

Number of factors/divisors (गुणखंडो/भाजकों की संख्या)

$$\begin{array}{r} 7 \overline{) 48} \quad (6 \\ \underline{42} \\ 6 \end{array}$$

$$\begin{array}{r} 6 \overline{) 48} \quad (8 \\ \underline{48} \\ 0 \end{array}$$

$\boxed{48}$ $\begin{matrix} \times \\ 7 \\ 6 \end{matrix}$ \checkmark

1, 48, 2, 3, 4, ..., 12

coaching center

Number of factors (भाजकों की संख्या) :

$$180 = 2^2 \times 3^2 \times 5^1$$

$\downarrow +1$ $\downarrow +1$ $\downarrow +1$

$$3 \times 3 \times 2 = 18$$

→ 1, 18 (included)

$$240 = 2^4 \times 3^1 \times 5^1$$
$$5 \times 2 \times 2 = 20$$

coaching center

$$180 = 2^2 \times 3^2 \times 5^1$$

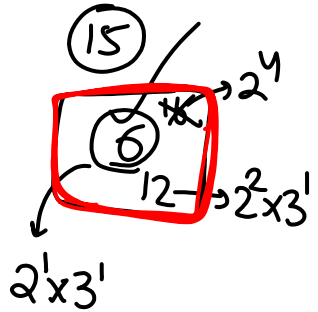
$$1 = 2^0 \times 3^0 \times 5^0 = 1$$

$$2^1 \times 3^2 \times 5^0$$

$$= 2 \times 9 \times 1 = 18$$

2^0	3^0	5^0
2^1	3^1	5^1
2^2	3^2	

$$18 = 3 \times 3 \times 2$$



coaching center

Find the total no. of factors of

$$380 = 2^2 \times 5^1 \times 19^1 \rightarrow 2 \times 3 \times 2 = 12$$

$$720 = 2^4 \times 3^2 \times 5^1 \rightarrow 5 \times 3 \times 2 = 30$$

$$460 = 2^2 \times 5^1 \times 23^1 \rightarrow 2 \times 3 \times 2 = 12$$

$$8 \times 63 \leftarrow 504 = 2^3 \times 3^2 \times 7^1 \rightarrow 3 \times 2 \times 4 = 24$$

$$480 = 2^5 \times 3^1 \times 5^1 \rightarrow 6 \times 2 \times 2 = 24$$

coaching center

$$3600 = 3^2 \times 2^4 \times 5^2 \quad \text{Total} = 45$$

$$\begin{array}{ccc}
 3^0 & 2^0 \times & 5^0 \\
 3^1 & 2^1 & 5^1 \\
 3^2 & 2^2 & 5^2 \\
 & 2^3 & \\
 & 2^4 &
 \end{array}$$

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

$$21 = 3 \times 7$$

$$42 = 3 \times 7 \times 2$$

$$\text{nof (even)} = 3 \times 4 \times 3 = 36$$

The total no. of factors of 3600, which are

even	
odd	
Multiple of 6	
Ending with 0	
prime	
composite	
Ending with 5	
Perfect square	
Perfect cube	

coaching

$$\begin{aligned} \text{nof(odd)} &= \text{Total} - \text{even} \\ &= 45 - 36 = 9 \end{aligned}$$

Odd \rightarrow 2 नाही

$$\text{nof(odd)} = 3 \times 1 \times 3 = 9$$

$$\begin{aligned} 3600 &= 3^2 \times 2^4 \times 5^2 \\ &\swarrow \quad \downarrow \quad \searrow \\ &3^0 \quad 2^0 \quad 5^0 \\ &\swarrow \quad \downarrow \quad \searrow \\ &3^1 \quad 2^1 \quad 5^1 \\ &\swarrow \quad \downarrow \quad \searrow \\ &3^2 \quad 2^2 \times 2^3 \times 2^4 \quad 5^2 \end{aligned}$$

coaching center

$$\text{nof (multiple of 6)} = 2 \times 4 \times 3 = 24$$

at least $2^1 \times 3^1$

$$3600 = 3^2 \times 2^4 \times 5^2$$

$$\begin{array}{l} \times 3^0 \quad \times 2^0 \quad 5^0 \\ \swarrow 3^1 \quad \swarrow 2^1 \quad 5^1 \\ \swarrow 3^2 \quad \swarrow 2^2 \quad 5^2 \\ \quad \quad \quad \swarrow 2^3 \\ \quad \quad \quad \swarrow 2^4 \end{array}$$

coaching center

$$\text{nof (ending with 0)} = 3 \times 4 \times 2 = 24$$

↓
10 से divisible

$$10 = 2^1 \times 5^1$$

$$3600 = 3^2 \times 2^4 \times 5^2$$

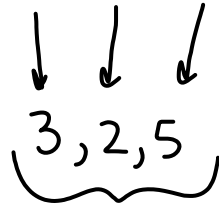
3 ⁰	2 ⁰ x	5 ⁰ x
3 ¹	2 ¹	5 ¹ ✓
3 ²	2 ²	5 ² ✓
3 ³	2 ³	
3 ⁴	2 ⁴	

coaching center

$$\text{nof (Prime)} = 3$$

$$3 \times 3 = \textcircled{9} \times$$

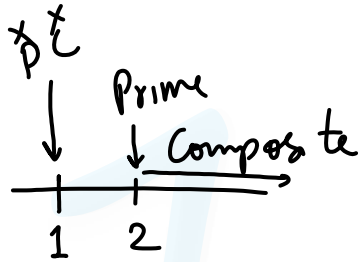
$$3600 = 3^2 \times 2^4 \times 5^2$$



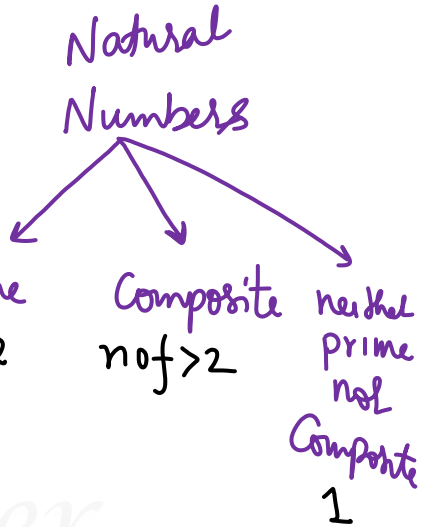
3

coaching center

nof (Composite) = 41
संयुक्त



3
1, 3



$$\begin{aligned} \text{Total} - (\text{Prime} + 1) \\ = 45 - (3 + 1) \\ = 41 \end{aligned}$$

coaching center

$$\text{nof (ending with 5)} = 3 \times 1 \times 2 = 6$$

✓ ✓
5 × 2 → end with 0

✓ ×
5 × 2 → end with 5

+1

$$3600 = 3^2 \times 2^4 \times 5^2$$

✓ 2⁰ 5⁰ ×
× 2¹ 5¹ ✓
× 2² 5² ✓
× 2³
× 2⁴

coaching center

$$\text{no of (Perfect square)} = 2 \times 3 \times 2 = 12$$

$$N = a^p \times b^q \times c^r$$

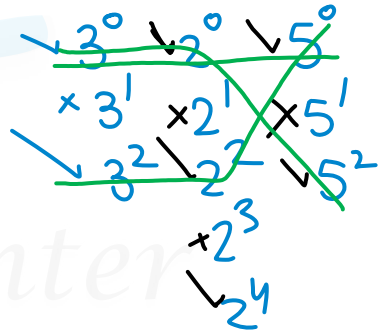
even

$$N_1 = 3^0 \times 2^0 \times 5^2 = 25$$

$$N_2 = 3^0 \times 2^0 \times 5^0 = 1$$

$$N_3 = 3^2 \times 2^2 \times 5^0 = \text{○}$$

$$3600 = 3^2 \times 2^4 \times 5^2$$



no of (Perfect Cube) = 2 ← multiple of 3

$$N = a^p \times b^q \times c^r$$

$$1 \times 2 \times 1 = 2$$

$$3600 = 3^2 \times 2^4 \times 5^2$$

$$\begin{array}{l} \checkmark 3^0 \quad 2^0 \checkmark \quad 5^0 \\ \times 3^1 \quad 2^1 \quad 5^1 \\ \times 3^2 \quad 2^2 \quad 5^2 \\ \quad \quad 2^3 \checkmark \\ \quad \quad 2^4 \end{array}$$

coaching center

Short methods:

$$\text{nof (even)} = \text{total factors of } \left(\frac{3600}{2} \right) = 1800 =$$

\downarrow
2 \nmid div.

$$\text{nof (div by 4)} = \text{total factors of } \left(\frac{3600}{4} \right) = 900 =$$

$$\text{nof (div. by 6)} = \text{ " " " " } \left(\frac{3600}{6} \right) = 600 =$$

nof (odd) = Ignore 2 & tell total factors

$$3600 = 3^2 \times 2^4 \times 5^2$$

\downarrow \downarrow \downarrow
+1 +1 +1
 $3 \times 3 = 9$

Short for Perfect Square

$$3600 = 3^2 \times 2^4 \times 5^2$$

$$2 \overline{) 2} \textcircled{1}$$
$$\underline{2}$$
$$0$$

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

$$2 \overline{) 4} (2 \text{ -}$$
$$\underline{4}$$
$$0$$

2 से divide करें
quotient निकालें, &
+1 करें multiply
(Ignore remainder)

coaching center

Perfect Cube

$$3600 = 3^2 \times 2^4 \times 5^2$$

$$\begin{array}{r} 3 \overline{) 41} \\ \underline{3} \\ 10 \end{array}$$

$$\begin{array}{c} \downarrow \\ \text{---} \\ \downarrow +1 \\ \textcircled{2} \end{array}$$

$$N = 2^7 \times 3^{17} \times 5^{14} \times 7^2$$

$$\begin{aligned} \text{No. of (Square)} &= 3 \times 8 \times 7 \times 1 \\ &= 4 \times 9 \times 8 \times 2 = \checkmark \end{aligned}$$

$$\begin{aligned} \text{No. of (cube)} &= 2 \times 5 \times 4 \\ &= 3 \times 6 \times 5 = 90 \end{aligned}$$

coaching center

Important points:

- Every numbers has $+ve$ and $-ve$ factors.
- Total number of factors of perfect squares are always odd in number.
- All numbers ~~on~~ ⁱⁿ the form $(prime)^2$ have 3 factors.

$$6 = 1, 2, 3, 6, \boxed{-1, -2, -3, -6}$$

$$N = a^2$$

↓ +1

$$n\ of = 3$$

SSCX

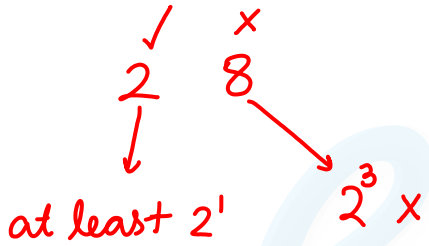
$$5^2 = 25 \quad (1, 5, 25)$$
$$7^2 = 49$$
$$11^2 = 121$$

even

$$N = a^p \times b^q \times c^r$$

↓ +1 ↓ +1 ↓ +1

$$Odd = Odd \times Odd \times Odd$$



91. How many even factors of 1008 are not divisible by 8?

1008 के कितने सम गुणखंड 8 से विभाज्य नहीं हैं?

- a) 16 ~~b) 12~~ c) 18 d) 24

8×126

$2 \times 3 \times 2 \times 6 = 12$

$= 2^4 \times 3^2 \times 7^1$

- $\times 2^0$
- \downarrow
- $\times 2^1$
- \downarrow
- $\times 2^2$
- \downarrow
- $\times 2^3$
- \downarrow
- $\times 2^4$

coaching center

$$\begin{array}{c} \checkmark \\ 6 \\ \downarrow \\ 2^1 \times 3^1 \end{array}$$

$$\begin{array}{c} \times \\ 9 \\ 3^2 \times \end{array}$$

q2. How many factors of 1080 are divisible by 6 but not by 9? $27 \times 4 \times 10$

1080 के कितने गुणखण्ड (फैक्टर) ऐसे हैं जो 6 से तो विभाजित हो जाते हैं पर 9 से नहीं ?

a) 24

b) 12

c) 6

d) 4

$$\begin{array}{r} 2^3 \times 3^3 \times 5^1 \\ \times 2^0 \times 3^0 \\ \checkmark 2^1 \quad \checkmark 3^1 \\ \checkmark 2^2 \quad \times 3^2 \\ \checkmark 2^3 \\ \hline 3 \times 1 \times 2 = 6 \end{array} \quad \begin{array}{c} \downarrow +1 \end{array}$$

$$6 \checkmark$$

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

$$8 \times$$

$$\downarrow$$

$$2^3$$

93. Find the number of factors of 480, which are divisible by 6 but not by 8? $16 \times 3 \times 10$

480 के कितने गुणखंड हैं जो 6 से विभाजित होते हैं परन्तु 8 से नहीं।

a) 2

~~b) 4~~

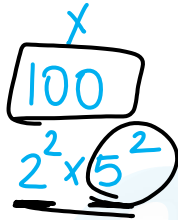
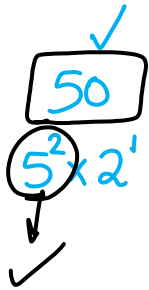
c) 8

d) 16

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

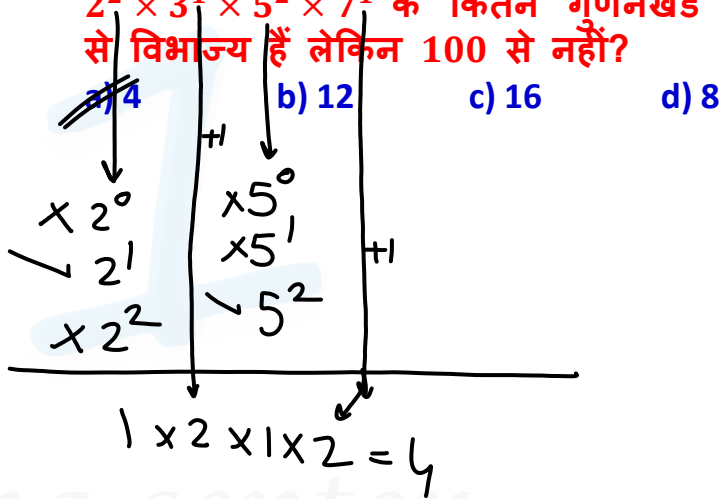
$$\begin{array}{r} \times 2^0 \quad 3^0 \times \\ \swarrow \quad \swarrow \\ 2^1 \quad 3^1 \checkmark \\ \swarrow \quad \swarrow \\ 2^2 \quad 3^2 \\ \times 2^3 \\ \times \end{array}$$

$$2 \times 1 \times 2 = 4$$



q4. How many factors of $2^2 \times 3^1 \times 5^2 \times 7^1$ are divisible by 50 but not by 100?

$2^2 \times 3^1 \times 5^2 \times 7^1$ के कितने गुणखंड 50 से विभाज्य हैं लेकिन 100 से नहीं?



coaching center

95. How many factors of 7200 are perfect squares?

7200 के कितने गुणखण्ड पूर्ण वर्ग हैं ?

a) 6

b) 8

~~c) 12~~

d) 16

8×9

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

$$\begin{array}{ccc} 2 & 1 & 1 \\ \downarrow & \downarrow & \downarrow \end{array}$$

$$3 \times 2 \times 2 = 12$$

coaching center

$$N = a^p \times b^q \times c^r$$

3rd div

Q6. How many factors of 10368 are perfect cubes?

10368 के कितने गुणखण्ड पूर्ण घन हैं ?

a) 4

b) 6

c) 8

d) 9

$$8 \times 1296$$
$$= 36 \times 36$$

$$2^7 \times 3^4$$

$$2, 1$$
$$\downarrow \quad \downarrow$$
$$3 \times 2 = 6$$

coaching center

$$N = (3^2)^9 = 3^{18}$$

$$3 \overline{) 18} \begin{array}{r} 6 \\ 18 \\ \hline \end{array}$$

An arrow points from the '6' in the division to the '6' in the expression 3^{18} .
 Below the '6' is a '7' with a '+1' next to it, indicating the next integer to check.

47. If $N = 9^9$ then N is divisible by how many positive perfect cubes?

यदि $N = 9^9$ है, तो n, कितने धनात्मक घनो से विभाज्ये है?

- a) 6
- b) 7
- c) 4
- d) 5

coaching center