# SHIKSHA CLASSES

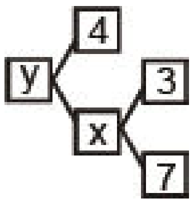
**Sub. : Maths.** | **Answer Paper** | **Total Marks : 30**

**Std. X (CBSE)** | **1 : Real Number.**

**Section : A (Each 1 Mark)**

**Multiple choice Questions (MCQs).**

**Q.1 : The values of x and y in the given figure are:**




**Ans :** b) $x = 21; y = 84$

**Q.2 : What is the greatest possible speed at which a man can walk 52m and 91m in an exact number of minutes?**

**Ans :** c) 13 m/min

**Q.3 : If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x, y are prime numbers, then HCF (a, b) is**

**Ans :** b) $xy^2$

**Q.4 : Which of the following is not irrational ?**

**Ans :** c) $(3+\sqrt{7})(3-\sqrt{7})$

**Q.5 : The decimal expansion of the rational number $23/(2^2 \times 5)$ will terminate after**

**Ans :** b) two decimal places

**Q.6 : The multiplication of two irrational numbers is:**

**Ans :** c) Maybe rational or irrational

**Q.7 : Three farmers have 490 kg, 588 kg and 882 kg of wheat respectively. Find the maximum capacity of a bag so that the wheat can be packed in exact number of bags.**

**Ans :** a) 98 kg

**Q.8 : The LCM of two numbers is 1200. Which of the following cannot be their HCF?**

**Ans :** b) 500

**Q.9 : If $n = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of consecutive zeros in n, where n is a natural number, is**

**Ans :** b) 3

**For question number 10 to 11 two statements are given one labeled Assertion and other labeled Reason select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below**

**Q.10 : Assertion: the addition of rational number and irrational number is equal to irrational number.**

**Reason: the sum of irrational number and rational number is always rational number.**

**Ans :** c) Assertion is correct but reason is false

**Q.11 : Assertion: the largest number that divide 70 and125 which leaves remainder 5 and 8 is 13.**

**Reason: HCF (65, 117) = 13.**

**Ans :** a) both Assertion and reason are correct and reason is correct explanation for assertion

## Section : B (Each 2 Marks)

**Q.12 : Three alarm clock ring at an interval of 6, 15 and 20 minutes. If three rang together at 7 am, then after what time they ring together again?**

**Ans. :** since all the three clocks ring together, we have to find their LCM.

| | | | |
|---|---|---|---|
| 3 | 6 | 15 | 20 |
| 5 | 2 | 5 | 20 |
| 2 | 2 | 1 | 4 |
| 2 | 1 | 1 | 2 |
| | 1 | 1 | 1 |

$\text{LCM} = 3 \times 5 \times 2 \times 2 = 60$

LCM of 6, 15 and 20 = 60

Clock ring together after 60 minutes.

**Q.13 : Prove that $(p^2 - q^2)$ is composite number if it is given that p and q are odd prime numbers.**

**Ans. :** Let $p = 2m + 1$, $q = 2n + 1$, where m and n are natural numbers.

$$p^2 - q^2 = (p - q)(p + q)$$

But, $p - q = (2m + 1) - (2n + 1)$

$= 2m - 2n$

$\therefore \quad p - q = 2(m - n)$

$p + q = (2m + 1) + (2n + 1)$

$= 2m + 2n + 2$

$\therefore \quad p + q = 2(m + n + 1)$

Clearly, both factors of $p^2 - q^2$ are even i.e. none of the divisors $(p - q)$ and $(p + q)$ is equal to 1.

$\therefore \quad p^2 - q^2$ is a composite number.

**OR**

**Check whether (17 × 11 × 2 + 17 ×11 × 5) is a composite number or not?**

**Ans. :** $17 \times 11 \times 2 + 17 \times 11 \times 5$

$= 17 \times 11\ (2 + 5)$

$= 17 \times 11 \times 7$

Factorisation of the number contain more than one prime.

$\therefore$ The given number is composite.

## Section : C (Each 3 Marks)

**Q.14 : Prove that $\sqrt{3}$ is an irrational number.**

**Ans. :** Let us assume that $\sqrt{3}$ is rational.

$\therefore \quad \sqrt{3} = \frac{a}{b}$, where a and b are coprime and $b \neq 0$.

$\therefore \quad \sqrt{3}\, b = a$

$\therefore \quad 3b^2 = a^2$ --- squaring both sides

$\therefore \quad \frac{a^2}{3} = b^2$

$\therefore \quad$ 3 divides $a^2$

So, 3 shall divide a also ---(i)

Hence, we can say

$\frac{a}{3} = c$, where c is some integar

So, $a = 3c$

Now, we know that

$3b^2 = a^2$

Put $a = 3c$

$\therefore \quad 3b^2 = (3c)^2$

$\therefore \quad 3b^2 = 9c^2$

$\therefore \quad b^2 = \frac{9}{3}c^2$

$\therefore \quad b^2 = 3c^2$

$\therefore \quad c^2 = \frac{b^2}{3}$

Hence, 3 divides $b^2$.

So, 3 divides b also ---(ii)

By (i) and (ii)

3 divides a and b

$\therefore$ a and b have a factor 3

$\therefore$ a and b are not coprime.

Hence, our assumption is wrong

So by contradiction

$\sqrt{3}$ is irrational number.

**OR**

**Prove that $\sqrt{11}$ is an irrational number.**

**Ans. :** Let us assume that $\sqrt{11}$ is rational.

$\therefore \sqrt{11} = \frac{a}{b}$, where a and b are coprime and $b \neq 0$.

$\therefore \sqrt{11}\, b = a$

$\therefore 11b^2 = a^2$ --- squaring both sides

$\therefore \frac{a^2}{11} = b^2$

$\therefore$ 11 divides $a^2$

So, 11 divides a also ---(i)

Hence, we can say

$\frac{a}{11} = c$, where c is some integer

So, $a = 11c$

Now, we know that

$11b^2 = a^2$

Put $a = 11c$

$\therefore 11b^2 = (11c)^2$

$\therefore 11b^2 = 121c^2$

$\therefore b^2 = \frac{121}{11}c^2$

$\therefore b^2 = 11c^2$

$\therefore c^2 = \frac{b^2}{11}$

Hence, 11 divides $b^2$.

So, 11 divides b also ---(ii)

By (i) and (ii)

11 divides a and b

$\therefore$ a and b have factor 11

$\therefore$ a and b are not coprime.

Hence, our assumption is wrong

So by contradiction

$\sqrt{11}$ is irrational number.

**Q.15 : Check whether $14^n$ can end with digit zero for any natural n.**

**Ans. :** $14^n = (2 \times 7)^n = 2^n \times 7^n$

Prime factorisation of $14^n$ are 2 and 7. for $14^n$ to end in digit zero, prime factorisation of $14^n$ should cantain the prime 5.

$\therefore$ There is no natural number n for which $14^n$ ends with digit zero.

**Section - D(Each 5 Marks)**

**Q.16 : Three set of English, Hindi and Mathematics books have to be stacked in such a way that all the books are stored topic wise and the height of each stack is the same. The number of English books is 96. The number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books.**

**Ans. :** In order to arrange the books as required, we have to find the largest number that divides 96,240 and 336 exactly. Clearly, such a number is their HCF. we have

$96 = 2^5 \times 3$

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

$336 = 2^4 \times 3 \times 7$

$\therefore$ HCF(96, 240, 336) $= 2^4 \times 3 = 48$

So, there must be 48 books in each stack

$\therefore$ Number of stacks of English books

$= \frac{96}{48} = 2$

Number of stacks of Hindi books

$= \frac{240}{48} = 5$

Number of stacks of Mathematics

books $= \frac{336}{48} = 7$.

**OR**

**Prove that $\sqrt{2} + \sqrt{5}$ is irrational.**

**Ans.** : Let, if possible $\sqrt{2} + \sqrt{5}$ be a rational number say r.

Then $\sqrt{2} + \sqrt{5} = r$

squaring both sides

$(\sqrt{2} + \sqrt{5})^2 = r^2$

$\therefore \quad 2 + 5 + 2\left(\sqrt{2}\right)\left(\sqrt{5}\right) = r^2$

$\therefore \quad 7 + 2\sqrt{10} = r^2$

$\therefore \quad 2\sqrt{10} = r^2 - 7$

$\therefore \quad \sqrt{10} = \frac{r^2 - 7}{2}$

Now, r is rational

$\therefore$ $r^2$ is rational

$\therefore$ $\frac{r^2 - 7}{2}$ is also rational.

So, RHS is rational number but LHS is irrational number, which is a contradiction.

$\therefore$ Our assumption is wrong.

Hence, $\sqrt{2} + \sqrt{5}$ is irrational number.

**Section : E**

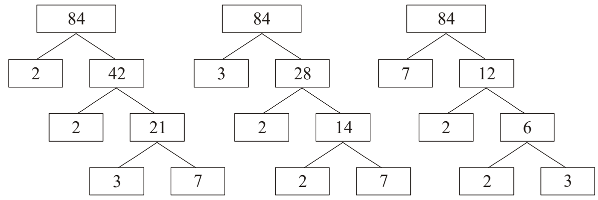
Q.17 : **Cast study :**

Let us consider two number 18 and 30 prime factors of 18 and 30 are

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

$30 = 2 \times 3 \times 5$

Let us take the example of prime factorisation of 84 in different orders

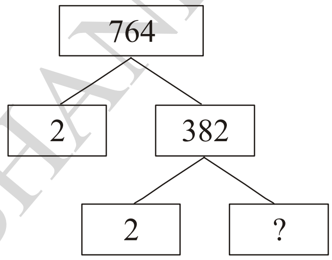



$84 = 2 \times 2 \times 3 \times 7 \qquad 84 = 3 \times 2 \times 2 \times 7 \qquad 84 = 7 \times 2 \times 2 \times 3$

Hence, we conclude that,

Every composite number can be expressed as a product of primes.

**i) Find the missing number in the factorisation given alongside.** 1




**Ans.** : Here, $382 = 2 \times ?$

$\Rightarrow \; ? = \frac{382}{2} = 191$

**ii) Find the LCM of numbers whose prime factorisation are expressible as** 1

**$2 \times 3 \times 5^2$ and $3^2 \times 7$.**

**Ans.** : LCM of number whose prime factorisation are expresible as $2 \times 3 \times 5^2$ and $3^2 \times 7$

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

$= 3150$.

**iii) Find the HCF of 31 and 37 by prime factorisation method.** 2

**Ans.** : Prime factorisaion of 31 and 37

$31 = 31 \times 1$

$37 = 37 \times 1$

So, HCF = 1.

**OR**

**Find the least number which when divided by 12, 24, and 30 leaves a remainder 7 in each case.**

**Ans. :** By prime factorisation

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

$24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$

$30 = 2 \times 3 \times 5 = 2 \times 3 \times 5$

So, LCM $= 2^3 \times 3 \times 5$

$= 120$

Hence. The least nmber which when divided by 12, 14 and 30 leaves a remainder 7 in each case

$= 120 + 7$

$= 127$

* * *


BECOME AN ACE IN JEE & NEET
SHIKSHA CLASSES
Believe & Achieve
JEE | NEET | Previse (8-10)
8625055707 | 8623085707
shikshaclasses.co.in
M-19, MHADA Colony, Khat Road, Bhandara
Learn with Jaiswal sir