# Multiples and Factors Questions



## MCQ Question 1

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**Find the sum of the factors of 3240**

1. 10890
2. 11000
3. 10800
4. 10190

**Answer** (Detailed Solution Below)

Option 1 : 10890

**Multiples and Factors MCQ Question 1 Detailed Solution**

**Given:**

3240

**Concept:**

If $k = a^x \times b^y$, then

a, and b must be prime number

Sum of all factors = $(a^0 + a^1 + a^2 + ..... + a^x)\ (b^0 + b^1 + b^2 + ..... + b^y)$

**Solution:**

$3240 = 2^3 \times 3^4 \times 5^1$

Sum of factors = $(2^0 + 2^1 + 2^2 + 2^3)\ (3^0 + 3^1 + 3^2 + 3^3 + 3^4)\ (5^0 + 5^1)$

$\Rightarrow (1 + 2 + 4 + 8)\ (1 + 3 + 9 + 27 + 81)\ (1 + 5)$

$\Rightarrow 15 \times 121 \times 6$

$\Rightarrow 10890$

**∴ required sum is 10890**



MCQ Question 2 View this Question Online >

**If a number is in the form of $8^{10} \times 9^7 \times 7^8$, find the total number of prime factors of the given number.**

1. 52
2. 560
3. 3360
4. 25

**Answer** (Detailed Solution Below)

Option 1 : 52

**Multiples and Factors MCQ Question 2 Detailed Solution**

**Given:**

The number is $8^{10} \times 9^7 \times 7^8$

**Concept used:**

If a number of the form $x^a \times y^b \times z^c$ ..... and so on, then total prime factors = a + b + c ..... and so on

Where x, y, z, ... are prime numbers

**Calculation:**

The number $8^{10} \times 9^7 \times 7^8$ can be written as $(2^3)^{10} \times (3^2)^7 \times 7^8$

The number can ve written as $2^{30} \times 3^{14} \times 7^8$

Total number of prime factors = 30 + 14 + 8

**∴ The total number of prime factors are 52**

**MCQ Question 3** View this Question Online >

**Find how many odd factors are there in the number 1240.**

1. 2
2. 4
3. 5
4. 16

**Answer** (Detailed Solution Below)

Option 2 : 4

**Multiples and Factors MCQ Question 3 Detailed Solution**

**Given:**

number 1240

**Formula used:**

Odd factors of $p^a \times q^b = (a+1)(b+1)$,

Where p and q should be odd prime numbers

**Calculation:**

Factor of 1240 = $2^3 \times 5^1 \times (31)^1$

$\Rightarrow$ Odd number are $5^1 \times (31)^1$

$\Rightarrow$ Odd factors of $p^a \times q^b$

$\Rightarrow (a+1)(b+1)$

$\Rightarrow (1 + 1)(1 + 1) = 4$

$\therefore$ 1240 has 4 odd factors



**MCQ Question 4**

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**The sum of all the factors of 100 is**

1. 115
2. 216
3. 217
4. 223

**Answer** (Detailed Solution Below)

Option 3 : 217

**Multiples and Factors MCQ Question 4 Detailed Solution**

**Given:**

Number = 100

**Formula Used:**

The sum of all the factors of $a^m \times b^n$ is $(a^0 + a^1 + ..... + a^m) \times (b^0 + b^1 + ..... + b^n)$

**Calculation:**

Factors of 100 = $2^2 \times 5^2$

Factors of $100 = 2^2 \times 5^2$

Sum of factors = $(2^0 + 2^1 + 2^2) \times (5^0 + 5^1 + 5^2)$

$\Rightarrow (1 + 2 + 4) \times (1 + 5 + 25)$

$\Rightarrow 7 \times 31$

$\Rightarrow 217$

**∴ The sum of all factors of 100 is 217.**



**MCQ Question 5**

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**Find total number of odd factors of 360.**

1. 6
2. 9
3. 4
4. 7

**Answer** (Detailed Solution Below)

Option 1 : 6

**Multiples and Factors MCQ Question 5 Detailed Solution**

**Given:**

Number = 360

**Concept Used:**

$x = a^m \times b^n$

where a, b → Odd numbers

Odd factors = $(m + 1) \times (n + 1)$

**Calculations:**

Prime factors of 360 = $2^3 \times 3^2 \times 5^1$

Odd factors = $(1 + 2) \times (1 + 1) = 6$

**∴ The total number of odd factors of 360 is 6**



## MCQ Question 6

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**Find the sum of the factors of 10800**

1. 38440
2. 38000
3. 39000
4. 36440

**Answer** (Detailed Solution Below)

Option 1 : 38440

**Multiples and Factors MCQ Question 6 Detailed Solution**

**Given:**

10800

**Concept used:**

If $k = a^x \times b^y$, then

Sum of all factors = $(a^0 + a^1 + a^2 + ..... + a^x)(b^0 + b^1 + b^2 + ..... + b^y)$

**Solution:**

$10800 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5$

$\Rightarrow 10800 = 2^4 \times 3^3 \times 5^2$

Sum of all factors = $(2^0 + 2^1 + 2^2 + 2^3 + 2^4)(3^0 + 3^1 + 3^2 + 3^3)(5^0 + 5^1 + 5^2)$

$\Rightarrow (1 + 2 + 4 + 8 + 16)(1 + 3 + 9 + 27)(1 + 5 + 25)$

$\Rightarrow 31 \times 40 \times 31$

$\Rightarrow 38440$

**∴ required sum is 38440**



## MCQ Question 7

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

1. 12
2. 24
3. 48
4. 36

**Answer** (Detailed Solution Below)

Option 2 : 24

**Multiples and Factors MCQ Question 7 Detailed Solution**

**Given:**

The number is 480.

**Formula Used:**

If Prime Factorisation of a number N = $a^p \times b^q \times c^r \times .....$

Then, Total number of factors of N = $(p + 1) \times (q + 1) \times (r + 1) \times .....$

**Calculation:**

Here,

Prime Factorisation of 480 = $2^5 \times 3^1 \times 5^1$

So, Total number of factors = $(5 + 1) \times (1 + 1) \times (1 + 1)$

$\Rightarrow 6 \times 2 \times 2$

$\Rightarrow 24$

**∴ The total number of factors of 480 is 24.**



**MCQ Question 8** View this Question Online >

**How many factors of 8820 are perfect squares?**

1. 8

2. 5

3. 6

4. 7

**Answer** (Detailed Solution Below)

Option 1 : 8

**Multiples and Factors MCQ Question 8 Detailed Solution**

We can write the prime factorization of 8820 as-

$\Rightarrow 8820 = 2^2 \times 3^2 \times 7^2 \times 5$

Now, this is clear that 1, 4, 9, 49 are **four** factors that are a perfect square.

But we can make more perfect square factors by the combination of 4, 9, and 49.

$\Rightarrow$ there are 4 more possible combinations i.e. $4 \times 9 = 36\ (6^2)$,

$9 \times 49 = 441\ (21^2)$

$49 \times 4 = 196\ (14^2)$,

and one more combination is $4 \times 9 \times 49 = 1764$ whose square root is 42

$\therefore$ **There are 8 perfect square factors of 8820.**

## Alternate Method

For a factor to be a square it needs to have an even number of powers of each of the prime factors

$8820 = 2^2 \times 3^2 \times 7^2 \times 5$

Let $8820 = 2^a \times 3^b \times 7^c \times 5^d$

Now a can take values 0 and 2 i.e 2 values

b can take values 0 and 2 i.e 2 values

c can take values 0 and 2 i.e 2 values

d can take value 0 i.e 1 value

Hence total number of perfect squares = $2 \times 2 \times 2 \times 1 = 8$

why do we need to multiply here?
All the square factors occur when we take combinations of exponents from the four sets sets - {0,2,}, {0,2}, {0,2} and {0}. hence the rule of multiplication is applied here for counting

**MCQ Question 9**

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**Which of the following numbers will have an even number of factors?**

1. 1600
2. 52900
3. 30000
4. 36100

**Answer** (Detailed Solution Below)

Option 3 : 30000

**Multiples and Factors MCQ Question 9 Detailed Solution**

**Concept used:**

We know when a number is a perfect square if it has an odd number of factors.

For example, 25 is a perfect square then it has an odd number of factors that is 1,5,25.

No of factors = 3 (odd value)

**Calculation:**

As we know,

1600, 52900 and 36100 are perfect square.

So, these have an odd number of factors.

30000 is not a perfect square so it has an even number of factors.

$\Rightarrow 1600 = 5^2 \times 2^6$

Total no of factors = $(2 + 1) \times (6 + 1) = 21$ (odd value)

$\Rightarrow 52900 = 23^2 \times 2^2 \times 5^2$ )

Total no of factors = $(2 + 1) \times (2 + 1) \times (2 + 1) = 27$ (odd value)

$\Rightarrow 30000 = 5^4 \times 2^4 \times 3$

Total no of factors = $(4 + 1) \times (4 + 1) \times (1 + 1) = 50$ (even value)

$\Rightarrow 36100 = 19^2 \times 2^2 \times 5^2$

Total no of factors = $(2 + 1) \times (2 + 1) \times (2 + 1) = 27$ (odd value)

∴ The correct answer is **30000**.



**MCQ Question 10** View this Question Online >

**The expression $2x^3 + x^2 - 2x - 1$ is divisible by**

1. 2x + 3
2. 2x + 1
3. 2x - 3
4. 2x – 1

**Answer** (Detailed Solution Below)

Option 2 : 2x + 1

**Multiples and Factors MCQ Question 10 Detailed Solution**

$2x^3 + x^2 - 2x - 1$

$\Rightarrow x^2(2x + 1) - (2x + 1)$

$\Rightarrow (2x + 1)(x^2 - 1)$

$\therefore$ The expression $2x^3 + x^2 - 2x - 1$ is divisible by $(2x + 1)$