ETHNUS ™

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Number of Factors, Factorial

Number of a factor

Factors of a number are defined as numbers or algebraic expressions that divide a given number/expression evenly. We can also say, factors are the numbers which are multiplied to get another number. For example, 1, 3 and 9 are the factors of 9, because 1 × 9 = 9 and 3 × 3 = 9. Here, the concepts of factors are explained which will help to understand how to find the factors and know the prime factors of some common digits. Here we will discuss finding factors, formulas to find the number of factors, product and sum of factors.

Find the number of factors of

A. 20
B. 9
C. 4
D. 12

Answer: A

Step 1: Get prime factors of a number say 240

$240 = 2^4 * 3^1 * 5^1$

Step 2: Number of factors of a number.

Number of factors = $(4+1) * (1+1) * (1+1) = 5*2*2 = 20$

Thus the powers of the numbers are increased by one and multiplied.

Find the number of factors of 40 ?

- A. 17
- B. 18
- C. 7
- D. 8

Answer: D

Step 1: Get prime factors of a number say 40

40 = 2^3 * 5^1

Step 2: Number of factors of a number.

Number of factors = (3+1) * (1+1) = 4*2 =8

Thus the powers of the numbers are increased by one and multiplied

Find the number of factors of 620 ?

A. 11
B. 12
C. 13
D. 14

Answer: B

Step 1: Get prime factors of a number say 620

620 = 2^2 * 5^1*31^1

Step 2: Number of factors of a number.

Number of factors = (2+1) * (1+1) * (1+1) = 3*2*2 =12

Thus the powers of the numbers are increased by one and multiplied

Find the sum of factors of 240 ?

A. 450
B. 744
C. 480
D. 800

Answer:B

Calculate the sum of factors of a number:

Step 1: Get prime factors of a number say 240

   $240 = 2^4 * 3^1 * 5^1$

Step 2: Sum of factors formula is

   $240 = (2^0 + 2^1 + 2^2 + 2^3 + 2^4) * (3^0 + 3^1)*(5^0 + 5^1)$

Step: $31*4*6 = 744$

Find the sum of factors of 124 ?

A. 217
B. 224
C. 192
D. 204

Answer: B

Calculate the sum of factors of a number:

Step 1: Get prime factors of a number say 124

$124 = 2^2 * 31^1$

Step 2: Sum of factors formula is

$240 = (2^0 + 2^1 + 2^2) * (31^0 + 31^1)$

Step 3: 7* 32 = 224

Find the number of even factors of 240?

A. 20
B. 16
C. 4
D. 8

Answer: A

Step 1: Get prime factors of a number say 240

240 = $2^4 * 3^1 * 5^1$

Step 2: Number of Even factors formula is

240= (4) * (1+1)*(1+1) = 4*2*2 =16

Thus the powers of the numbers are increased by one and multiplied except 2.

Find the Sum of even factors of 240?

A. 120
B. 720
C. 480
D. 240

Answer: B

Step 1: Get prime factors of a number say 240

$240 = 2^4 * 3^1 * 5^1$

Step 2: Sum of Even factors formula is

$240 = (2^1 + 2^2 + 2^3 + 2^4) * (3^0 + 3^1)*(5^0 + 5^1)$

Step: 30*4*6 = 720

Find the number of odd factors of 240?

A. 5
B. 4
C. 3
D. 2

Answer:B

Step 1: Get prime factors of a number say 240

240 = 2^4 * 3^1 * 5^1

Step 2: Number of odd factors formula is

240= (2^0) * (3^1)*(5^1) = 1*(1+1)*(1+1) =1*2*2 =4

Thus the powers of the numbers are increased by one and multiplied except 2.

Find the Sum of odd factors of 240?

A. 24
B. 124
C. 90
D. 150

Answer: A

Step 1: Get prime factors of a number say 240

240 = 2^4 * 3^1 * 5^1

Step 2: Sum of Odd factors formula is

240= (2^0) * (3^0 + 3^1)*(5^0 + 5^1)

Step: 1*4*6 = 24

Find the number of zeros in a 127! ?

A. 25
B. 5
C. 1
D. 31

Answer: D

Find zeros in 127! = [127 / 5] + [127 / 5^2] + [127 / 5^3] + [127 / 5^4] ...

= 25 + 5 + 1 + 0 = 31

Remember that we ignore decimal values so after 3rd equation remaining terms are all 0's

Find the number of zeros in a 50! ?

A. 24
B. 15
C. 12
D. 30

Answer: C

Find zeros in 50! = [50 / 5] + [50 / 5^2] + [50 / 5^3] + [50 / 5^4] ...

= 10 + 2 +0= 12

Remember that we ignore decimal values so after 2nd equation remaining terms are all 0's

Find the highest power of 3 in 100 !

   A. 47
   B. 48
   C. 49
   D. 50

Answer: B

100! = [100/3] + [100/9] + [100/27] + [100/81] + [100/243]+......
= 33 + 11 +3 +1
=48

Find the highest power of 5 in 100 !

A. 20
B. 24
C. 28
D. 32

Answer: B

100! = [100/5] + [100/25] + [100/125] + [100/5^4] + [100/5^5]+......

= 20 + 4 +0

=24

Find the highest power of 15 in 127! ?

A. 30
B. 60
C. 61
D. 31

Answer: D

Step 1: Select a number and use the formula

Find highest power of 15 in 127! but 15 is composite so prime factors are 3 * 5.

Step 2: Find highest power of each prime factor.

Find highest power of 3 in 127! = [127 / 3] + [127 / 3^2] + [127 /3^3] + [127 / 3^4] + [127 / 3^5] + ...

= 42 + 14 + 4 + 1 = 61

Find highest power of 5 in 127! = [127 / 5] + [127 / 52] + [127 / 53] + [127 / 54] ...

= 25 + 5 + 1 + 0 = 31

Choose the lesser of both values and that is the answer = 31

Find the highest power of 12 in 100! ?

A. 48
B. 96
C. 24
D. 12

Answer: A

12 = $2^2 \times 3$

Find the highest power of 2^2 and 3 in 100!

First, find out the highest power of 2.

100/2= 50; 50/2= 25; 25/2= 12; 12/2= 6;6/2= 3; 3/2= 1

Highest power of 2 = 50 + 25 + 12 + 6 + 3 + 1 = 97

So highest power of 22=97/2= 48 (out of 97 2's only 48 can make 22)

Now for the highest power of 3,

100/3= 33; 33/3= 11; 11/3= 3; 3/3= 1

 So, highest power of 3 = 48

Also, Highest power of 12 = 48

THANK YOU