



UDAAN

RITIK



2026

REAL NUMBERS

MATHS

LECTURE-3

BY-RITIK SIR



Topics

to be covered



✓ **A** Coprime numbers (Relatively Prime)

✓ **B** Relation between HCF and LCM of two numbers

✓ **C** Word Problems on HCF and LCM *→ next class.*

#GPK

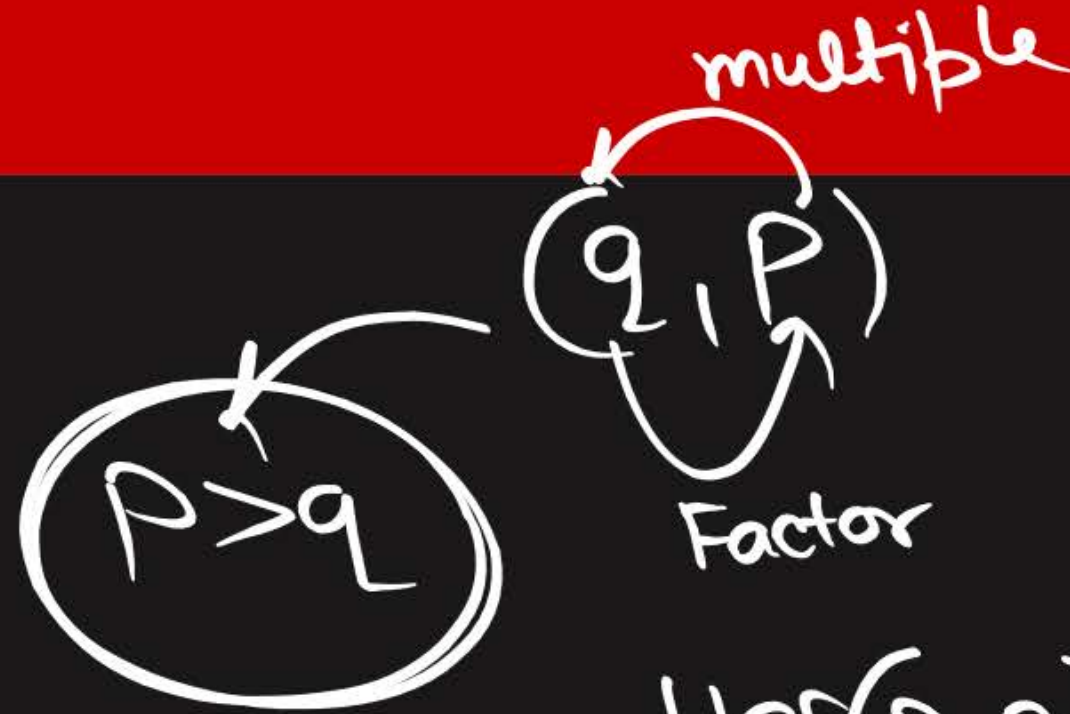
#Q. If 'p' and 'q' are natural numbers and 'p' is the multiple of 'q', then what is the HCF of 'p' and 'q'?

A pq

B p

☒ C q

D p + q



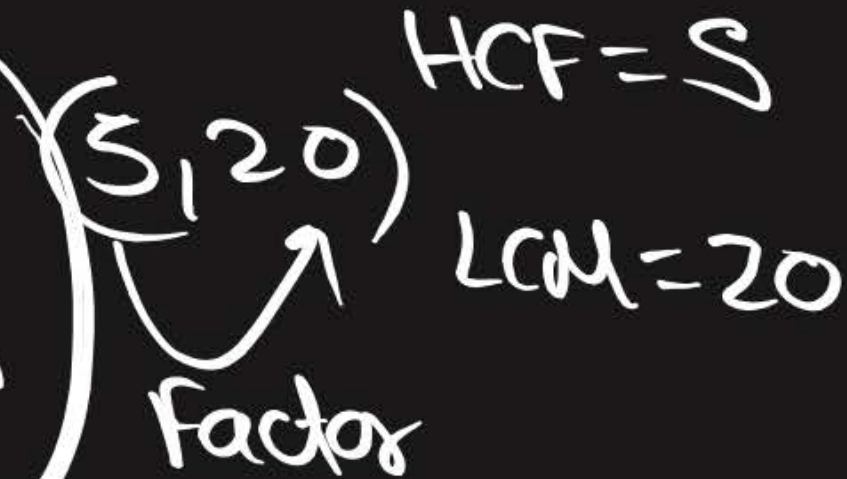
$$\text{HCF}(p, q) = q$$

$$\text{LCM}(p, q) = p$$



$$\text{HCF} = 2$$

$$\text{LCM} = 4$$



$$\text{HCF} = 5$$

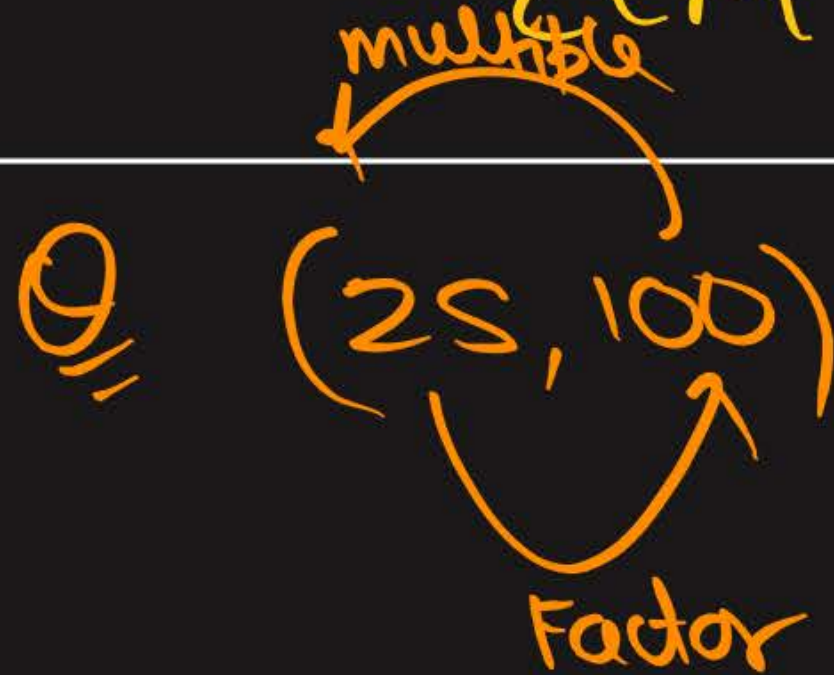
$$\text{LCM} = 20$$

Jabhi chota no., bade no. ka factor hai,

toh $HCF = \text{chota no.}$

$LCM = \text{bada no.}$

$(25, 100)$



$HCF = 25$

$LCM = 100$

$$25 \times 100 = 25 \times 100$$



Relation b/w HCF and LCM for two positive integers

For any two positive integers a and b

$$\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$$

(a, b)

$$\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$$

$\{1, 2, 3, 4, 5, \dots, \infty\}$

$\{\infty, \dots, -5, -4, -3, -2, -1\}$

0 → naahi
positive
naahi
negative.

#Q. Given that $\text{HCF}(306, 657) = 9$, find $\text{LCM}(306, 657)$

M.I

Prime factorisation

$\text{HCF} \times \text{LCM} = \text{product of two no.s.}$

$$9 \times \text{LCM} = 306 \times 657$$

$$\text{LCM} = \frac{306 \times 657}{9}$$

$$= 22338$$

#Q. The LCM and HCF of two numbers are 180 and 6 respectively. If one of the numbers is 30, find the other number.

$$\begin{aligned} \text{LCM}(a, b) &= 180 \\ \text{HCF}(a, b) &= 6 \end{aligned}$$

$$\begin{aligned} a &= 30 \\ b &= ? \end{aligned}$$

$$\text{Let } = a, b$$

$$b = 36$$

$$\text{HCF} \times \text{LCM} = a \times b$$

$$6 \times 180 = 30 \times b$$

$$\frac{6 \times 180}{30} = b$$

Q 144, 90

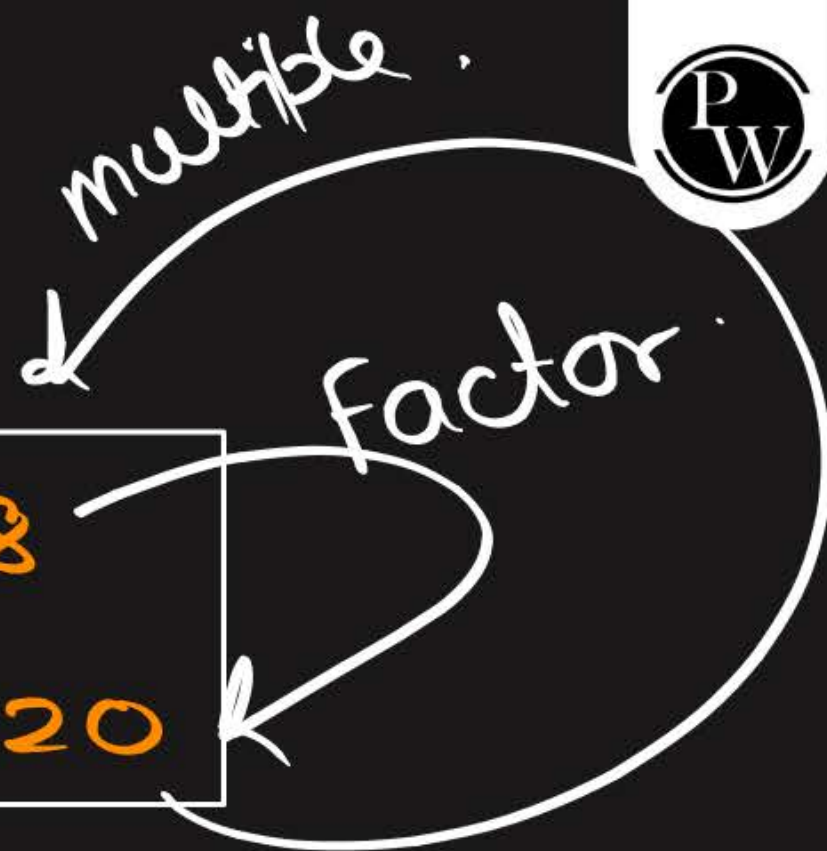
2	144	2	90
2	72	5	45
2	36	3	9
2	18	3	3
3	9		1
3	3		
	1		

$$144 = 2^4 \times 3^2 \times 5^0$$

$$90 = 2^1 \times 3^2 \times 5^1$$

$$\text{HCF} = 2^1 \times 3^2 \times 5^0 = 18$$

$$\text{LCM} = 2^4 \times 3^2 \times 5^1 = 720$$



#Q. Can two numbers have 16 as their HCF and 380 as their LCM? Give reason.

HCF = 16
LCM = 380

not a factor.

∴ No

HCF is always a factor of LCM.

LCM is a multiple of HCF.

#Q. If the LCM of two numbers is 3600, then which of the following numbers can HCF?

cannot be their

LCM = 3600

not a factor.

A 600 ✓

~~B 500~~

C 400 ✓

D 150 ✓

#Q. ^{True} Assertion (A): For two odd prime numbers x and y , ($x \neq y$), $\text{LCM}(2x, 4y) = 4xy$

^{True} Reason (R): $\text{LCM}(x, y)$ is a multiple of $\text{HCF}(x, y)$.

CBSE 2025

A Both A and R are true and R is correct explanation of A.

☒ **B** Both A and R are true and R is NOT the correct explanation of A.

C A is true, but R is false.

D A is false, but R is true.

1, 2, 3, 4, 5, 6, 7, 8, 9
 ↓ odd prime. ↓ odd prime. ↓
 (x, y)

$2x = 2^1 \times x^1 \times y^0$
 $4y = 2^2 \times y^1 \times x^0$
 $\text{LCM} = 2^2 \times x^1 \times y^1 = 4xy$
 two odd prime
 $\text{HCF} = 1$
 $\text{LCM} = xy$



Prime and Co-prime Numbers



2 no.s. (Relatively prime)

Note : 2 Prime Numbers hamesha Co-prime hote hain Lekin Co-prime numbrs zaruri nahi haiki prime ho.



8, 9 → coprime.



7, 12 → coprime.

3, 12 → not coprime.



2, 5 → coprime

HCF of coprime = 1

coprime no.s → 2 nos

#Q. If a and b are relatively prime numbers, then what is their HCF?

2

#Q. If a and b are relatively prime numbers, then what is their LCM?

coprime nos → 2 no's

ab

#Q. Two numbers are in the ratio 2 : 3 and their LCM is 180. what is the HCF of these numbers?

CBSE(2023)

Let the no.s be $2x$ and $3x$

$$\text{LCM}(2x, 3x) = 180$$

$$\text{HCF}(2x, 3x) = ?$$

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

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

$$\text{HCF} = 2^0 \times 3^0 \times x^1 = x$$

$$\text{LCM} = 2^1 \times 3^1 \times x^1 = 6x$$

$$\text{LCM} = 180$$

$$6x = 180$$

$$x = \frac{180}{6}$$

$$x = 30$$

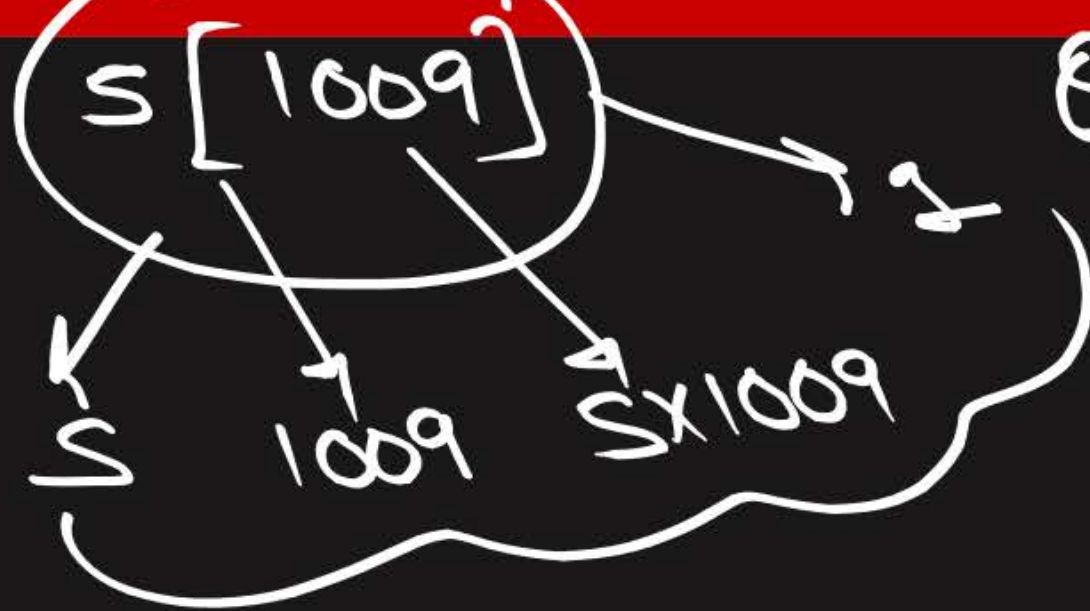
$$\therefore \text{HCF} = 30$$

#Q. Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

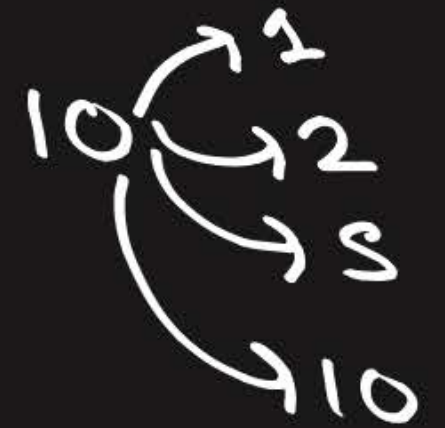
Let $x = 7 \times 11 \times 13 + 13$
 $x = 13[7 \times 11 + 1]$
 $x = 13[78]$

Clearly 'x' has more than 2 factors, \therefore composite no.

$$5[7 \times 6 \times 5 \times 4 \times 3 \times 2 + 1]$$



Q. prove 10 is a composite no.



Since 10 has more than 2 factors, \therefore 10 is a composite no.

#GPR

#Q. Explain why $3 \times 5 \times 7 + 7$ is a composite number.

#Q. Let x and y two distinct prime numbers and $p = x^2y^3$, $q = xy^4$, $r = x^5y^2$. Find the HCF and LCM of p , q and r .

Further check if $\text{HCF}(p, q, r) \times \text{LCM}(p, q, r) = p \times q \times r$ or not.

#GPK

$$\begin{aligned}\text{HCF} &= xy^2 \\ \text{LCM} &= x^5y^4\end{aligned}$$

$$xy^2 \times x^5y^4 = x^2y^3 \times xy^4 \times x^5y^2$$

$$x^6y^6 \neq x^8y^9$$

#Q. If the least prime factors of two positive integers a and b are 5 and 13 respectively, then the least prime factor of $a + b$, is _____.

#GPK

A 2

B 3

C 5

D 1

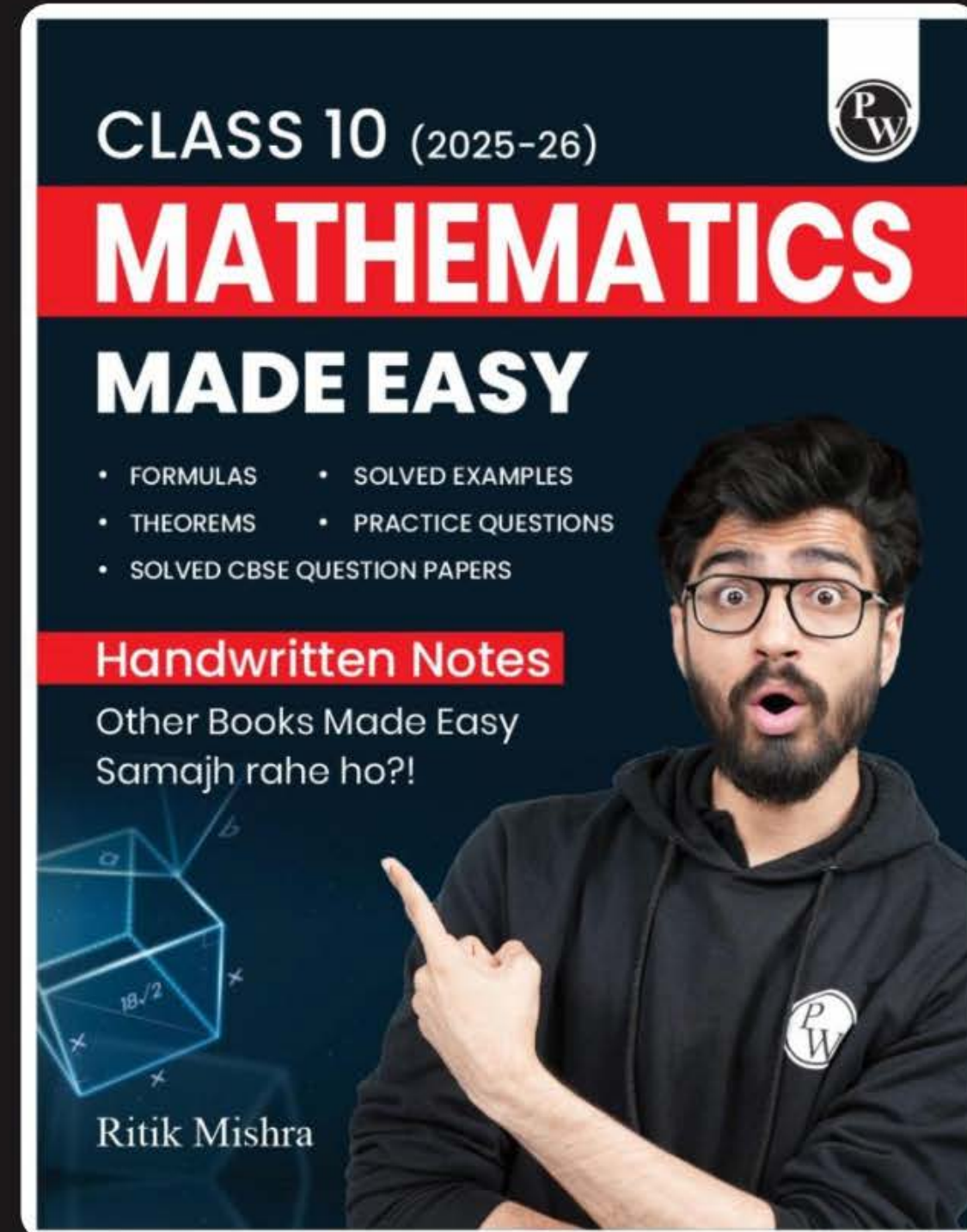
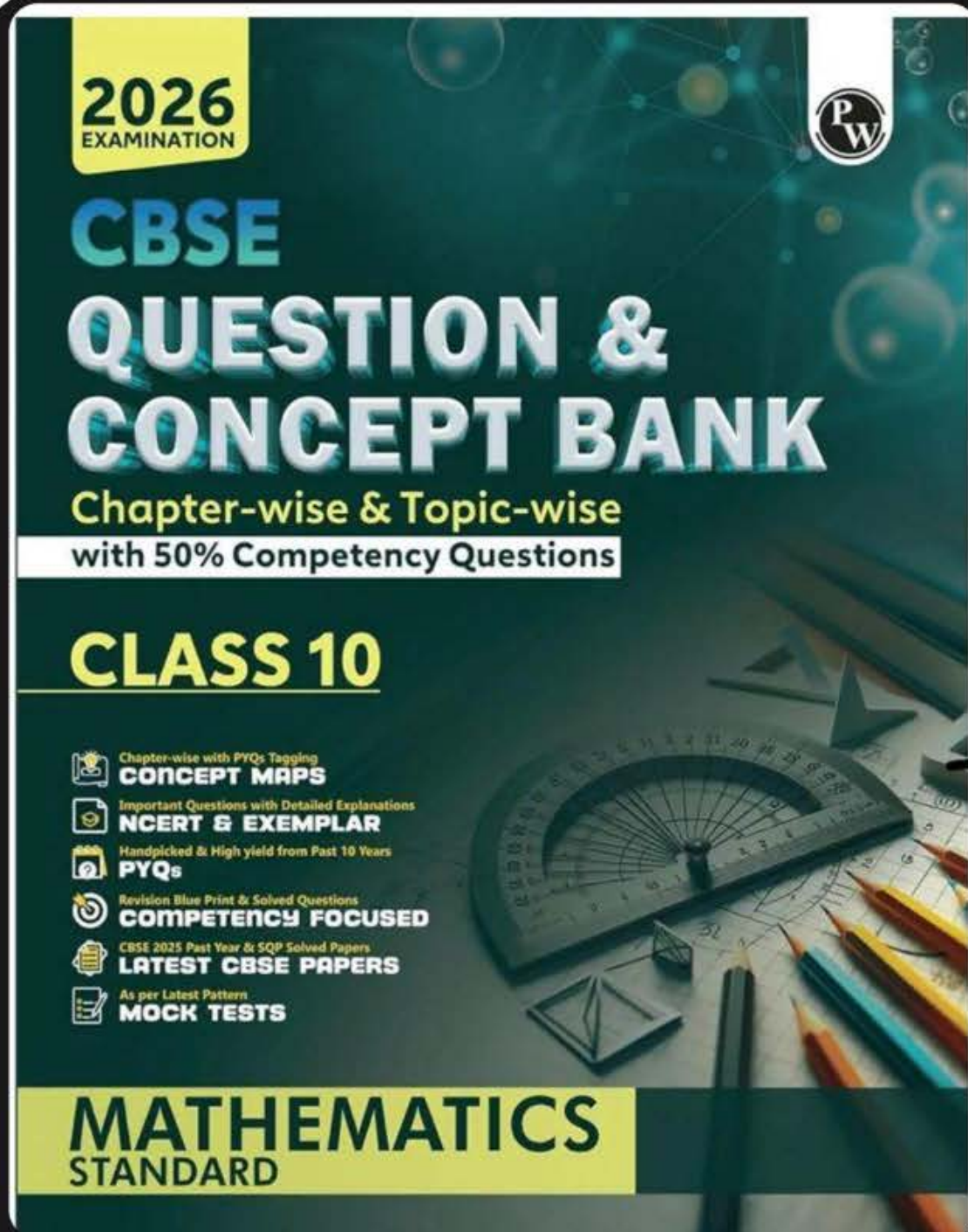
#GPR

#Q. Teaching Mathematics through activities is a powerful approach that enhances student's understanding and engagement. Keeping this a mind Ms. Mukta planned a prime number game for class 5 students. She announces the number 2 in her class and asked the first student to multiply it by a prime number and then pass it to second student. Second student also multiplied it by a prime number and passed it to third student. In this way by multiplying to a prime number, the last student got 173250.

Now, Mukta asked some questions as given below to the students:

- (i) What is the least prime number used by students?
- (ii) (a) How many students are in the class?
OR
(b) What is the highest prime number used by students?
- (iii) Which prime number has been used maximum times?

Next week





WORK HARD

DREAM BIG

NEVER GIVE UP



Thank
You