 3 = 18$$

2. How many positive factors does 288

have?

288 के कितने धनात्मक गुणनखंड हैं?

(a) 18

(b) 15

(c) 10

(d) 16

$$2^5 \times 3^2$$

$$\begin{array}{c} 2^5 \times 144 \\ \swarrow \searrow \\ 16 \times 9 \\ \downarrow \quad \downarrow \\ 2^4 \quad 3^2 \end{array}$$



1000

$$2^3 \times 5^3$$

$$(3+1) \times (3+1)$$

$$4 \times 4 = 16$$

$$16 - 2 = 14$$

3. What is the number of divisors of 1000 (excluding 1 and 1000)?

1000 के विभाजक की संख्या क्या है (1 और 1000 को छोड़कर)?

(a) 12

(b) 13

☒ (c) 14

☐ (d) 16



$$\begin{array}{r|l} 3 & 105 \\ 5 & 35 \\ 7 & 7 \\ & 1 \end{array}$$

$$\underline{3}^1 \times \underline{5}^1 \times \underline{7}^1$$

$$(1+1) \times (1+1) \times (1+1)$$

$$2 \times 2 \times 2$$

$$(8)$$

4. What is the number of factors of

105?

105 के गुणखंडों की संख्या क्या है?

1. 3

2. 4

3. 6

~~4. 8~~

$$\begin{array}{l} 105 \\ \wedge \\ 15 \times 7 \\ \wedge \\ 3 \times 5 \\ 3 \times 5 \times 7 \end{array}$$



$$\begin{array}{l} 360 \\ \swarrow \quad \searrow \\ 36 \times 10 \\ \swarrow \quad \searrow \quad \downarrow \\ 4 \times 9 \quad 2 \times 5 \\ \downarrow \quad \downarrow \\ 2^2 \times 3^2 \times 2^1 \times 5 \\ 2^3 \times 3^2 \times 5^1 \end{array}$$

$$(3+1) \times (2+1) \times (1+1)$$

$$4 \times 3 \times 2 = 24$$

5. What is the number of divisors of 360?

360 के भाजक की संख्या कितनी है?

(a) 12

(b) 18

(c) 24

(d) None of these



$$325$$

$$25 \times 13$$

$$\downarrow$$
$$5^2 \times 13^1$$

$$\begin{array}{r|l} 5 & 325 \\ \hline 5 & 65 \\ \hline 13 & 5 \\ \hline & 1 \end{array}$$

$$5^2 \times 13^1$$

$$(2+1) \times (1+1)$$

$$3 \times 2 = 6$$

6. How many positive factors are there in 325?

325 के कितने धनात्मक गुणनखंड हैं?

(1) 6

(2) 8

(3) 12

(4) 9



$$\begin{array}{c} 648 \times 10 \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 8 \times 81 \quad 2 \times 5 \\ \downarrow \quad \downarrow \\ 2^3 \times 3^4 \times 2^1 \times 5^1 \end{array}$$

$$2^4 \times 3^4 \times 5^1$$

$$(4+1) \times (4+1) \times (1+1)$$

$$5 \times 5 \times 2$$

$$= 50$$

7. How many total factors can be there of 6480?

6480 के कुल कितने गुणनखण्ड हो सकते हैं?

(a) 50

(b) 55

(c) 52

(d) 51



2	12288
2	6144
2	3072
2	1536
2	768
2	384
2	192
2	96
2	48
2	24
2	12
2	6
2	3
1	1

8. How many factors will the number 12288 have?

12288 संख्या के कितने गुणनखंड होंगे?

$$2^{12} \times 3^1 \quad (1) \ 22$$
$$(12+1) \times (1+1) \quad (2) \ 24$$
$$13 \times 2 = 26 \quad (3) \ 28$$
$$(4) \ 26$$

$$16 \times 768$$
$$4 \times 192$$
$$16 \times 12$$
$$16 \times 4 \times 16 \times 12$$
$$2^4 \times 2^2 \times 2^4 \times 2^2 \times 3$$



$$480$$

$$48 \times 10$$

$$\begin{array}{c} \downarrow \quad \downarrow \\ 16 \times 3 \quad 2 \times 5 \end{array}$$

$$\begin{array}{c} \downarrow \\ 2^4 \times 3^1 \times 2^1 \times 5 \end{array}$$

$$2^5 \times 3^1 \times 5^1$$

$$(5+1) \times (1+1) \times (1+1)$$

$$6 \times 2 \times 2$$

$$= 24$$

9. Find the total number of factors of the number 480.

संख्या 480 के गुणनखंडों की कुल संख्या ज्ञात कीजिए।

1. 12

2. 24

3. 48

4. 36

$$\begin{array}{r|l} 2 & 480 \\ \hline 2 & 240 \\ \hline 2 & 120 \\ \hline 2 & 60 \\ \hline 2 & 30 \\ \hline 3 & 10 \\ \hline 5 & 2 \\ \hline & 1 \end{array}$$



10. Which one of the following has least number of divisors?

निम्नलिखित में से किसमें भाजक की संख्या सबसे कम है?

(a) 88

(b) 91

(c) 96

(d) 99