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REMAINDERS-1



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Agenda

- * What is Remainder
of Remainder
- * Remainder with Exponents

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Agenda

* What is Remainder

Rules of Remainder

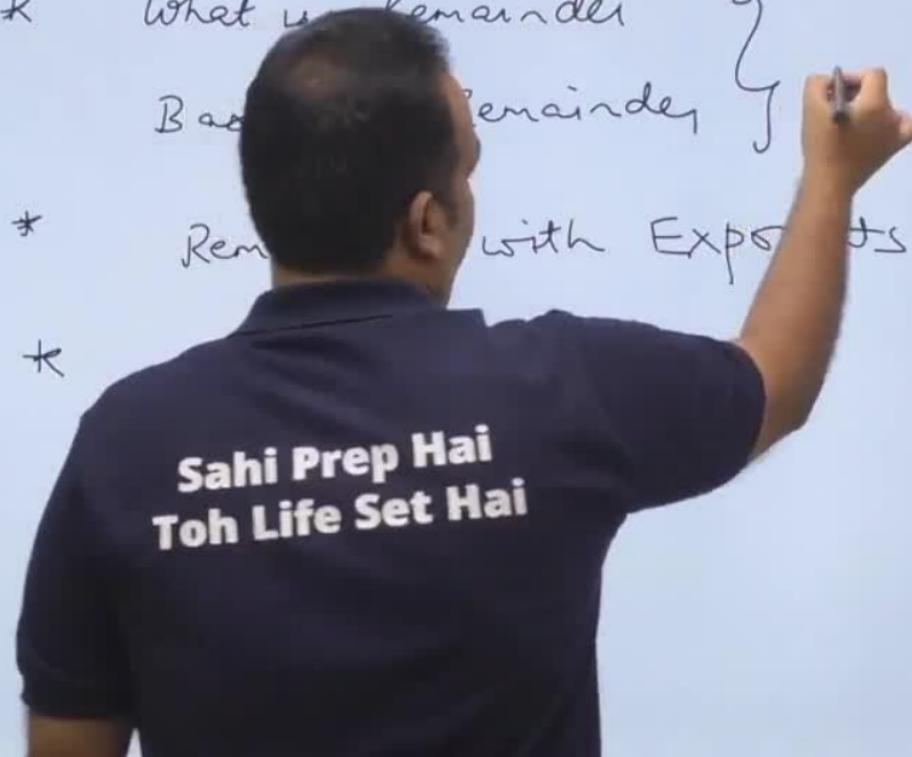
Remainder with Exponents

+ Theo

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Agenda

- * What is Remainder }
- * Basics of Remainder }
- * Remainder with Exponents
- *



Agenda

* What is Remainder 9
20 min

Basis of Remainder

* Remainder with Divisibility Tests → 40 min

* Fermat

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Agenda

- * What is Remainder

↳ Remainder } 20 min

- * Remainder with Exponents

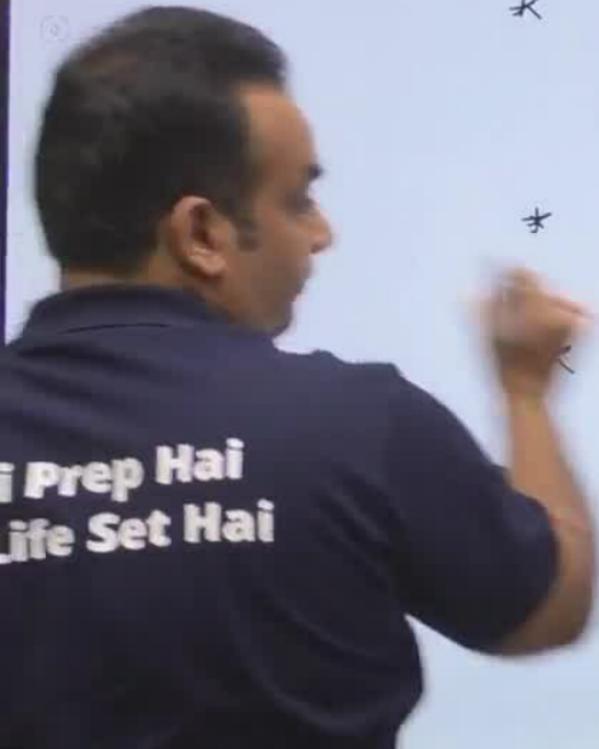
→ 40 min

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Agenda

* What is Remainder
Basis of Remainder } 20 min

* Remainder with Exponents → 40 min
Fermat Theorem



Agenda

- * What is Remainder {
 ↳ Basis of Remainder } $\frac{20\text{min}-25\text{min}}{}$
- * Remainder & Exponents $\rightarrow \frac{45\text{ min}}{}$
- * $\frac{\text{Remainder}}{ }$ $\rightarrow \frac{10\text{ min}}{}$
 $\frac{15\text{ m}}{ }$

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Agenda

- * What is Remainder }
Basis of Remainder } $\frac{20\text{min}-25\text{min}}{\underline{\underline{}}$

- * Remainder Exponents $\rightarrow \frac{45\text{ min}}{\underline{\underline{}}}$
- * $\rightarrow \frac{10\text{ min}}{\underline{\underline{}}}$

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$\frac{15\text{ min}-20\text{ min}}{\underline{\underline{}}}$

☞ If 47 is divided by 5

$$\begin{array}{r} 9 \\ 5 \overline{)47} \\ 45 \\ \hline 2 \end{array}$$

Where
5 → Divisor
9 → Quotient
2 → Remainder

$$\text{DIVEND} = \text{DIVISOR} \times \text{QUOTIENT} + \text{REMAINDER}$$

$$47 = 5 \times 9 + 2$$

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☞ If 47 is divided by 5

$$\begin{array}{r} 9 \\ 5 \overline{)47} \\ 45 \\ \hline \underline{(2)} \end{array} \quad \text{Dividend} \quad 47$$

Where
5 → Divisor
9 → Quotient
2 → Remainder

DIVIDEND = DIVISOR × QUOTIENT + REMAINDER

$$47 = 5 \times$$

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< divisor

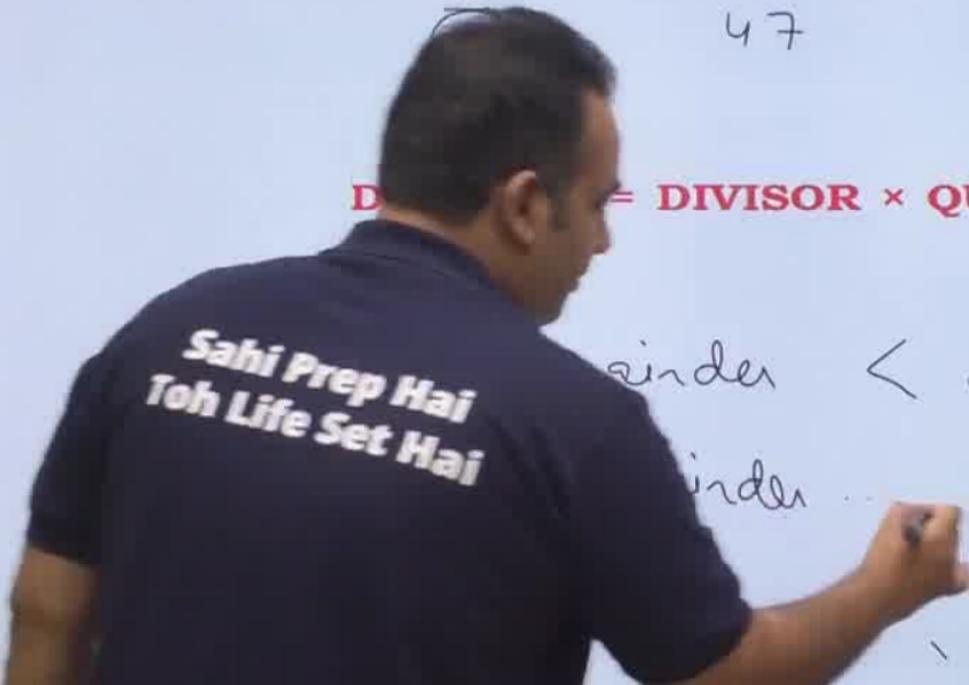
☞ If 47 is divided by 5

$$\begin{array}{r} 9 \\ 5 \overline{)47} \\ 45 \\ \hline 2 \end{array}$$

Dividend

Where
5 → Divisor
9 → Quotient
2 → Remainder

$$\text{Dividend} = \text{DIVISOR} \times \text{QUOTIENT} + \text{REMAINDER}$$



☞ If 47 is divided by 5

$$\begin{array}{r} 9 \\ 5 \overline{)47} \\ 45 \\ \hline \underline{2} \end{array} \quad \begin{array}{l} \text{Dividend} \\ 47 \end{array}$$

Where
5 → Divisor
9 → Quotient
2 → Remainder

DIVIDEND

→ DIVISOR × QUOTIENT + REMAINDER

$$47 = 5 \times 9 +$$

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< divisor

why

☞ If 47 is divided by 5

$$\begin{array}{r} N \\ \hline 5) 47 \\ 45 \\ \hline 2 \end{array}$$

Dividend
Rem → 0, 1, 2, 3 or 4

Where 5 → Divisor
9 → Quotient
2 → Remainder

DIVIDEND = DIVISOR × QUOTIENT + REMAINDER

$$47 = 5 \times 9 + 2$$

division

whole numbers (0, 1, 2, ...)

☞ If 47 is divided by 5

$$\frac{N}{5}$$

Rem \rightarrow 0, 1, 2, 3 or 4

$$\begin{array}{r} 9 \\ 5 \overline{)47} \\ 45 \\ \hline 2 \end{array}$$

Dividend 7

Where
5 \rightarrow Divisor
9 \rightarrow Quotient
2 \rightarrow Remainder

DIVIDEND = DIVISOR \times QUOTIENT + REMAINDER

$$47 = 5 \times 9$$

division

whole numbers (0, 1, 2, ...)

Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

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In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

$$\text{Dividend} = \text{divisor} \times \text{quotient} + \text{remainder}$$

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Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

D
Dividend divisor \times qp

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Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

$$\begin{aligned} \text{Dividend} &= \text{divisor} \times \text{quotient} + \text{Remainder} \\ &= (d) \end{aligned}$$

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Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

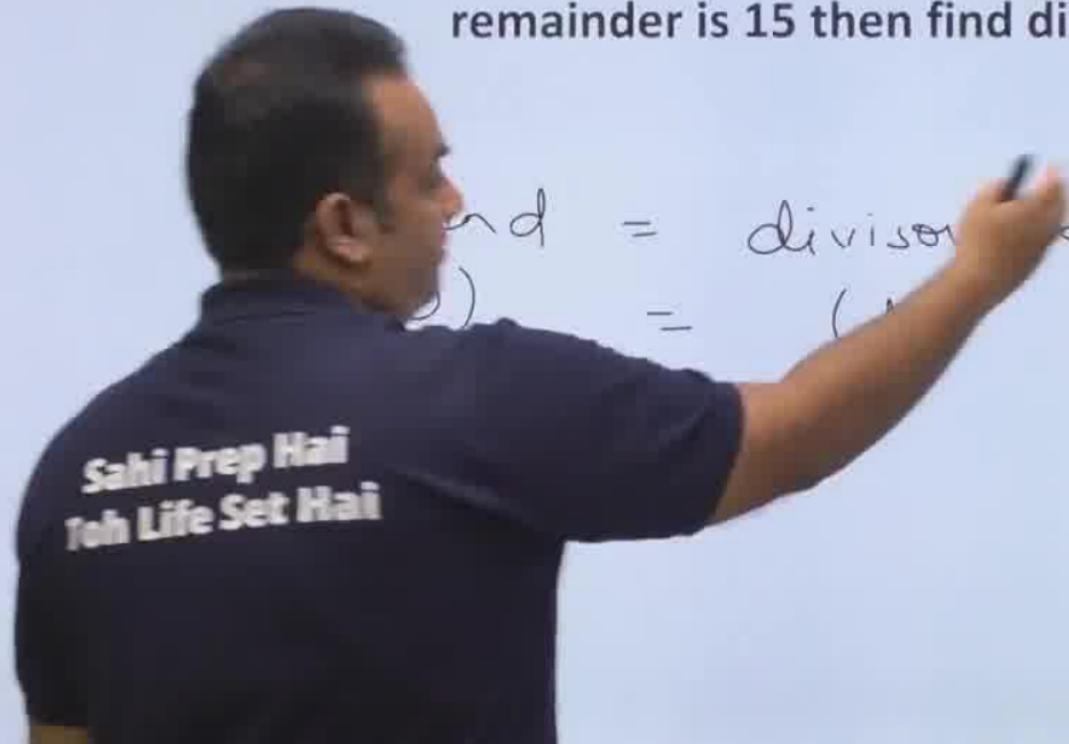
$$\text{Dividend} = \text{Divisor} \times \text{quotient} + \text{Remainder}$$
$$(D) \quad (d) \quad 0$$

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Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

$$\text{Dividend} = \text{divisor} \times \text{quotient} + \text{Remainder}$$
$$\text{Dividend} = (4 \times 15) + 15$$
$$\text{Dividend} = 60 + 15$$
$$\text{Dividend} = 75$$



Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

Dividend 60 45 15
(D) divisor × quotient + Remainder
 (d) 0 + 15

$$60 \times 45 + 15$$

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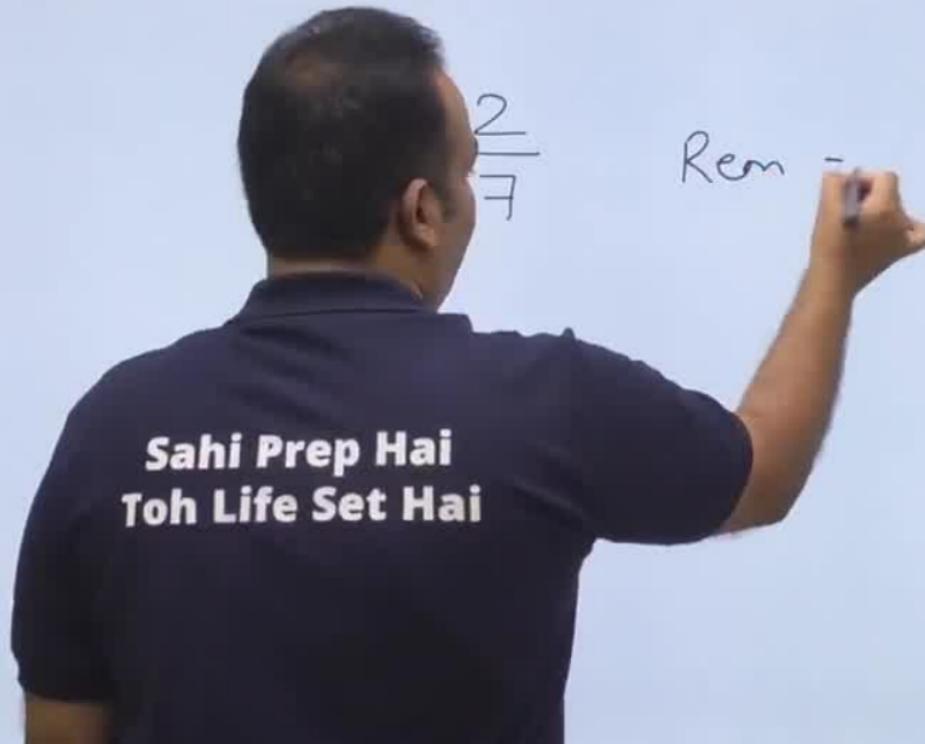
Example :

In a question on division, the divisor is 4 times of remainder and quotient is 3 times of Remainder. If remainder is 15 then find dividend.

$$\begin{aligned}\text{Dividend} &= \frac{60}{\text{divisor}} \times \frac{45}{\text{quotient}} + \text{Remainder} \\ (D) &= (d) \quad \textcircled{15} \\ &= 60 \times 45 + 15 \\ &= 2715\end{aligned}$$

Two Important points :

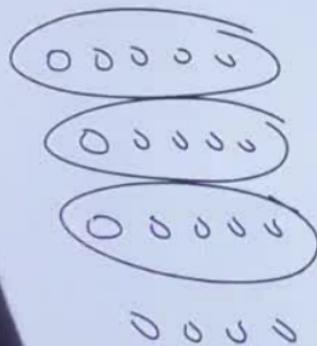
- I. Find the remainder when 2 is divided by 7.



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19 Toffees

$$\frac{19}{5}$$



Two Important points :

I. Find the remainder when 2 is divided by 7.

$$\frac{2}{7} \quad \text{Rem} =$$

☞ If 47 is divided by 5

$$\begin{array}{r} N \\ \hline 5) 47 \\ 45 \\ \hline 2 \end{array}$$

Dividend 47

Rem → 0

Where
5 → Divisor
9 → Quotient
2 → Remainder

$$\text{DIVEND} = \text{DIVISOR} \times \text{QUOTIENT} + \text{REMAINDER}$$

$$= 5 \times 9 + 2$$

(i) $\text{Remainder} < \text{divisor}$

Whole numbers $(0, 1, 2, \dots)$

Two Important points :

19 Toffees

I. Find the remainder when 2 is divided by 7.

$$\begin{array}{r} 19 \\ \hline 5 \end{array}$$

0 0 0 0 0

0 0 0 0 1

0 0

$$\boxed{\text{Rem} = 2}$$



Whenever N^R

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Two Important points :

19 Toffees

I. Find the remainder when 2 is divided by 7.

$$\frac{19}{5}$$

0 0 0 0

$$\frac{2}{7}$$

$$\boxed{\text{Rem} = 2}$$



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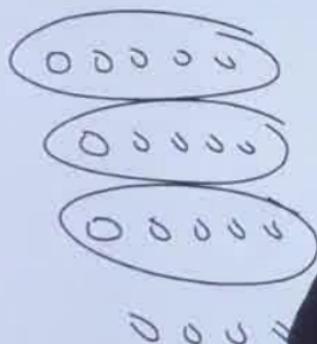
Whenever N^R is smaller than D^R

N^R itself

Two Important points :

19 Toffees

$$\frac{19}{5}$$



- I. Find the remainder when 2 is divided by 7.

$$\frac{2}{7} \quad m = 2 \quad \checkmark$$

$A < D^R$ is smaller than D^R
the Remainde

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Rem

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II. Find the remainder when 80 is divided by 24.

80

Remainder

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder = 8

mm mistake

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder = 8

mm mistake

$$\begin{array}{r} 4 < 20 & 10 \\ - & 24 \\ \hline & 3 \end{array}$$

Re

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder = 8

A common mistake

$$\begin{array}{r} 80 \\ \hline 24 \end{array} \quad \begin{array}{r} 4 < 20 \\ + 2 & 8 \\ \hline 1 & 0 \end{array} \quad \text{Rem} = 1$$

X

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder = 8

A

mistake

$$\begin{array}{r} 30 \ 10 \\ \times \ 2 \ 3 \\ \hline \end{array}$$

Rem = 1

X

$$1 \times 8$$

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder = 8

common mistake

$$\begin{array}{r} 80 \ 4 \leftarrow 30 \ 10 \\ \underline{-} 4 \ 12 \leftarrow 8 \ 3 \end{array}$$

~~Rem = 1~~ X

$1 \times 8 = 8$ //

II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 3 \\ \hline 24 \overline{)80} \\ 72 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 80 \\ \hline 24 \end{array}$$

Reminder = 8 ✓

common mistake

$$\begin{array}{r} 80 \\ \times 24 \\ \hline 320 \\ + 120 \\ \hline 1920 \end{array}$$

Rem = 1 X

8 = 8 ✓

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 3 \\ \hline 24 \overline{)80} \\ 72 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 80 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$$

Reminder = 8 //

← mistake

$$\begin{array}{r} 30 \\ 12 \times 2 \\ \hline 3 \end{array}$$

Rem = 1 X

$$X 8 = 8 //$$

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Example :

If $\frac{a}{b}$ Remainder is 30. Find the remainder when $\frac{5a}{5b}$

$$\frac{a}{b}$$

$$\text{Rem} = 30$$

$$\underline{89}$$

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II. Find the remainder when 80 is divided by 24.

$$\begin{array}{r} 3 \\ \hline 24 \overline{)80} \\ 72 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 80 \\ \hline \end{array}$$

Reminder = 8 ✓

A

mistake

$$\begin{array}{r} < 30 \\ < 10 \\ < 3 \end{array}$$

$$\begin{array}{r} \text{Rem} = 1 \\ \hline \end{array}$$

X

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Remainders are additive, subtractive and multiplicative in nature.



Remainders are additive, subtractive and
multiplicative in nature.

$$\frac{N}{R_1}$$

$$\frac{N_2}{}$$

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Remainders are additive, subtractive and multiplicative in nature.

$$\frac{N_1}{Z} \rightarrow R_1$$

$$\frac{N_2}{Z} \rightarrow R_2$$

$$\frac{N_1 + N_2}{Z} \rightarrow R_1 + R_2$$

$$\frac{N_1 - N_2}{Z} \rightarrow R_1 - R_2$$

$$\frac{N_1 \cdot N_2}{Z}$$

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Remainders are additive, subtractive and multiplicative in nature.

$$\frac{N_1}{N} \rightarrow R_1$$

$$\frac{N_2}{N} \rightarrow R_2$$

$$\underline{N_1 + N_2}$$

$$R_1 + R_2$$

$$\rightarrow R_1 - R_2$$

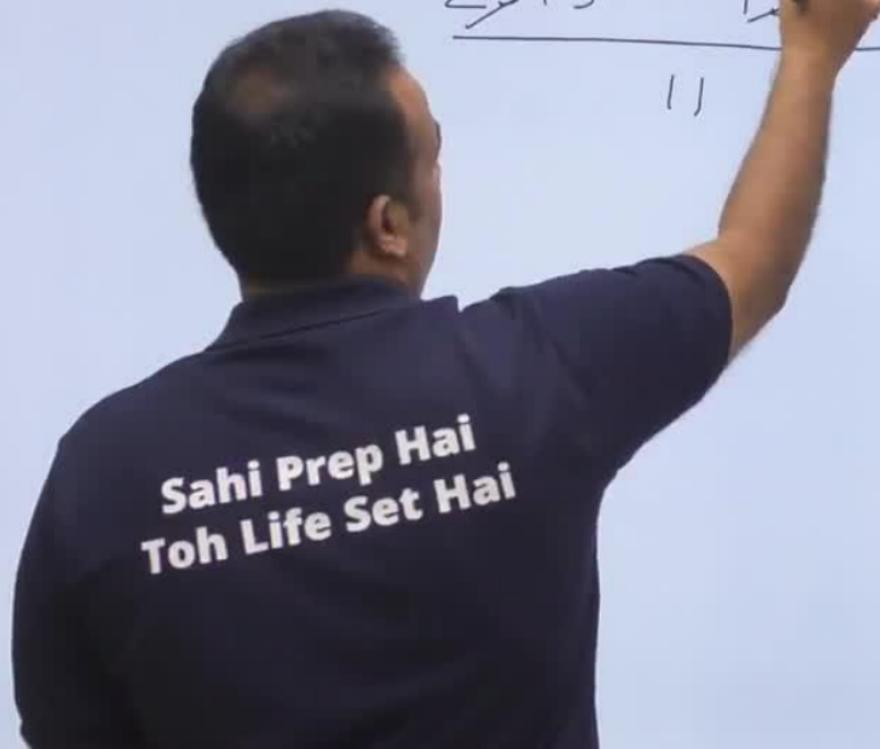
$$R_1$$

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Eg1. Find the remainder when $38 + 40 + 42 + 44$ is divided by 16.

Eg2. Find the remainder when $(2315 - 1344)$ is divided by 11.

$$\begin{array}{r} 5 \\ \cancel{2315} \quad - 1344 \\ \hline 11 \end{array}$$



Eg3. Find the remainder when $(2315 - 1350)$ is divided by 11.

$$\begin{array}{r} 2315 \\ \hline = \\ R \end{array}$$



Eg3. Find the remainder when $(2315 - 1350)$ is divided by 11.

Rem

$$\begin{array}{r} 2315 \\ \hline 11 \\ = 5 \end{array}$$

$$\begin{array}{r} 1350 \\ \hline 11 \\ = 8 \end{array}$$

$$\begin{array}{r} 5 & 8 \\ \cancel{2315} - \cancel{1350} \\ \hline 11 \end{array}$$

Eg3. Find the remainder when $(2315 - 1350)$ is divided by 11.

Rem

$$\begin{array}{r} 2315 \\ \hline 11 \\ = 5 \end{array}$$

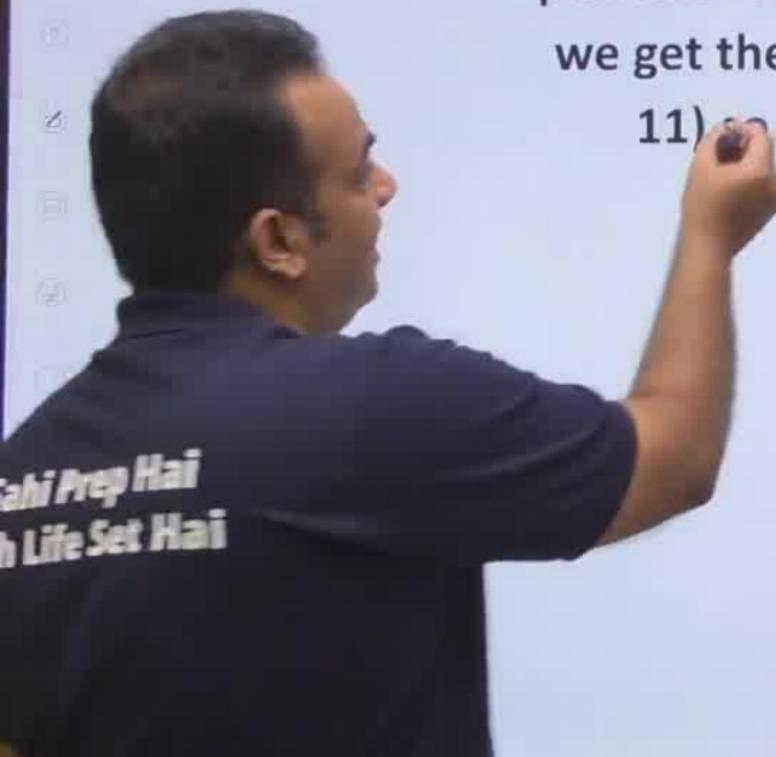
$$= 8$$

$$\begin{array}{r} 8 \\ - 1350 \\ \hline = -3 \\ | \end{array}$$

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Important Note

If we get a negative remainder, to convert it into a positive remainder we have to add the divisor As in Eg. 3 we get the final remainder as -3 (while on dividing it by 11) so the final remainder is $(-3 + 11)$ which is 8 .



Important Note

If we get a negative remainder, to convert it into a positive remainder we have to add the divisor. As in Eg. 3 we get the final remainder as -3 (while on dividing it by 13) so the final remainder is $(-3 + 11)$ which is 8 .

eg.

$$\frac{N_1}{13} \quad R = 4$$

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Important Note

If we get a negative remainder, to convert it into a positive remainder we have to add the divisor As in Eg. 3 we get the final remainder is -3 (while on dividing it by 11) so the final remainder is (-3 + 11) which is 8.

eg

$$\frac{N_1}{13} R$$

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$$\frac{N_2}{17} R = ?$$

Important Note

If we get a negative remainder, to convert it into a positive remainder we have to add the divisor. As in Eg. 3 we get the final remainder as -3 (while on dividing it by 13) so the final remainder is $(-3 + 11)$ which is 8 .

$$\begin{array}{r} N_1 \\ \hline 13 \\ R = 4 \end{array}$$
$$\begin{array}{r} N_2 \\ \hline 13 \\ R = 10 \end{array}$$
$$\frac{N_1 - N_2}{13}$$

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Important Note

If we get a negative remainder, to convert it into a positive remainder we have to add the divisor. As in Eg. 3 we get the final remainder as -3 (while on dividing it by 11) so the final remainder is $(-3 + 11)$ which is 8 .

eg

$$\frac{N_1}{13} \quad R = 4$$

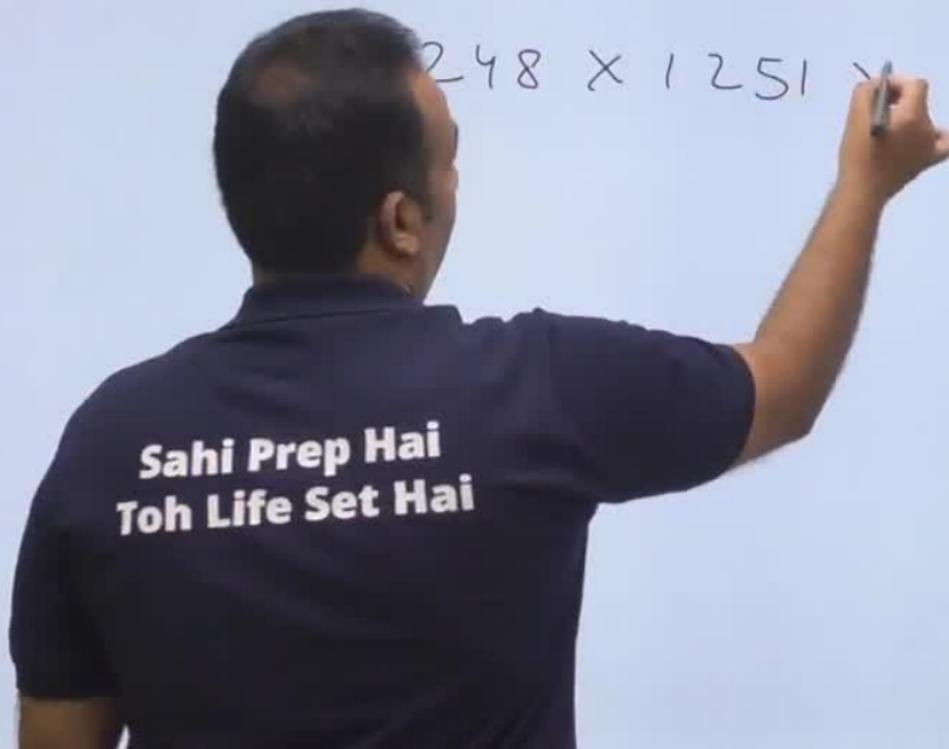
$$\frac{N_2}{13} \quad R = 10$$

$$\begin{array}{r} 4 \\ \cancel{N_1} - \cancel{N_2} \\ \hline 13 \end{array}$$

$$\text{Rem} = ??$$

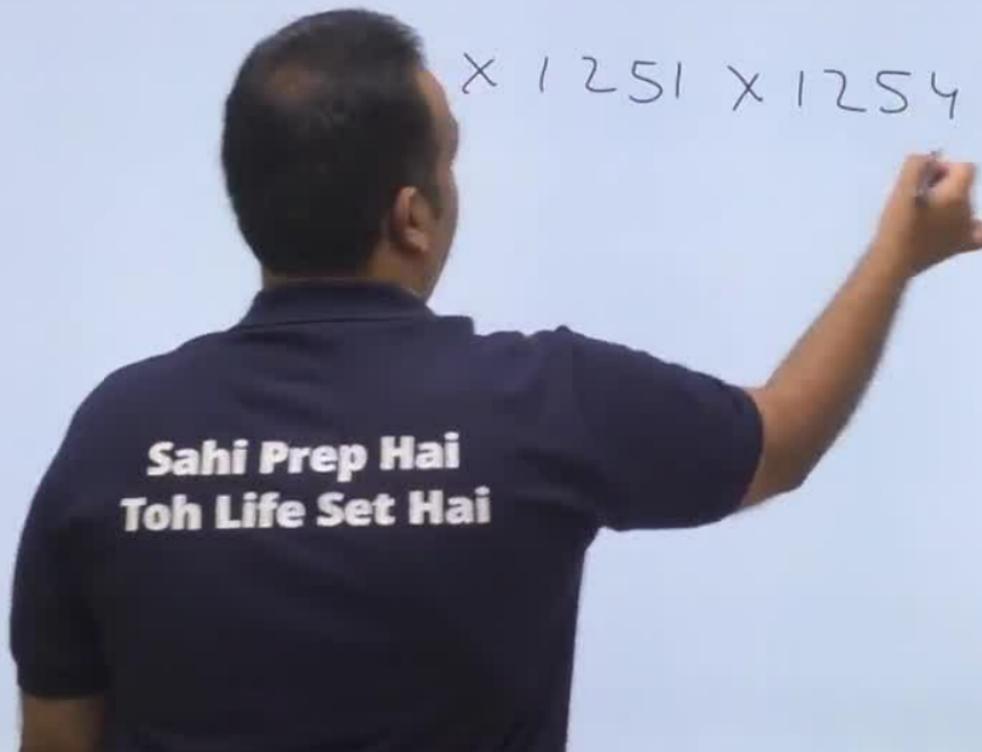
7 ✓

Eg4. Find the remainder when
 $1248 \times 1251 \times 1254$ is divided by 17.



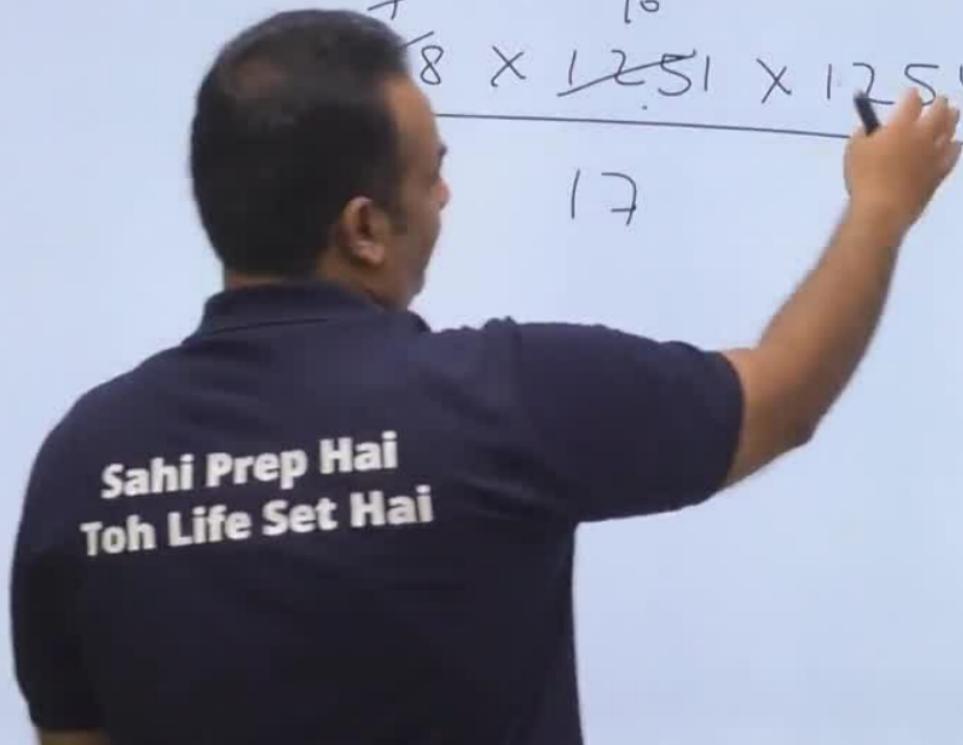
Eg4. Find the remainder when
 $1248 \times 1251 \times 1254$ is divided by 17.

$$\times 1251 \times 1254$$



Eg4. Find the remainder when
 $1248 \times 1251 \times 1254$ is divided by 17.

$$\begin{array}{r} 7 \\ 18 \times \cancel{1251} \times 1254 \\ \hline 17 \end{array}$$



Eg4. Find the remainder when
 $1248 \times 1251 \times 1254$ is divided by 17.

$$\begin{array}{r} \overbrace{1248 \times 1251 \times 1254}^{\text{17}} \\ 17 \\ \hline 70 \times 13 \end{array}$$

Eg4. Find the remainder when
 $1248 \times 1251 \times 1254$ is divided by 17.

$$\begin{array}{r} \overbrace{1248 \times 1251 \times 1254}^{\text{13}} \\ \hline 17 \\ \times 13 = 26 \end{array}$$

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Some Practice Questions :

Find the remainder.

$$\begin{array}{r} 544 + 545 + 546 + 547 + 548 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 544 \times 545 \times 546 \times 547 \\ \hline 11 \end{array}$$

Some Practice Questions :

Find the remainder.

$$\begin{array}{r} \text{S} \quad \text{C} \\ \underline{544 + 545 + 546 + 547 + 548} \end{array}$$

$$\begin{array}{r} 5 \times 546 \times 547 \\ \hline \end{array}$$

11

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Some Practice Questions :

Find the remainder.

$$\begin{array}{r} 5 \quad 6 \quad 7 \quad 8 \quad 9 \\ 544 + 545 + 546 + 547 + 548 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 35 \\ 11 \\ \hline R = 2 \end{array}$$

$$545 \times 546 \times 547$$

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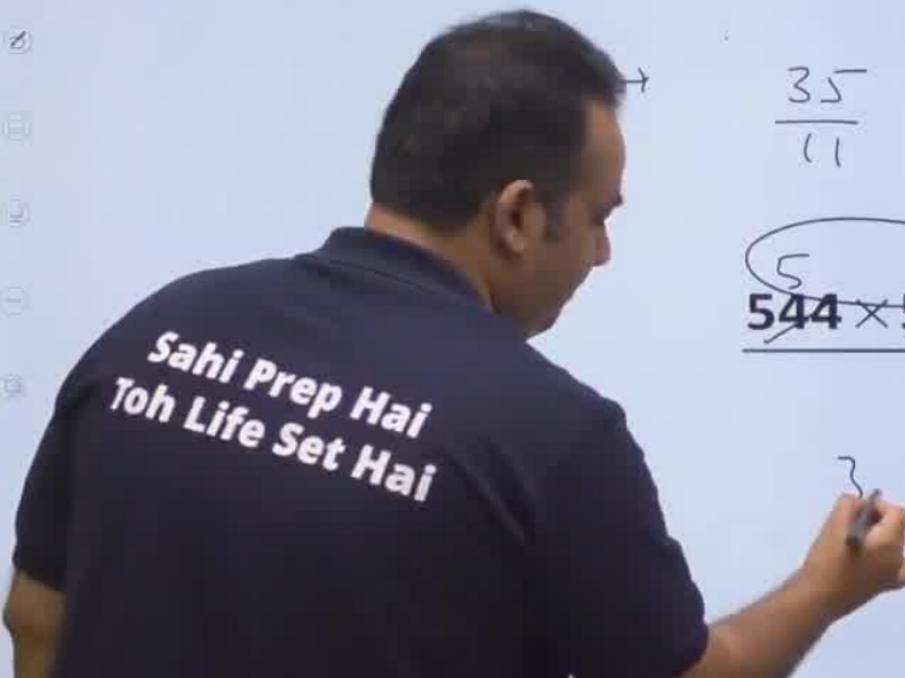
Some Practice Questions :

Find the remainder.

$$\begin{array}{r} 5 \quad 6 \quad 7 \quad 8 \quad 9 \\ \hline 544 + 545 + 546 + 547 + 548 \\ \hline 11 \end{array}$$

$$\frac{35}{11} \quad R = 2$$

$$\begin{array}{r} 5 \quad 6 \quad 7 \quad 8 \\ \hline 544 \times 545 \times 546 \times 547 \\ \hline 11 \end{array}$$



$$\frac{82 \times 84 \times 86 \times 88 \times 90}{17}$$

$$\frac{1004 \times 1006 \times 1008 \times 1010 \times 1012}{13}$$

14 16

$$\cancel{82} \times \cancel{84} \times \cancel{86} \times \cancel{88} \times 90$$

17

$$\times 1008 \times 1010 \times 1012$$

13

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$$\begin{array}{r} 14 \quad 16 \quad 1 \quad 3 \quad 5 \\ \hline 82 \times 84 \times 86 \times 88 \times 90 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 2 \quad 14 \\ 76 \times \underline{1} \\ \hline 17 \end{array}$$

$$\begin{array}{r} 1004 \quad 1006 \times 1008 \times 1010 \times 1012 \\ \hline 13 \end{array}$$

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$$\begin{array}{c} 14 \\ \textcircled{16} \quad 1 \quad 3 \\ \textcircled{5} \\ \hline 82 \times 84 \times 86 \times 88 \times 90 \\ 17 \end{array}$$

$$\begin{array}{r} 2 \\ \cancel{76} \times \cancel{48} \\ \hline 17 \end{array} = \frac{28}{17} \quad \text{Rem} = 11$$

$$\begin{array}{c} 1004 \times 1006 \times 1008 \times 1010 \times 1012 \\ \hline 13 \end{array}$$

$$\begin{array}{c} 14 \\ \textcircled{16} \quad 1 \quad 3 \\ \textcircled{5} \\ \hline 82 \times 84 \times 86 \times 88 \times 90 \\ 17 \end{array}$$

$$\begin{array}{r} 2 \\ \overline{76 \times 48} \\ 17 \\ = \frac{28}{17} \end{array} \quad \text{Rem} = 11$$

$$\begin{array}{c} 3 \\ \overline{1004 \times 1006 \times 1008 \times 1010 \times 1012} \\ 13 \end{array}$$

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$$\begin{array}{r} 14 \\ 16 \quad 1 \quad 3 \\ 5 \\ \hline 82 \times 84 \times 86 \times 88 \times 90 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 2 \\ \times 14 \\ \hline 17 \\ \hline 28 \\ = \frac{28}{17} \end{array} \quad \text{Rem} = 11$$

$$\begin{array}{r} 5 \\ \hline 1004 \times 1006 \times 1008 \times 1010 \times 1012 \end{array}$$

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$$\begin{array}{c} 14 \quad 16 \quad 1 \quad 3 \quad 5 \\ \hline 82 \times 84 \times 86 \times 88 \times 90 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 2 \quad 14 \\ \overline{76 \times 48} \\ \hline 17 \end{array} = \frac{28}{17} \quad \text{Rem} = 11$$

$$\begin{array}{c} 3 \quad 5 \quad 7 \quad 9 \quad 11 \\ \hline 1004 \times 1006 \times 1008 \times 1010 \times 1012 \\ \hline 13 \end{array}$$

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$$\begin{array}{c} 14 \quad 16 \quad 1 \quad 3 \quad 5 \\ \textcircled{16} \quad \textcircled{1} \quad \textcircled{3} \\ \hline 82 \times 84 \times 86 \times 88 \times 90 \\ 17 \end{array}$$

$$\begin{array}{r} 2 \quad 14 \\ \cancel{76} \times \cancel{1} \quad = \quad \frac{28}{17} \\ \textcircled{3} \quad \textcircled{7} \\ \text{Rem} = 11 \end{array}$$

$$\begin{array}{c} 3 \quad 7 \quad 9 \quad 11 \\ \textcircled{100} \quad \textcircled{8} \quad \textcircled{10} \quad \textcircled{12} \\ \hline 1008 \times 1010 \times 1012 \\ 13 \end{array}$$

Rem = 8

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If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{N_1 + N_2}{7}$

(ii) $\frac{N_1 - N_2}{7}$

$\frac{N_1^2}{7}$

(iv) $\frac{N_2^3}{7}$

(v) $\frac{2N_1 - 5N_2}{7}$

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If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{N_1 + N_2}{7}$

(ii) $\frac{N_1 - N_2}{7}$

(iii) $\frac{N_1^2}{7}$

$\frac{2N_1 - 5N_2}{7}$

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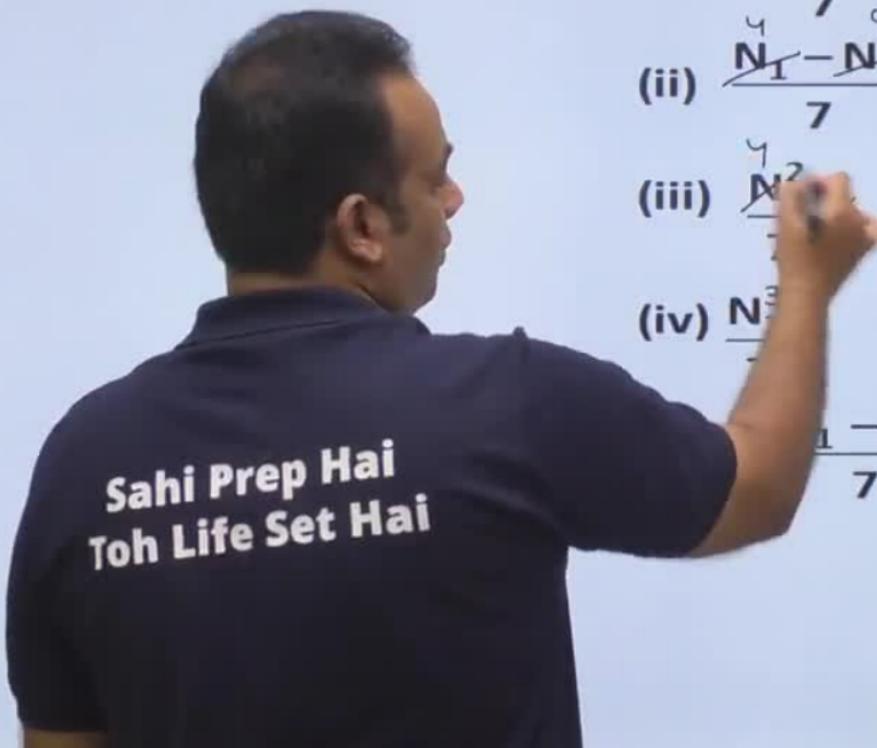
If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{\cancel{N_1} + \cancel{N_2}}{7} = 2 \quad \checkmark$

(ii) $\frac{\cancel{N_1} - \cancel{N_2}}{7} = 6 \quad \checkmark$

(iii) $\frac{\cancel{N_1^2}}{7} \quad \dots$

(iv) $\frac{\cancel{N_1^3} - 5\cancel{N_2}}{7} \quad \dots$



If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{\cancel{N_1} + \cancel{N_2}}{7} = 2 \quad \checkmark$

(ii) $\frac{\cancel{N_1} - \cancel{N_2}}{7} = 6 \quad \checkmark$

(iii) $\frac{\cancel{N_1}^2}{7} = \frac{15}{7} \quad R = 2 \quad \checkmark$

(iv) $\frac{\cancel{N_2}^3}{7}$

(v) $\frac{2\cancel{N_1} - 5\cancel{N_2}}{7}$

Sahi Prep Hai
Toh Life Set Hai

If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{\overset{4}{N_1} + \overset{5}{N_2}}{7} = 2 \quad \checkmark$

(ii) $\frac{\overset{4}{N_1} - \overset{5}{N_2}}{7} = 6 \quad \checkmark$

(iii) $\frac{\overset{4}{N_1^2}}{7} = \frac{15}{7} \quad R = 2 \quad \checkmark$

(iv) $\frac{\overset{5}{N_2^3}}{7} = \frac{125}{7}$

$$\frac{2N_1 - 5}{7}$$

Sahi Prep Hai
Toh Life Set Hai

If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

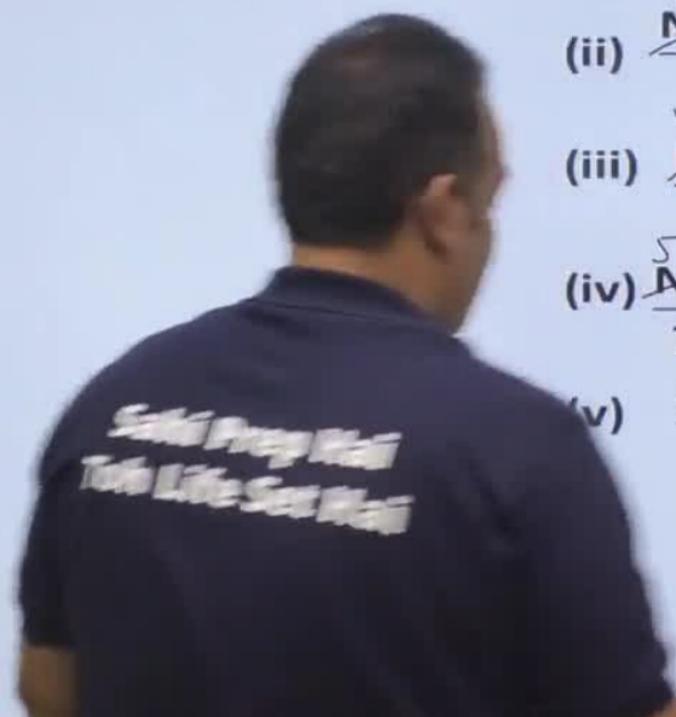
(i) $\frac{N_1 + N_2}{7} = 2 \checkmark$

(ii) $\frac{N_1 - N_2}{7} = 6 \checkmark$

(iii) $\frac{N_1^2}{7} = \frac{12}{7} R = 2 \checkmark$

(iv) $\frac{N_2^3}{7} = \frac{125}{7} R = 6 \checkmark$

(v) $\frac{2N_1 - 5N_2}{7}$



If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{\cancel{N_1} + \cancel{N_2}}{7} = 2 \checkmark$

(ii) $\frac{\cancel{N_1} - 1}{7} = 6 \checkmark$

(iii) $\frac{\cancel{N_1} - 12}{7} = R = 2 \checkmark$

(v) $\frac{\cancel{2N_1} - \cancel{5N_2}}{7} = R = 6 \checkmark$

Sahi Prep Hai
Toh Life Set Hai

If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{\cancel{N_1} + \cancel{N_2}}{7} = 2 \quad \checkmark$

(ii) $\frac{\cancel{N_1} - \cancel{N_2}}{7} = 6 \quad \checkmark$

(iii) $\frac{\cancel{N_1}^2}{7} = \frac{12}{7} \quad R = 2 \quad \checkmark$

(iv) $\frac{\cancel{N_2}^3}{7} = \frac{125}{7} \quad R = 6 \quad \checkmark$

$$\frac{2\cancel{N_1} - 5\cancel{N_2}}{7}$$

$$\begin{array}{r} 1 - 4 \\ \hline 7 \end{array}$$

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Toh Life Set Hai

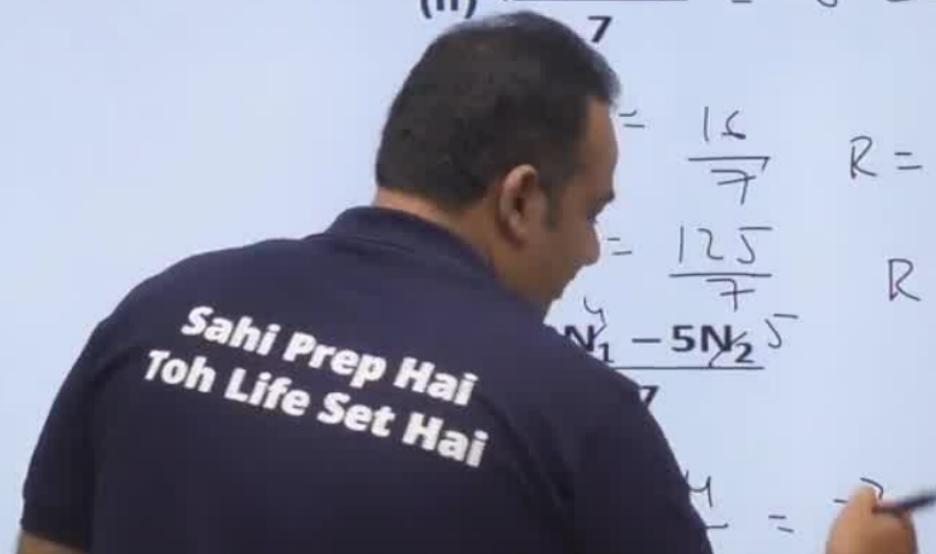
If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{N_1 + N_2}{7} = 2 \checkmark$

(ii) $\frac{N_1 - N_2}{7} = 6 \checkmark$

$$= \frac{12}{7} \quad R = 2 \checkmark$$

$$= \frac{125}{7} \quad R = 6 \checkmark$$



If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{N_1 + N_2}{7} = 2 \checkmark$

(ii) $\frac{N_1 - N_2}{7} = 6 \checkmark$

(iii) $\frac{N_1^2}{7} = R = 2 \checkmark$

(iv) $\frac{N_2^2}{7} = R = 5 \checkmark$

Sahi Prep Hai
Toh Life Set Hai

$R = 4$

If $\frac{N_1}{7}$ Rem = 4 & $\frac{N_2}{7}$ Rem = 5

(i) $\frac{N_1 + N_2}{7} = 2 \checkmark$

(ii) $\frac{N_1 - N_2}{7} = 6 \checkmark$

(iii) $\frac{N_1^2}{7} = \frac{12}{7} \quad R = 2 \checkmark$

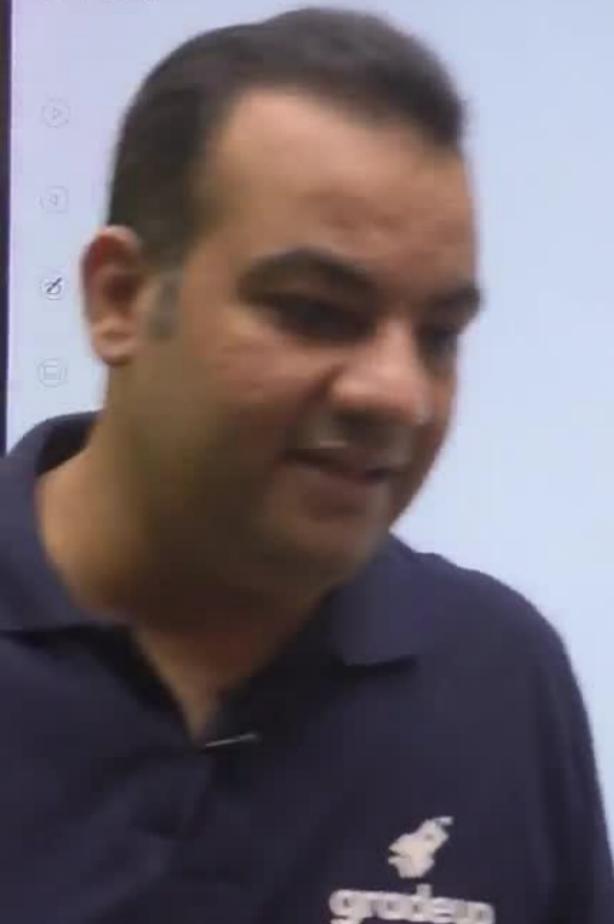
(iv) $\frac{N_2^3}{7} = \frac{125}{7} \quad R = 6 \checkmark$

(v) $\frac{2N_1 - 5N_2}{7}$

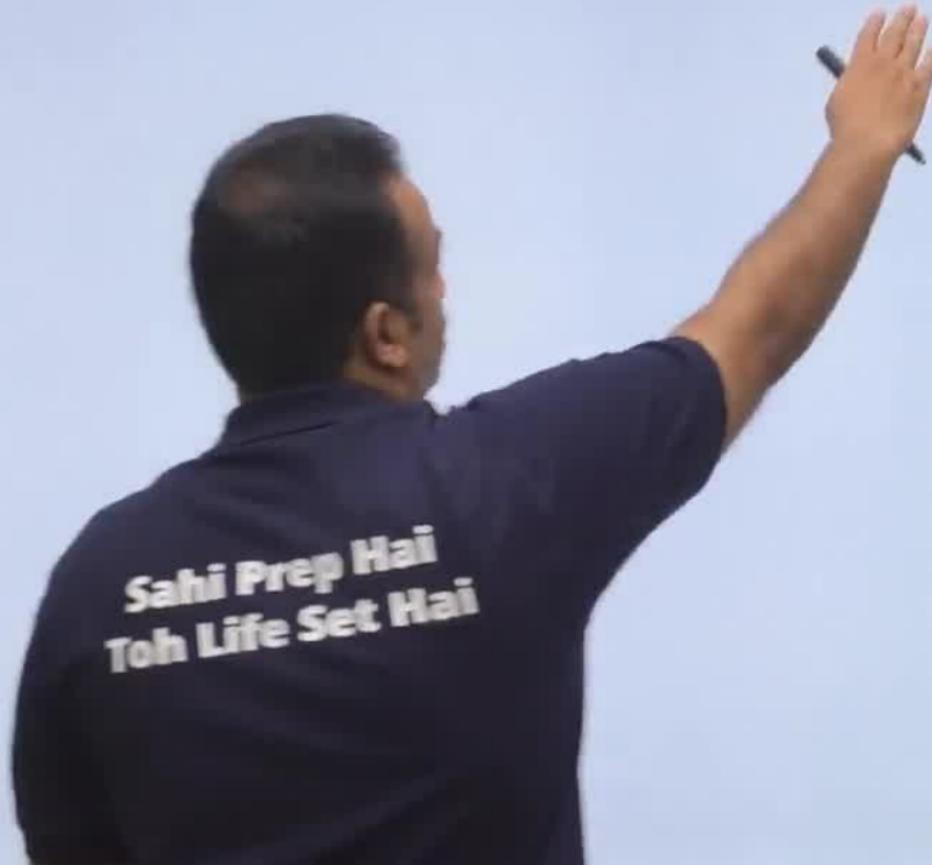
$\frac{1 - 4}{7} = \frac{-3}{7} \quad R = 4 \checkmark$



Eg. Find the remainder when 2^{50} is divided by 3.

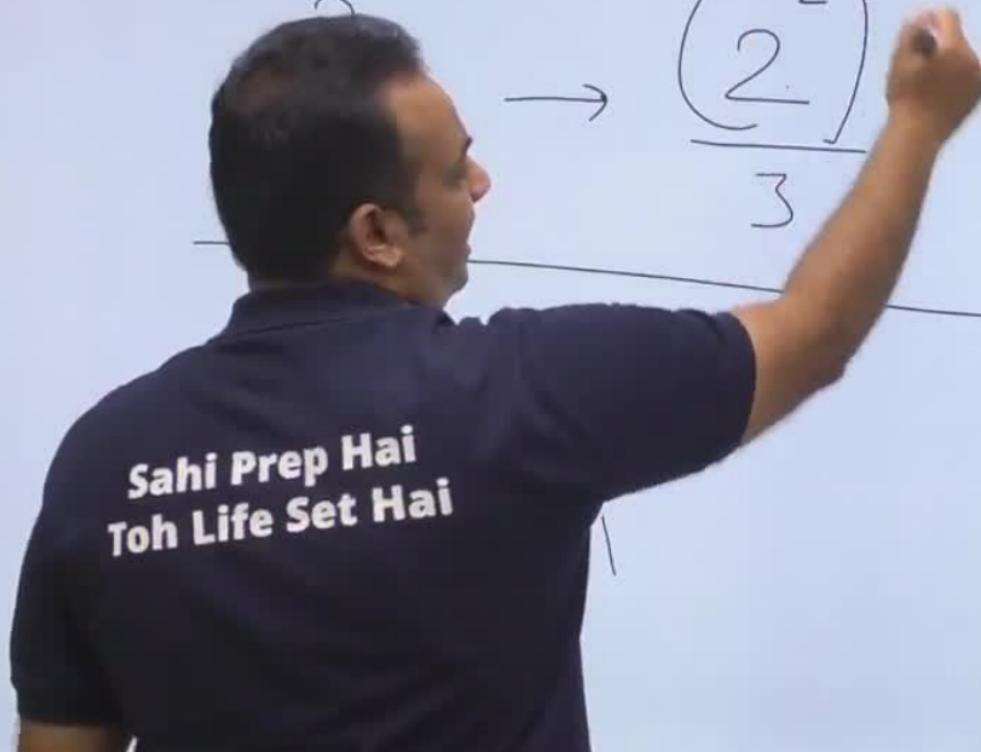


Eg. Find the remainder when 2^{50} is divided by 3.



Eg. Find the remainder when 2^{50} is divided by 3.

$$\overset{50}{\overbrace{2}} \rightarrow \begin{array}{r} 25 \\ \underline{(2^2)} \\ 3 \end{array}$$



Eg. Find the remainder when 2^{50} is divided by 3.

$$\begin{array}{r} 2^{50} \\ \hline 3 \\ \hline 2 \\ \hline 1 \end{array} = \frac{1}{2}$$

The diagram shows a division process where 2 is divided by 3. The quotient is 1, and the remainder is 2. This remainder 2 is then squared to become 4, which is then divided by 3, resulting in a quotient of 1 and a remainder of 1. This remainder 1 is then squared to become 1, which is then divided by 3, resulting in a quotient of 1 and a remainder of 1. This pattern repeats, showing that the remainders will cycle through 1, 2, 1, 2, ... forever.

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Eg. Find the remainder when 2^{50} is divided by 3.

$$\begin{array}{r} 2^{50} \\ \hline 3 | \quad 2^1 \\ \hline \end{array} \quad \left(\frac{2^2}{3} \right)^{25} \quad \frac{1}{3} \quad \text{Rem} = 1 \checkmark$$

Eg. Find the remainder when 3^{48} is divided by 8.

$$\frac{3^{48}}{8} = \frac{(3^2)^{24}}{8}$$

$$\text{Rem} = 3$$

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Eg. Find the remainder when 3^{48} is divided by 8.

$$\frac{3^{48}}{8} = \underline{\left(3^2\right)^{24}}$$

Rem = 1

$$\frac{3^1}{8} \quad \text{Rem} = 3$$

$$\frac{3^2}{8}$$

(1) any natural

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Eg. Find the remainder when 2^{50} is divided by 7.

$$\begin{array}{r} 2^{50} \\ \hline 7 \\ \overline{2} \end{array} = \cancel{\left(\begin{array}{r} 2^3 \\ 2^1 \end{array} \right)^{16}} \overline{2^2}$$

$$R = 2$$

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Eg. Find the remainder when 2^{50} is divided by 7.

$$\begin{array}{r} 2^{50} \\ \hline 7 \\ = (2^{16})^2 \\ \hline 7 \end{array}$$

$$R = 2$$

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Eg. Find the remainder when 2^{50} is divided by 7.

$$\frac{2^{50}}{7} = \frac{\cancel{(2^3)^{16}} \cdot 2^2}{\cancel{7}} \quad \underline{\text{Rem}} = 4$$

$$\frac{2^1}{7} \quad R = 2$$

$$\frac{2^2}{7} \quad R = 4$$

$$\frac{2^3}{7} \quad R = 1$$

Some Practice Questions :

$$\frac{5^1}{24} \quad R = 1$$

$$\frac{5^2}{24} \quad R$$

1. $\frac{5^{69}}{24}$

$$(5^2)^{34} \cdot 5^1$$

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Some Practice Questions :

$$\frac{5}{24} \quad R = 1$$

1. $\frac{5^{69}}{24}$

$$\begin{array}{r} 39 \\ (5^2) \overline{)5} \\ -5 \\ \hline 0 \end{array}$$

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2. $\frac{3^{47}}{20}$

$$\frac{3^1}{20}$$

$$R = 3$$

$$\frac{3^2}{20}$$

$$R = 9$$

$$\frac{3^3}{20}$$

$$R = 27$$

$$\frac{3^4}{20}$$

$$R = 81$$

$$\frac{3^5}{20}$$

$$R = 243$$

3^1 3^2

$$\frac{3^3}{26} =$$

3. $\frac{3^{49}}{26}$

$$\begin{array}{r} \cancel{(3^3)^{16}} \\ \hline 26 \end{array}$$

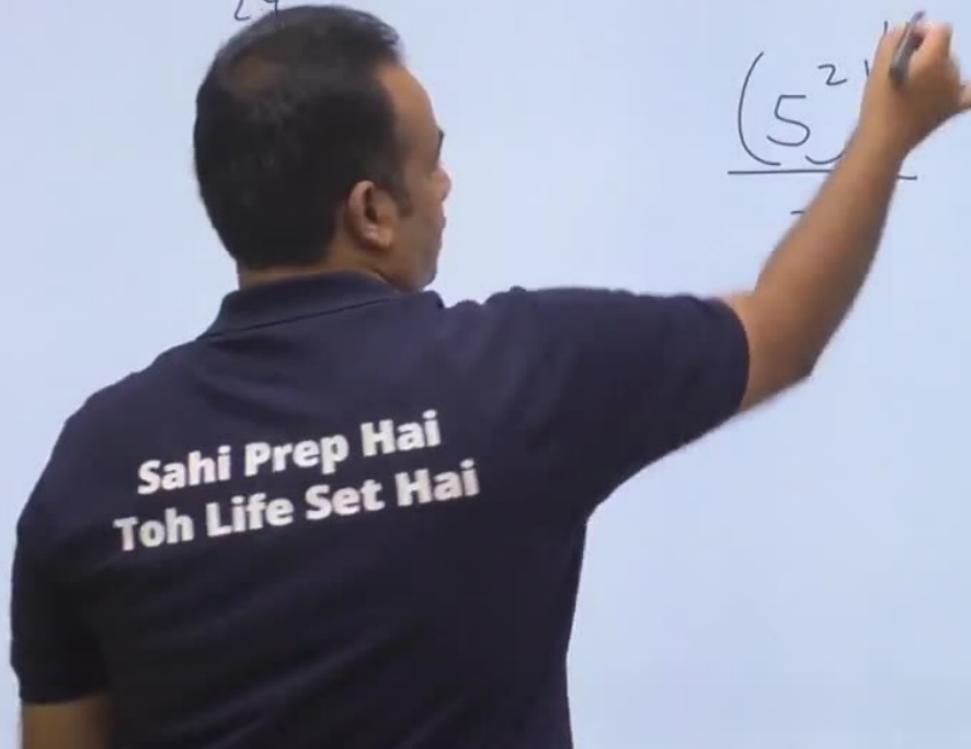
Re

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4. $\frac{5^{28}}{24}$

$$\frac{5^1}{24} = 5$$

$$\underline{(5^2)}$$



5. $\frac{2^{63}}{8}$

$$\begin{array}{r} 2^1 \\ \hline 8 \\ R = 2 \end{array}$$

$$\begin{array}{r} 2^2 \\ \hline 8 \end{array}$$

$$\boxed{\begin{array}{r} 2^3 \\ \hline 8 \end{array}}$$

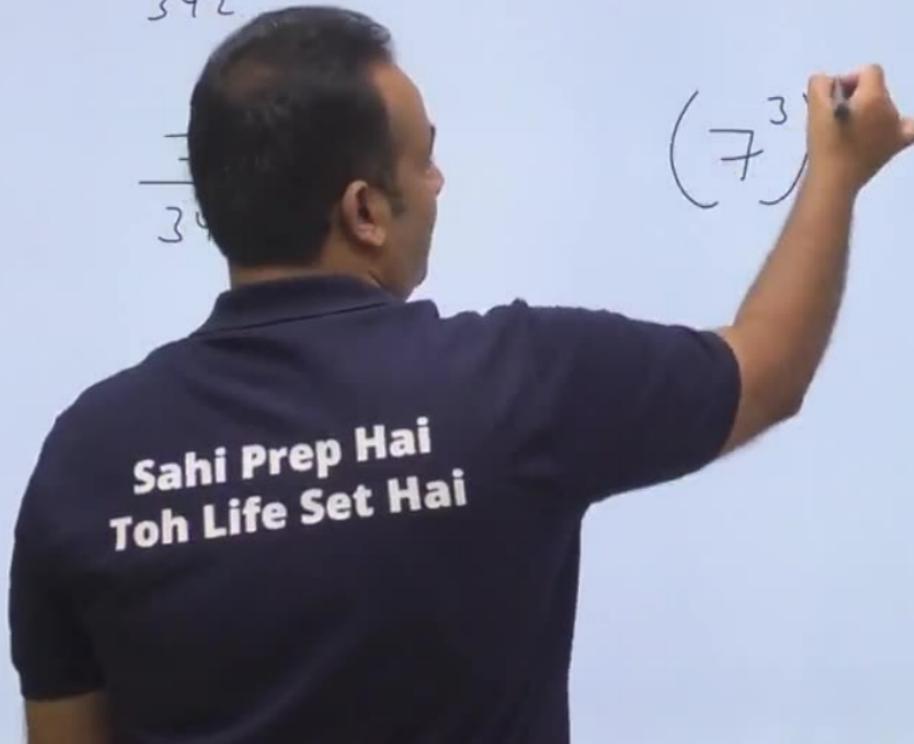
$$\overbrace{(2^3)}^{21} \quad 8$$

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6. $\frac{7^{35}}{342}$

$$\begin{array}{r} 7^1 \\ \hline 342 \\ - \\ \hline \end{array}$$

$$(7^3)$$



$$7. \frac{2^{75}}{15}$$

$$\frac{(2^4)^{18} \cdot 2^3}{15}$$

Rem = 8

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$$\frac{5^1}{31} \quad R = 5$$

8. $\frac{5^{31}}{31}$

$$\frac{5^2}{31}$$

$$\frac{5^3}{31}$$

$$(5^3)^1$$

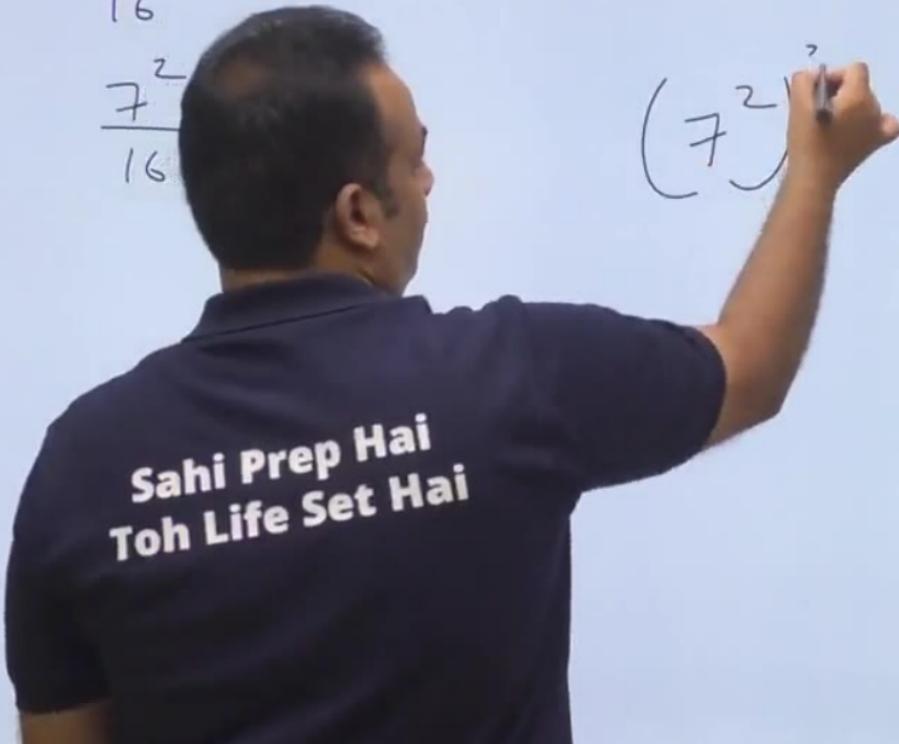
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$$\frac{7^1}{16} \quad R = 7$$

$$\frac{7^2}{16}$$

9. $\frac{7^{65}}{16}$

$$(7^2)^?$$

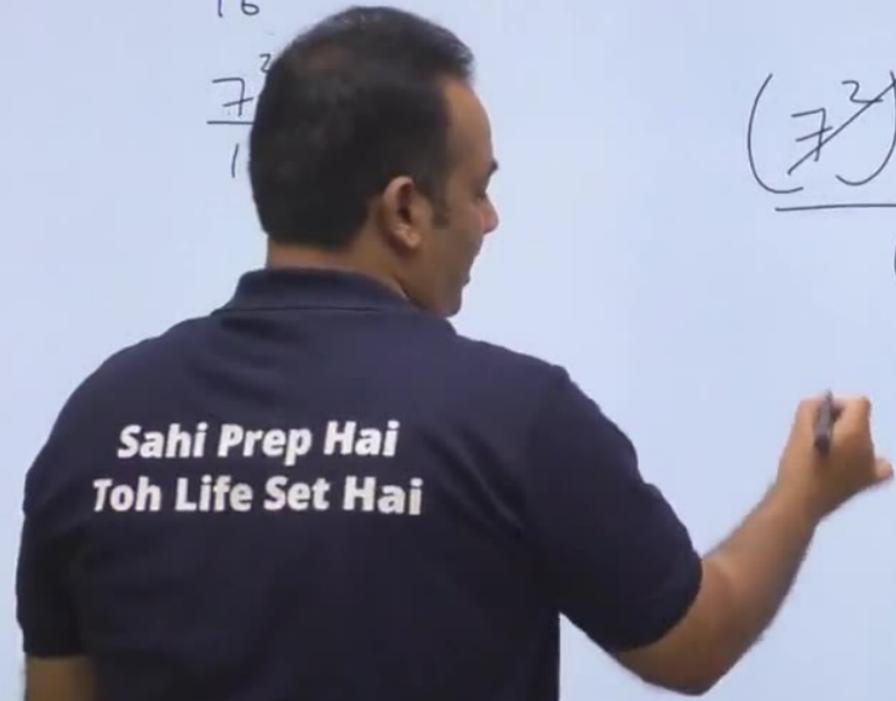


$$\frac{7^1}{16} \quad R = 7$$

$$\frac{7^2}{16}$$

9. $\frac{7^{65}}{16}$

$$\frac{(7^2)^{32} \cdot 7^1}{16}$$



10. $\frac{11^{83}}{8}$

D

d

E

B

A

BB

C

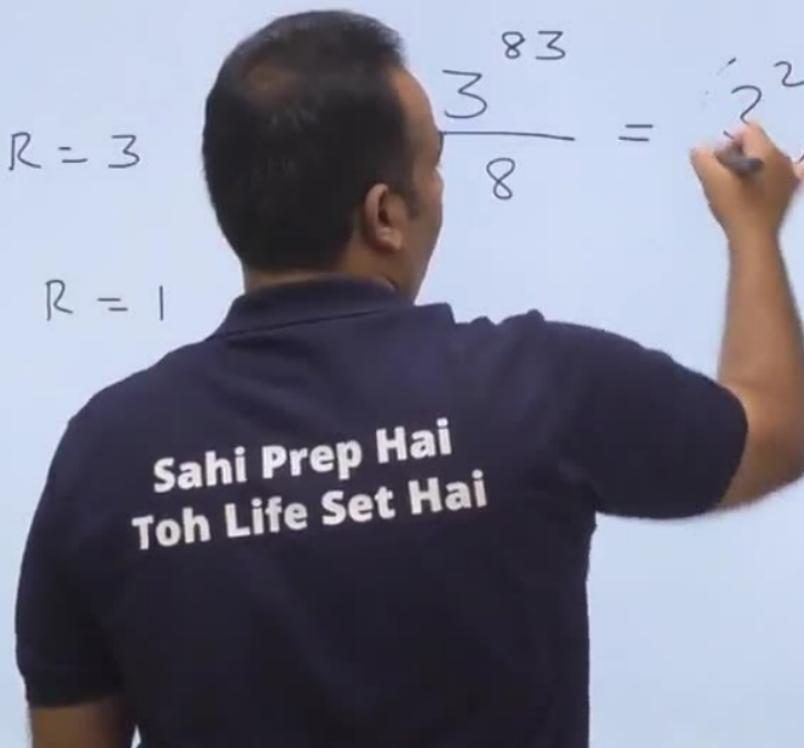
$$\frac{11}{8} \quad R = 3$$

10. $\frac{11^{83}}{8}$

$$\frac{3^1}{8} \quad R = 3$$

$$\frac{3^2}{8} \quad R = 1$$

$$\frac{3^{83}}{8} = (?)$$



$$\frac{11}{8} \quad R = 3$$

10. $\frac{11^{83}}{8}$

$$\frac{3^1}{8} \quad R = 3$$

$$\frac{3^2}{8} \quad R = 1$$

$$\frac{3^{83}}{8} = \frac{(3^2)^{41} \cdot 3^1}{8}$$

$= 3$

Sahi Prep Hai
Toh Life Set Hai

$$\frac{11}{8} \quad R = 3$$

10. $\frac{11^{83}}{8}$

$$\frac{3^1}{8} \quad R =$$

$$\frac{3^2}{8}$$

$$\frac{3^{83}}{8} = \frac{(3^2)^{41} \cdot 3^1}{8}$$

$$R = 3$$

$$\frac{11}{8} \quad R = 3$$

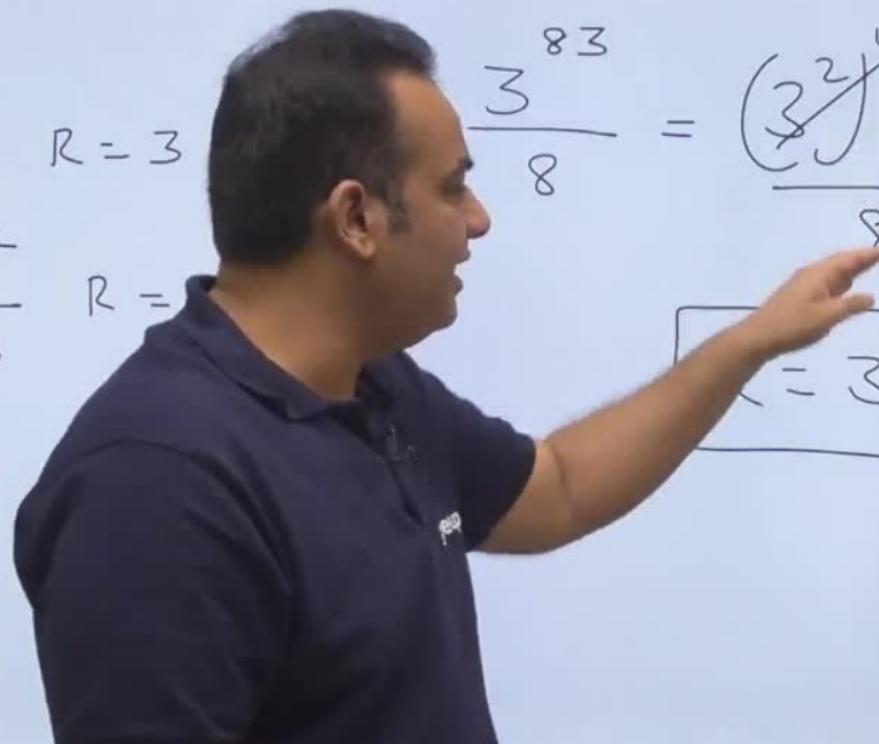
10. $\frac{11^{83}}{8}$

$$\frac{3^1}{8} \quad R = 3$$

$$\frac{3^2}{8} \quad R =$$

$$\frac{3^{83}}{8} = \frac{(3^2)^{41} \cdot 3^1}{8}$$

$$= 3$$



$$2^1 \rightarrow 2$$

$$2^2 \rightarrow 4$$

$$2^3 \rightarrow 8$$

$$2^4 \rightarrow$$

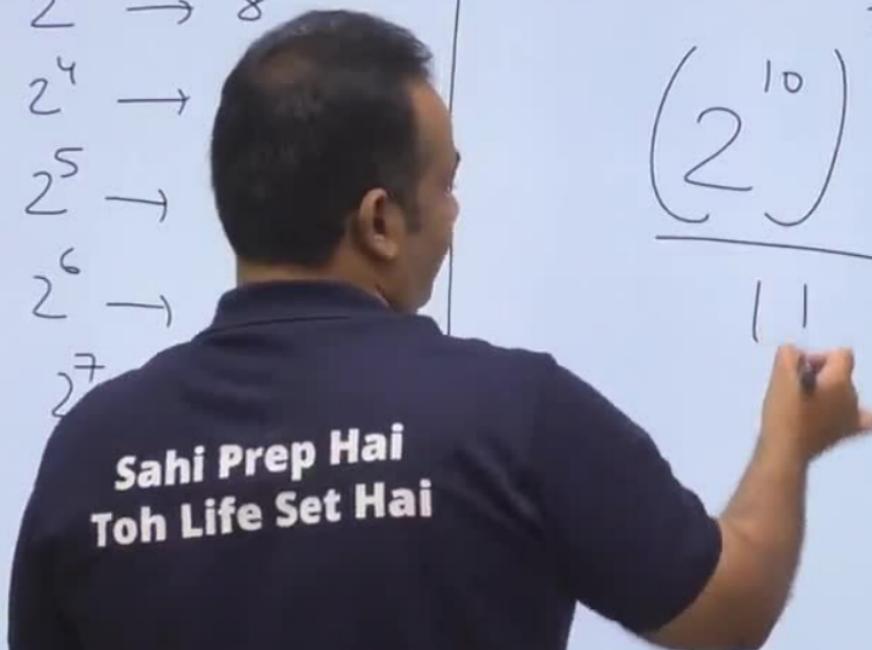
$$2^5 \rightarrow$$

$$2^6 \rightarrow$$

$$2^7$$

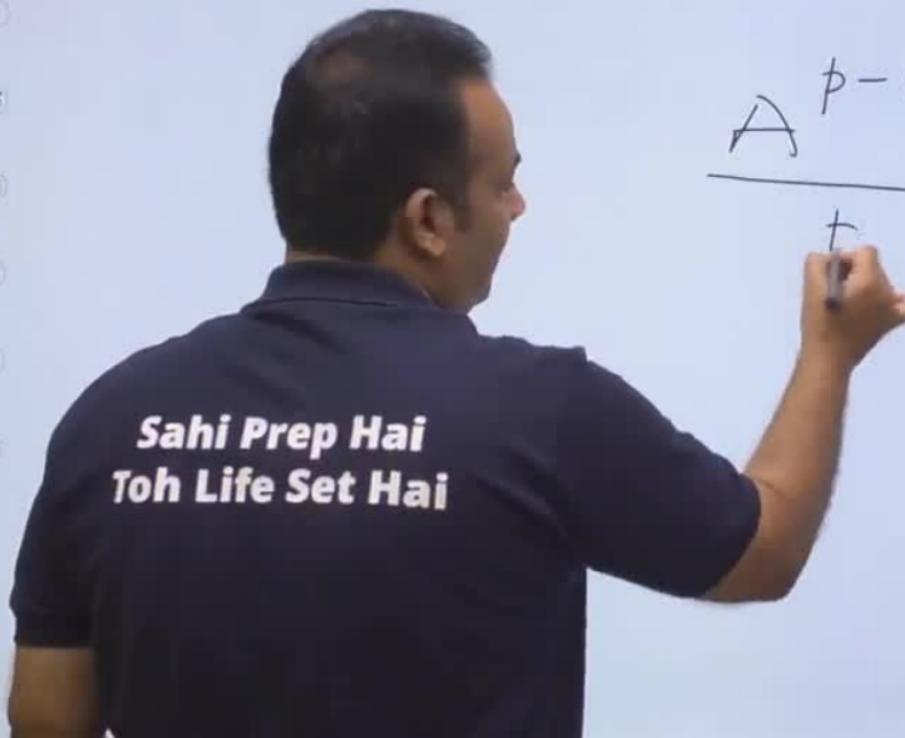
11. $\frac{2^{70}}{11}$

$$\begin{array}{r} (2^{10})^7 \\ \hline 11 \end{array}$$



FERMAT THEOREM

$$\frac{A^{p-1}}{t}$$



Cond^N (i) $p \rightarrow \text{prime no}$ (ii) As p are co-primes

$$\text{HCF} = 1$$

FERMAT THEOREM

$$\frac{A^{p-1}}{p}$$

$$\text{Rem} = 1$$

eg

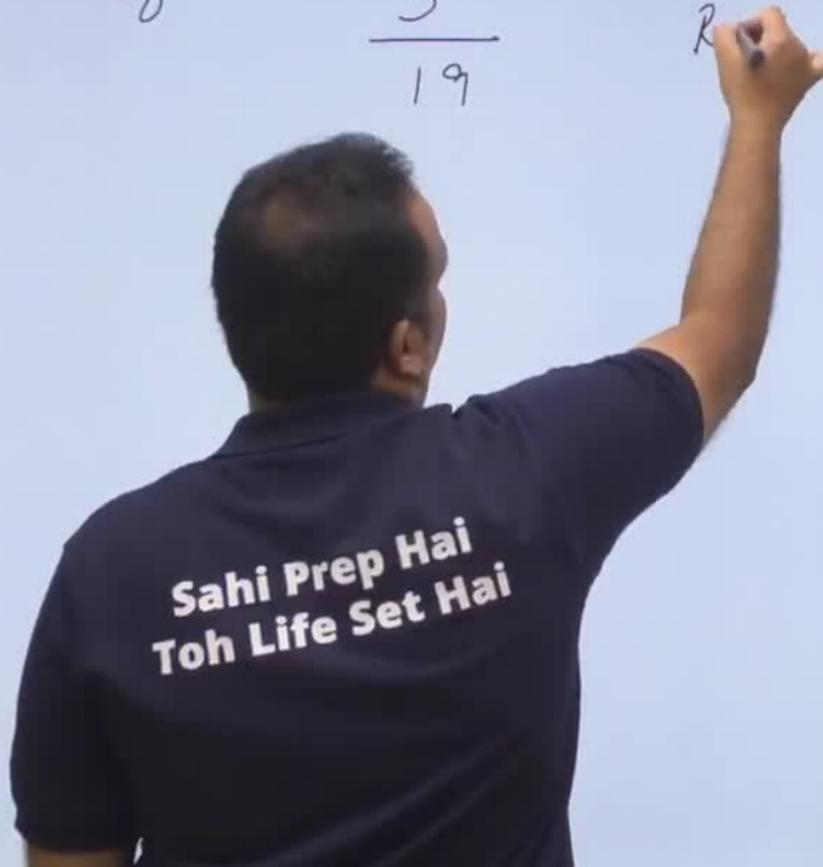
$$\frac{2^{10}}{11}$$

$$\text{Rem} =$$

eg

$$\begin{array}{r} 3^{18} \\ \hline 19 \end{array}$$

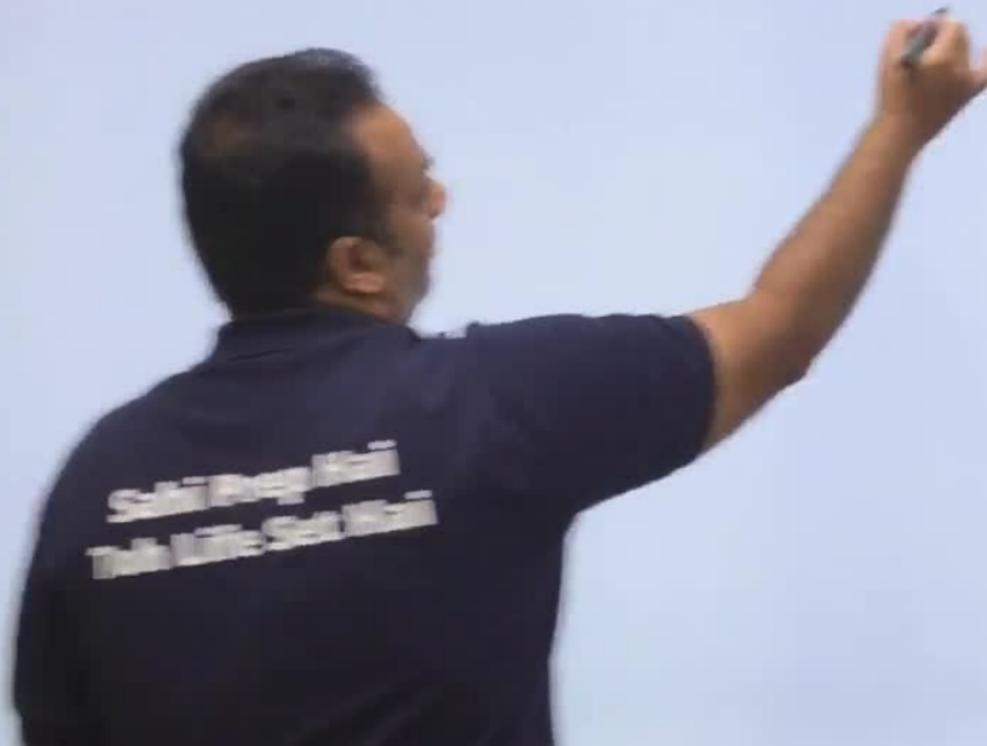
R



eg

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 19 \end{array}^{18}$$

Rem =



eg

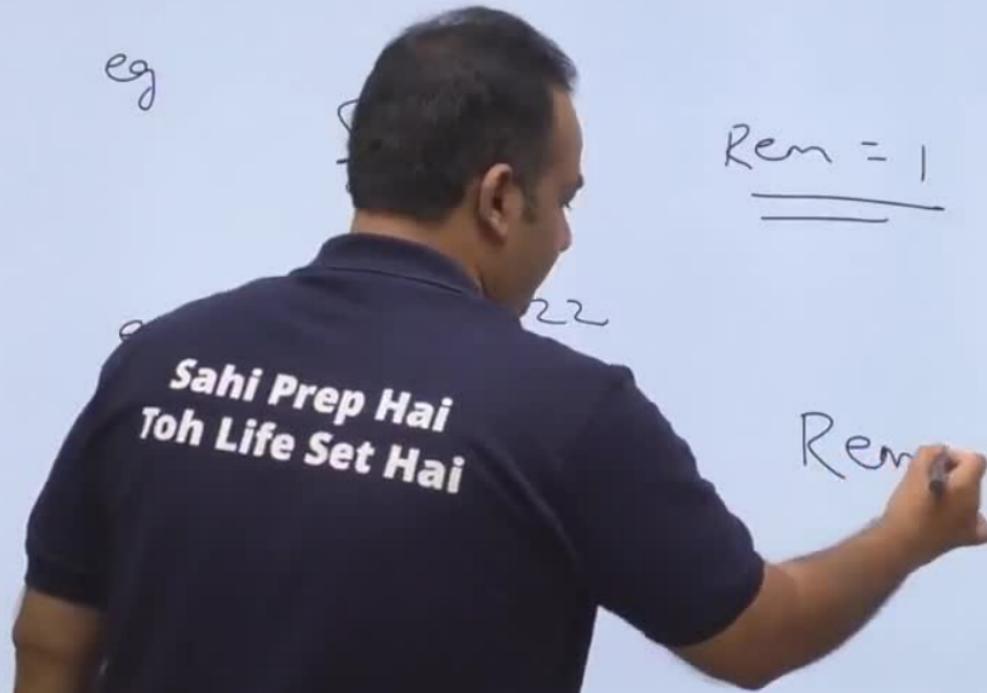
$$\begin{array}{r} 3 \\ \times 3 \\ \hline 19 \end{array}$$

Rem = 1 ✓

eg

$$\begin{array}{r} 2 \\ \times 2 \\ \hline 22 \end{array}$$

Rem = 1 ✓



eg

$$\begin{array}{r} 3^{18} \\ \sqrt{19} \\ \hline \end{array}$$

$$\underline{\text{Rem}} = 1 \quad \checkmark$$

e

$$\begin{array}{r} 4^{100} \\ \sqrt{101} \\ \hline \end{array}$$

$$\underline{\text{Rem}} = 1 \quad \checkmark$$

$$\begin{array}{r} 15^{22} \\ \hline 23 \end{array}$$

$$\text{Rem} = 1 \quad \checkmark$$

Examples on Fermat Theorem

Eg 1

$$\frac{2^{62}}{29} \quad \text{Rem} =$$

Examples on Fermat Theorem

Eg 1

$$2^{62} \text{ Rem } = ?^{28}$$

$$\frac{2^{28}}{29}$$

$$R = 1$$

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Examples on Fermat Theorem

Eg 1

$$\frac{2^{62}}{2^9} = \left(\frac{2^{28}}{2^2}\right)^2 \cdot 2^6$$

$$\frac{2^{28}}{2^9}$$

$$R = 1$$

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Examples on Fermat Theorem

Eg 1

$$\begin{array}{r} 2^{62} \\ \hline 2^9 \end{array}$$

$$\begin{array}{r} 2^{28} \\ \hline 2^9 \end{array}$$

[By F.T]

$$\text{Rem} = \frac{(2^{28})^7 \cdot 2^6}{2^9} = \frac{64}{2^9}$$

$\boxed{R = 6}$

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$$\begin{array}{r} 3 \\ \hline 5^{16} - 3 \\ = \frac{(5^4)^4 - 3}{17} \end{array}$$

Examples on Fermat Theorem

Eg 1

$$\frac{2^{62}}{29}$$

$$\text{Rem} = \frac{(2^{38})^2 \cdot 2^6}{29} = \frac{64}{29}$$

R = 6

$$\frac{2^{28}}{29}$$

$$R = 1 \quad \left[\text{By } \right]$$

Eg

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$$= \frac{125}{17}$$

Examples on Fermat Theorem

Eg 1

$$\frac{2^{28}}{29}$$

62
R = ? by F.T]

$$\text{Rem} = \frac{(2^{28})^6}{29} = \frac{64}{29}$$

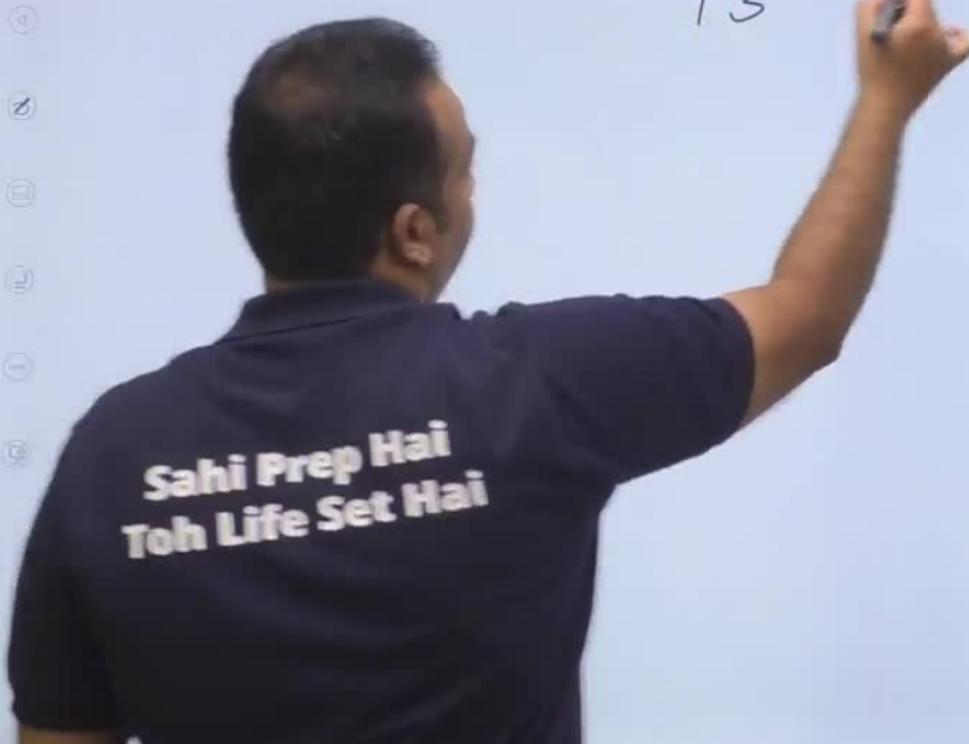
R = 6

Eg 2

$$\frac{5^{16}}{17} = \frac{(5^4)^4}{17} = \frac{625}{17} R =$$

eg

$$\begin{array}{r} 100 \\ 8 \\\hline 13 \end{array}$$



Eg

$$\begin{array}{r} 100 \\ 13 \overline{)8} \\ \hline \end{array}$$

Rem = ?

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Eg

$$\begin{array}{r} 100 \\ 8 \overline{)12} \\ \text{Rem} = 7 \end{array}$$

$$\begin{array}{r} (2^3)^{100} \\ \hline 13 \\ -13 \\ \hline 0 \\ = 2^{12} \end{array}$$

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eg

$$\begin{array}{r} 93 \\ \hline 6 \end{array}$$

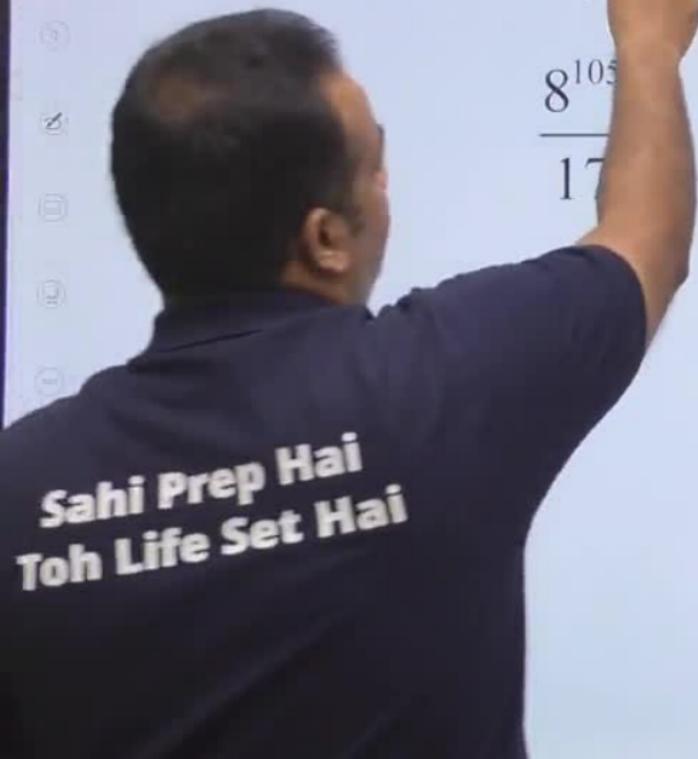
Rem =

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Limitations of Fermat theorem

It can be used only when the divisor is prime and sometimes the powers are not as easy to evaluate .

$$\frac{8^{105}}{17}$$



Limitations of Fermat theorem

It can be used only when the divisor is prime and sometimes the powers are not as easy to evaluate.

$$\frac{8^{105}}{17}$$



eg

$$\begin{array}{r} 6^{93} \\ \hline 19 \\ \text{Rem} = ?? \end{array}$$

$$\frac{(6^{18})^5 \cdot 6^3}{19} = \frac{216}{19}$$

Rem = 7

$$2^1 \rightarrow 2$$

$$2^2 \rightarrow 4$$

$$2^3 \rightarrow 8$$

$$2^4 \rightarrow 5$$

$$2^5 \rightarrow 10$$

$$2^6 \rightarrow 9$$

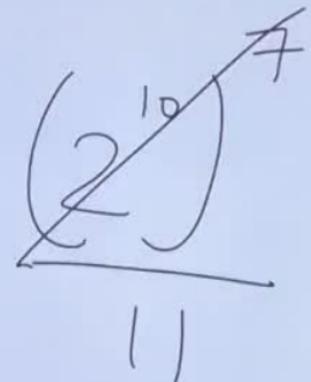
$$2^7 \rightarrow 7$$

$$2^8 \rightarrow 3$$

$$2^9 \rightarrow 6$$

$$2^{10} \rightarrow 1$$

11. $\frac{2^{70}}{11}$



$$R = \underline{\underline{1}}$$

$$2^1 \rightarrow 2$$

$$2^2 \rightarrow 4$$

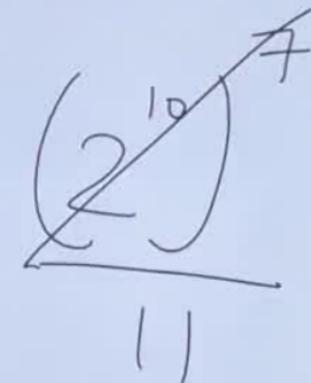
$$2^3 \rightarrow 8$$

$$2^4 \rightarrow 16$$

$$2^5 \rightarrow 32$$

$$2^6 \rightarrow 64$$

11. $\frac{2^{70}}{11}$



$$R = \underline{\underline{1}}$$

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Fermat Theo

$$2^1 \rightarrow 2$$

$$2^2 \rightarrow 4$$

$$2^3 \rightarrow 8$$

$$2^4 \rightarrow 5$$

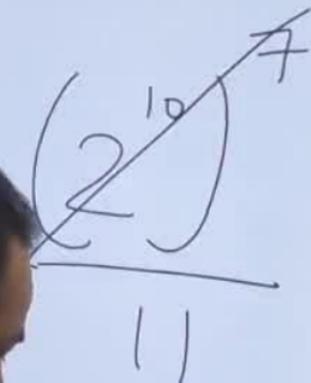
$$2^5 \rightarrow 10$$

$$2^6 \rightarrow 9$$

$$2^7$$

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11. $\frac{2^{70}}{11}$



$$R = \underline{\underline{1}}$$

$$\frac{2^{10}}{11} \quad R = 1$$

$$R = \underline{\underline{1}}$$

$$2^1 \rightarrow 2$$

$$2^2 \rightarrow 4$$

$$2^3 \rightarrow 8$$

$$2^4 \rightarrow 5$$

$$2^5 \rightarrow 10$$

$$2^6 \rightarrow 9$$

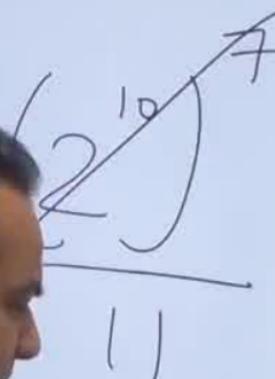
$$2^7 \rightarrow$$

$$2^8 \rightarrow$$

$$2^9 \rightarrow$$

$$2^{10} \rightarrow$$

11. $\frac{2^{10}}{11}$



$$R = 1$$

Let Theorem

$$\frac{2^{10}}{11}$$

$$R = 1$$

$$x = 1$$

$$\frac{3}{13} \quad R = 3$$

$$\frac{3^2}{13}$$

$$\frac{3}{17}$$

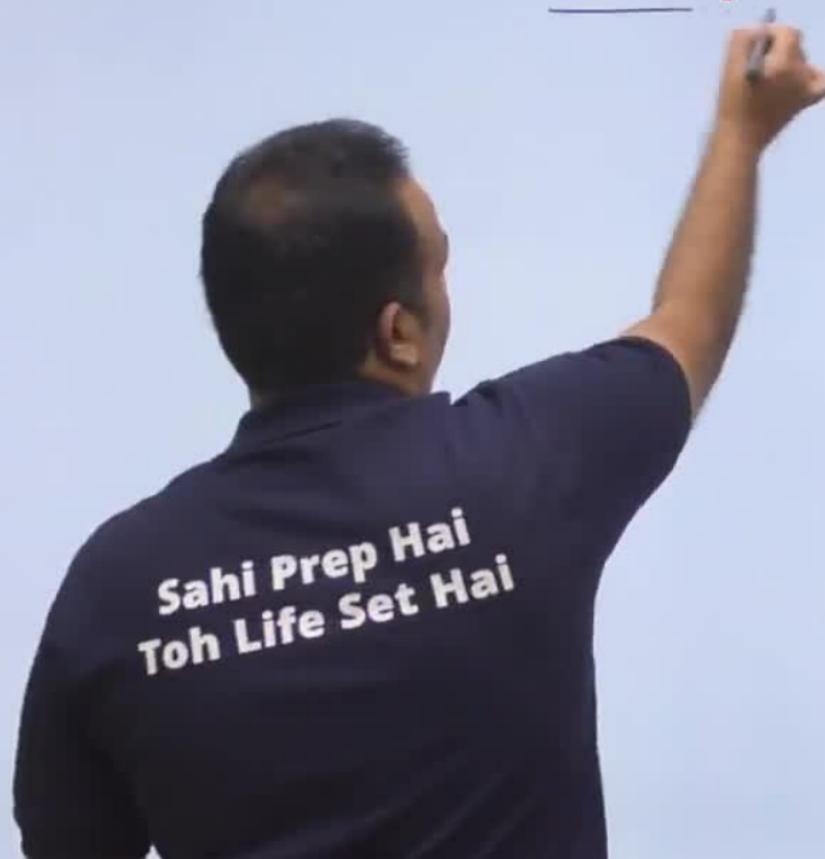
12. $\frac{3^{100}}{13}$

$$\left(\cancel{3}\right)^{\cancel{33}} \cdot 3^1$$

$$13$$

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Toh Life Set Hai

Concept of Negative Remainder



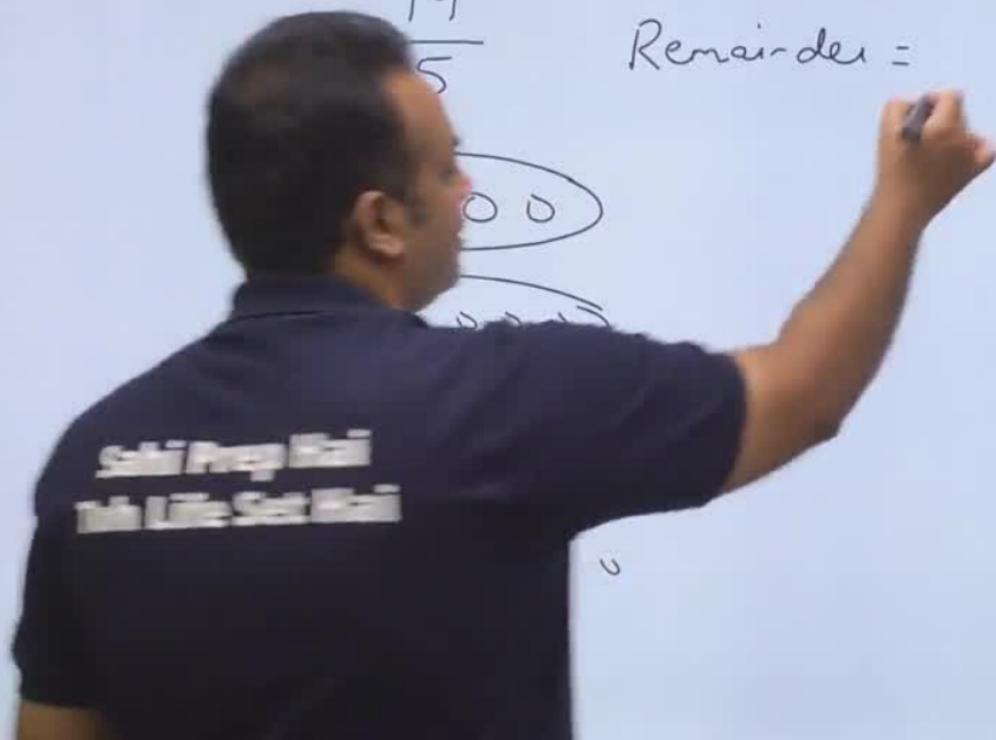
Concept of Negative Remainder



Concept of Negative Remainder

$$\begin{array}{r} 19 \\ \hline 5 \end{array}$$

Remainder =



Concept of Negative Remainder

19

Remainder = 4



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Concept of Negative Remainder

$$\frac{19}{5}$$



Reminder = 4

$$= -1$$

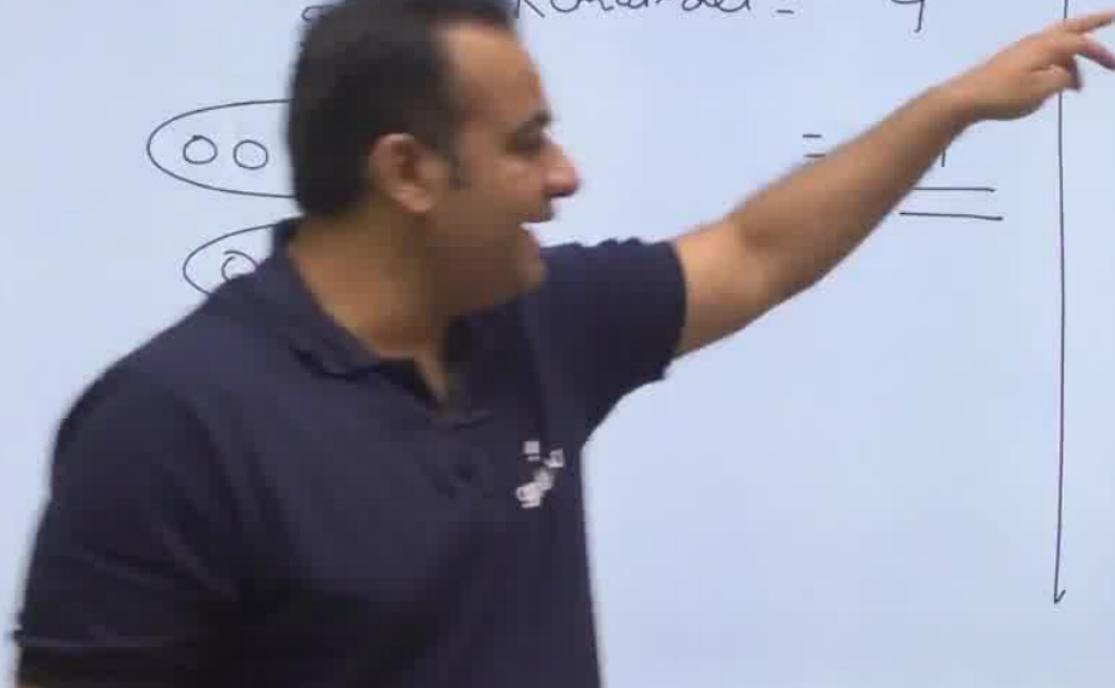
$$\frac{198}{200}$$

Concept of Negative Remainder

$$\frac{19}{2}$$

Reminder = 4

$$\frac{198}{200}$$



eg $\frac{2}{3}$ Rem =



$$\text{eg. } 1 \frac{2^{50}}{3} \quad \text{Re } m = ?$$

$$\begin{array}{r} 2 \\ \hline 3 \end{array}$$

$$\underline{(-1)^{50}}$$

$$(-1)^{\text{odd}}$$

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Toh Life Set Hai

$$\text{eg. } 1 \frac{2^{50}}{3} \quad \text{Re } m = ?$$

$$R = -1$$

$$(-)$$

$$\frac{(-1)^{50}}{3} \quad R = +1 \quad \checkmark$$

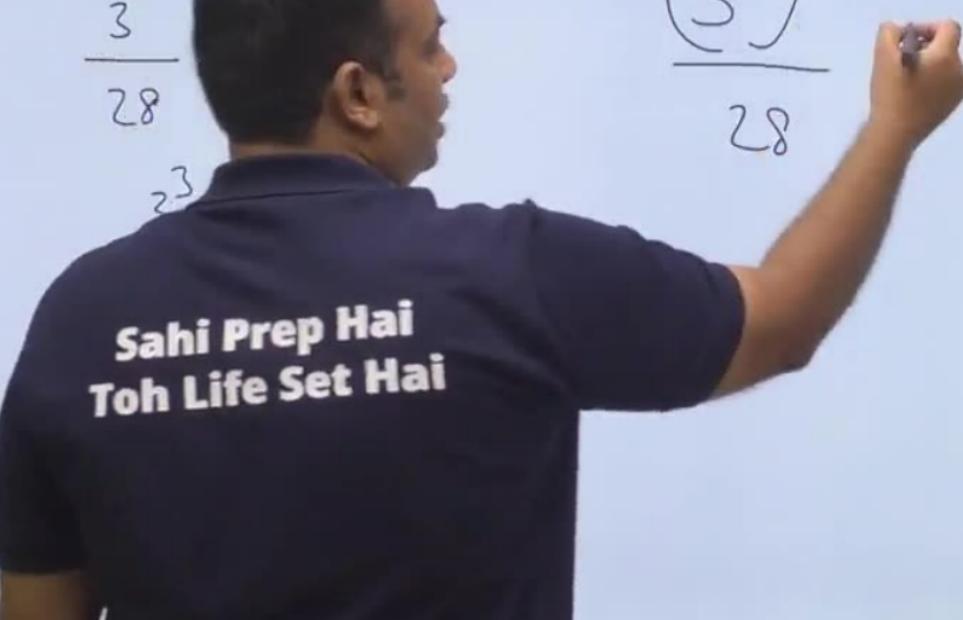
$$\text{eg. } 2 \frac{3^{30}}{28} \text{ Re } m = ?$$

$$\begin{array}{r} 3^1 \\ \hline 28 \\ R = 3 \end{array}$$

$$\begin{array}{r} 3^2 \\ \hline 28 \end{array}$$

$$2^3$$

$$\begin{array}{c} (3^3)^{10} \\ \hline 28 \end{array}$$



eg.3 $\frac{2^{51}}{17}$ Re m = ?



$$\text{eg.3} \quad \frac{2^{51}}{17} \quad \text{Re } m = ?$$

$$\frac{2^1}{17} = 2$$

$$2^2 =$$

$$2^3 =$$

$$\underline{2^4}$$

$$(2^4)$$

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Toh Life Set Hai

$$\text{eg.3} \quad \frac{2^{51}}{17} \quad \text{Re } m = ?$$

$$\frac{2^1}{17} = 2$$

$$2^2 =$$

$$2^3 =$$

$$\underline{(2^4)^{12} \cdot 2^3}$$

$$17$$

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$$\text{eg.3} \quad \frac{2^{51}}{17} \quad \text{Re } m = ?$$

$$\frac{2^1}{17} = 2$$

$$2^2 = 4$$

$$2^3 = 8$$

$$\frac{(2^4)^{12} \cdot 2^3}{17}$$

$$\frac{1 \cdot 2^3}{1}$$

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$$\text{eg.3} \quad \frac{2^{51}}{17} \quad \text{Re } m = ?$$

$$\frac{2^1}{17} = 2$$

$$2^2$$

$$2^3$$

$$\begin{array}{r} (2)^{12} \\ \underline{-} \quad 2^3 \\ 17 \end{array}$$

$$\begin{array}{r} 2^3 \\ \underline{-} \quad 17 \\ R = 8 \end{array}$$

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$$eg. 4 \quad \frac{5^{37}}{126} \quad \text{Re } m = ?$$

$$\begin{array}{r} 5^1 \\ \hline 126 \end{array}$$

$$\begin{array}{r} 5^2 \\ \hline 126 \end{array}$$

$$\begin{array}{r} 5^3 \\ \hline 126 \end{array}$$

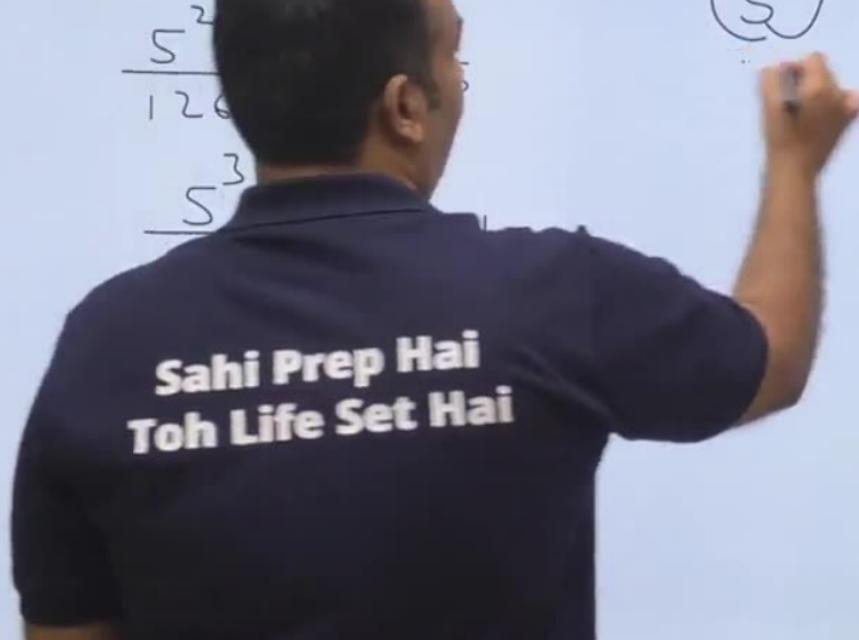
$$(5^3)^{12}$$

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$$eg.4 \quad \frac{5^{37}}{126} \quad Re m = ?$$

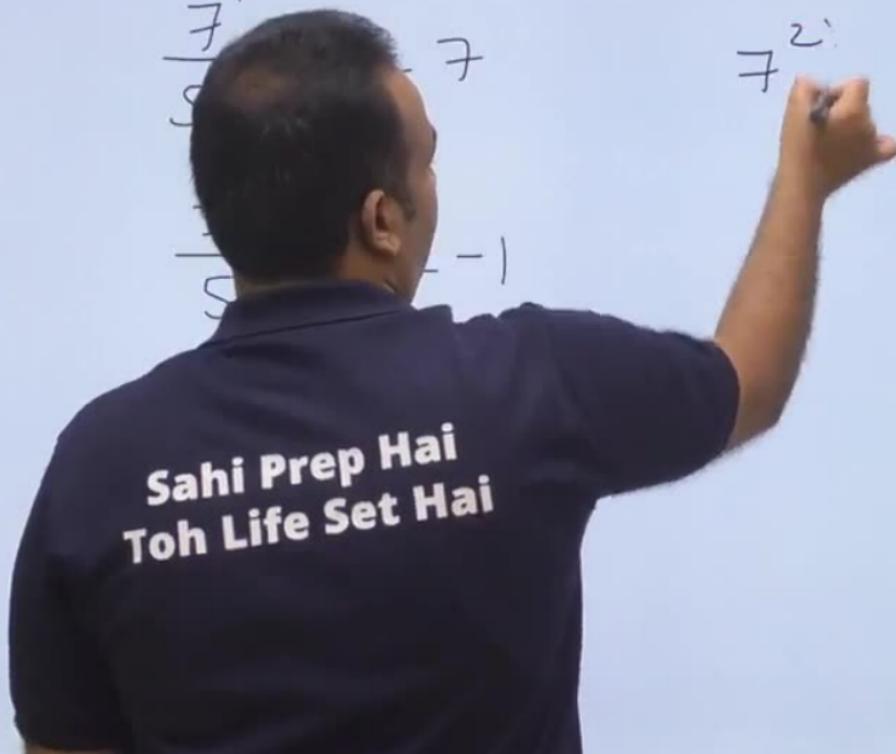
$$\begin{array}{r} 5^1 \\ \hline 126 \\ 5^2 \\ \hline 126 \\ 5^3 \\ \hline \end{array}$$

$$(5^3)^{12} \cdot 5^1$$



$$eg. 5 \quad \frac{7^{39}}{50} \quad \text{Re } m = ?$$

$$\begin{array}{r} 7^1 \\ \hline S \\ - 7 \\ \hline S \\ -) \\ \hline \end{array}$$



$$eg.5 \quad \frac{7^{39}}{50} \quad \text{Re } m = ?$$

$$\frac{7^1}{50}$$

$$\frac{7^2}{50}$$

$$\frac{(7^2)^{19} \cdot 7^1}{50}$$

Sahi Prep Hai
Toh Life Set Hai

$$eg.5 \quad \frac{7^{39}}{50} \quad \text{Re } m = ?$$

$$\frac{7^1}{50}$$

$$\frac{7^2}{50}$$

$$\left(\frac{7^3}{50} \right) \begin{matrix} -1 \\ 2 \\ 1 \end{matrix}$$

Sahi Prep Hai
Toh Life Set Hai

$$eg. 5 \quad \frac{7^{39}}{50} \quad \text{Re } m = ?$$

$$\frac{7^1}{50} \quad R$$

$$\frac{7^2}{50}$$

$$\frac{(7^2)^{-1}}{50}$$

$$= -\frac{7}{50}$$

Sahi Prep Hai
Toh Life Set Hai

eg.5 $\frac{7^{39}}{50} \text{ Re } m = ?$

$$\frac{7^1}{50} \quad R = 7$$

$$\frac{7^2}{50} \quad R = -1$$

$$\frac{\cancel{(7^2)}^{-1} \cdot 7^1}{50}$$

50

$$= \frac{-7}{50} \quad \underline{\underline{R = 43}}$$

Points to Remember while solving questions on Remainders

1. Find a power - check for the power where remainder is 1 or -1)

If you are using Fermat Theorem then always check for its condition .

If some factors are getting cancelled then while calculating the final answer you have to multiply by the same factor by which it was cancelled .

Sahi Prep Hai
Tujh Little Step Bhi

Points to Remember while solving questions on Remainders

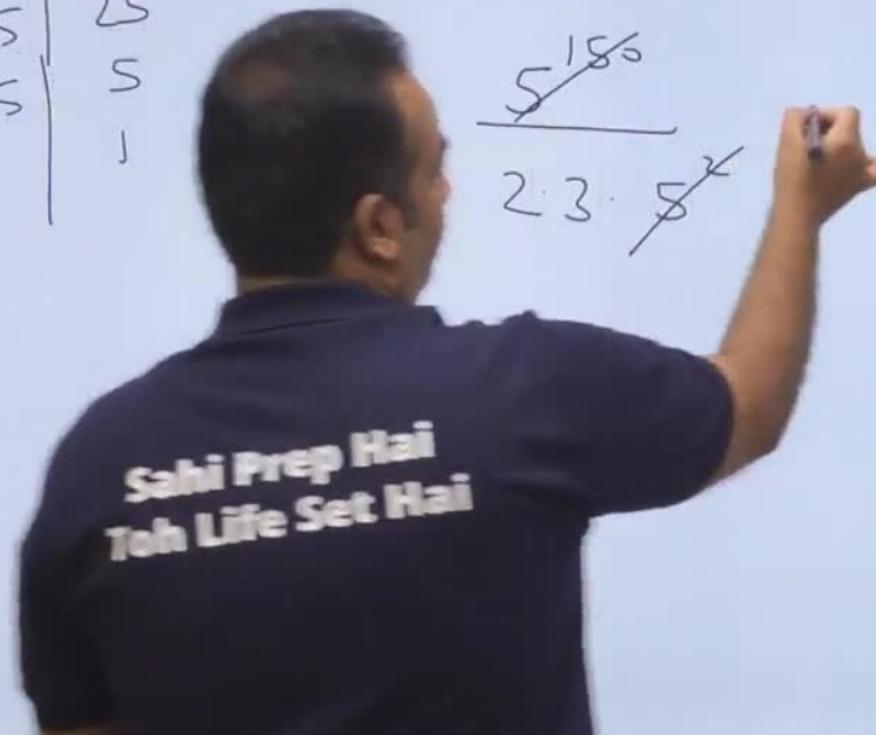
1. Find a power (check for the power where remainder is 1 or -1)
2. If you are using Fermat Theorem then always check for its condition .
- 3 . If some factor is getting cancelled then while calculating the final answer you have to multiply by the same factor by which you have cancelled .

$$\begin{array}{r} 150 \\ 2 \overline{)150} \\ -10 \\ \hline 50 \\ 3 \overline{)50} \\ -30 \\ \hline 20 \\ 5 \overline{)20} \\ -20 \\ \hline 0 \end{array}$$

13. $\frac{5^{150}}{150}$

$$\begin{array}{r} 150 \\ 5 \overline{)150} \\ -15 \\ \hline 0 \end{array}$$

~~23. 5~~

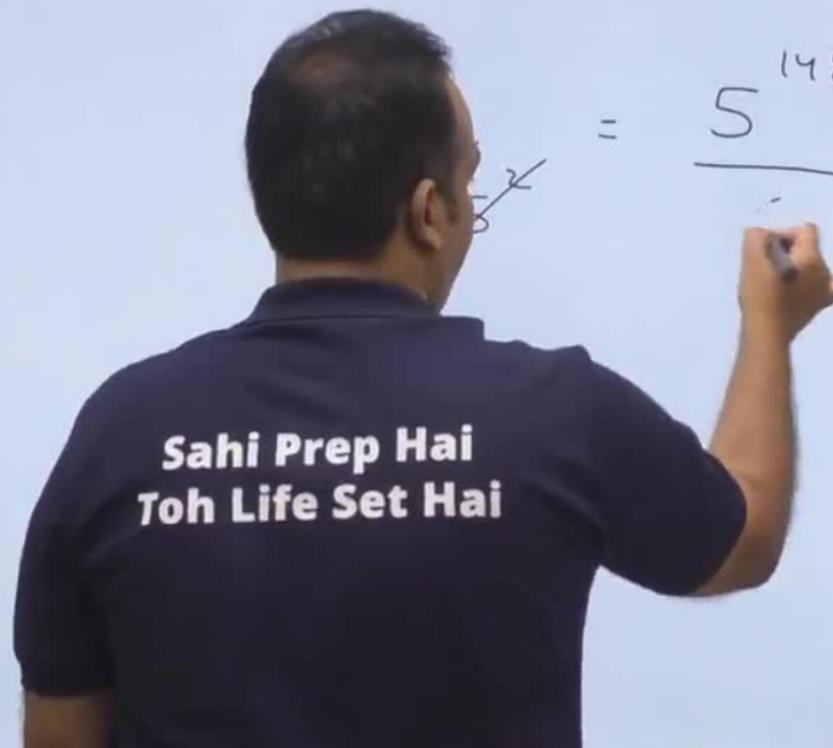


$$\begin{array}{r} 150 \\ \hline 2 \Big) \end{array}$$

75
25
5

13. $\frac{5^{150}}{150}$

= $\frac{5^{148}}{1}$

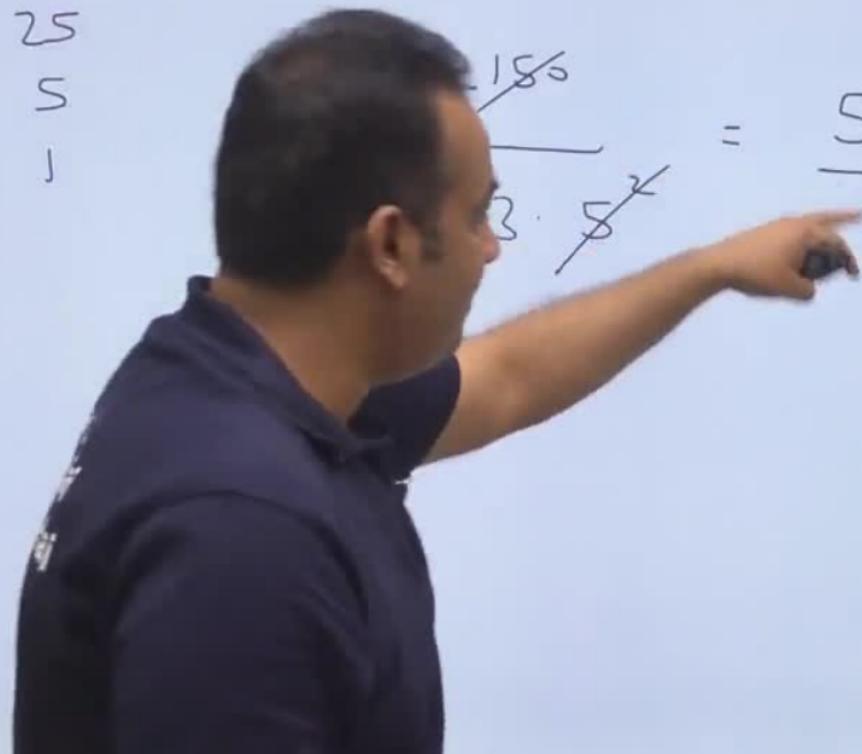


$$\begin{array}{r} 150 \\ \hline 2 \Big) \end{array}$$

75
25
5

13. $\frac{5^{150}}{150}$

$\frac{150}{3 \cdot 5^2} = \frac{5^{148}}{6}$



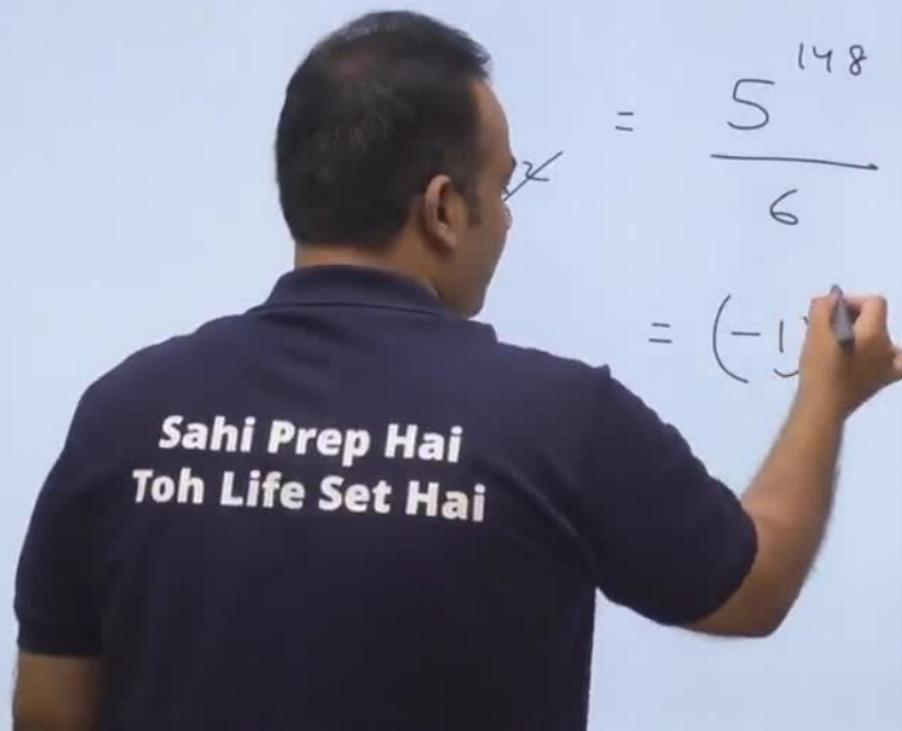
$$\begin{array}{r} 150 \\ \hline 2 \Big) \end{array}$$

75
25
5
5
1

13. $\frac{5^{150}}{150}$

~~$= \frac{5^{148}}{6}$~~

$= (-1)$



$$\begin{array}{r} 150 \\ \hline 2 \Big) \quad | \\ 3 \quad 75 \\ 5 \quad 25 \\ 5 \quad 5 \\ \hline \end{array}$$

13. $\frac{5^{150}}{150}$

$$= \frac{5^{148}}{6}$$

$$= \underline{(-1)^{148}}$$

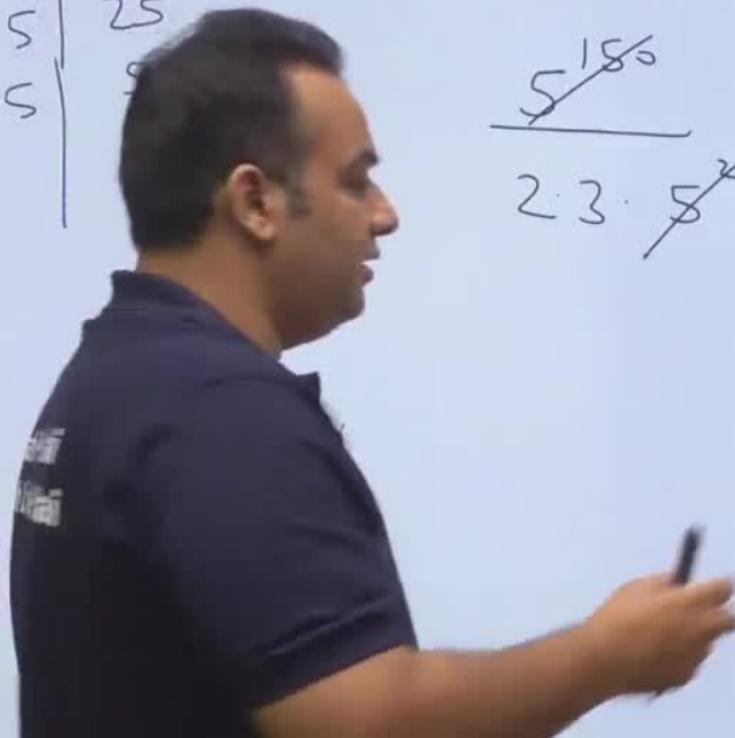
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$$\begin{array}{r} 150 \\ 2 \overline{)150} \\ -10 \\ \hline 50 \\ 5 \overline{)50} \\ -5 \\ \hline 0 \end{array}$$

13. $\frac{5^{150}}{150}$

$$\frac{\cancel{5}^{150}}{2 \cdot 3 \cdot \cancel{5}^2} = \frac{5^{148}}{6}$$

$$= \frac{(-1)^{148}}{6} = 1$$



$$\begin{array}{r} 150 \\ \hline 2 \Big) \end{array}$$

75
25
5

13. $\frac{5^{150}}{150}$

$$\begin{array}{r} 150 \\ \hline 5 \end{array}$$

~~23.5~~

148

148

6 = 1

25 = 25

Sahi Prep Hai
Toh Life Set Hai

$$\begin{array}{r} 150 \\ \hline 2 \Big) \end{array}$$

75
25
5

13. $\frac{5^{150}}{150}$

$$\begin{array}{r} 150 \\ \hline 5 \end{array} = \frac{5^{148}}{6}$$

$$= \left(-\frac{5^{148}}{6} \right) = 1$$

$$1 \times 25 = \boxed{25}$$

Sahi Prep Hai
Toh Life Set Hai

$$\begin{array}{r} 150 \\ \hline 2 \Big) \end{array}$$

75
25
5

13. $\frac{5^{150}}{150}$

$$\frac{150}{5^2} = \frac{148}{5}$$

$$= \frac{(-1)^{148}}{5} = 1$$

$$1 \times 25 = \boxed{25}$$

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eg $\frac{2}{3}$ Rem = -1

$$\frac{39}{20} \quad \text{Rem} = -1$$

$$\frac{37}{20} \quad R = -3$$

$$\frac{78}{10} \quad \text{Rem} = -2$$

$$\frac{69}{14} \quad R = -1$$

$$Q.4 \quad \frac{2^{96}}{96}$$



$$Q.4 \quad \frac{2^{96}}{96}$$

$$\begin{aligned} &= \frac{2^{91}}{3} \\ &= \frac{(-1)^{91}}{3} \end{aligned}$$

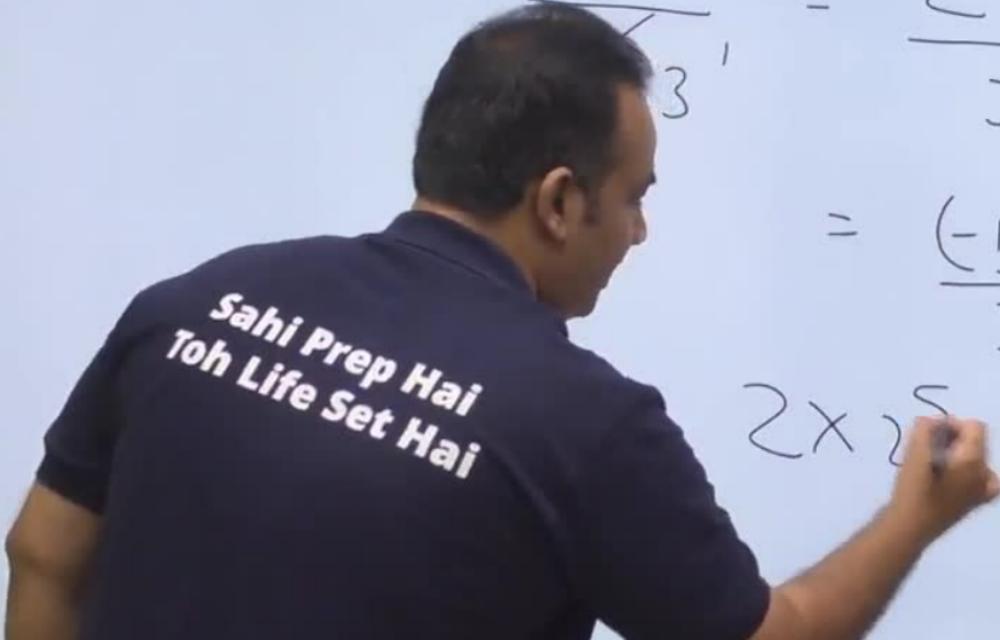
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$$Q.4 \quad \frac{2^{96}}{96}$$

$$\frac{2^{96}}{3} = \frac{2^{91}}{3}$$

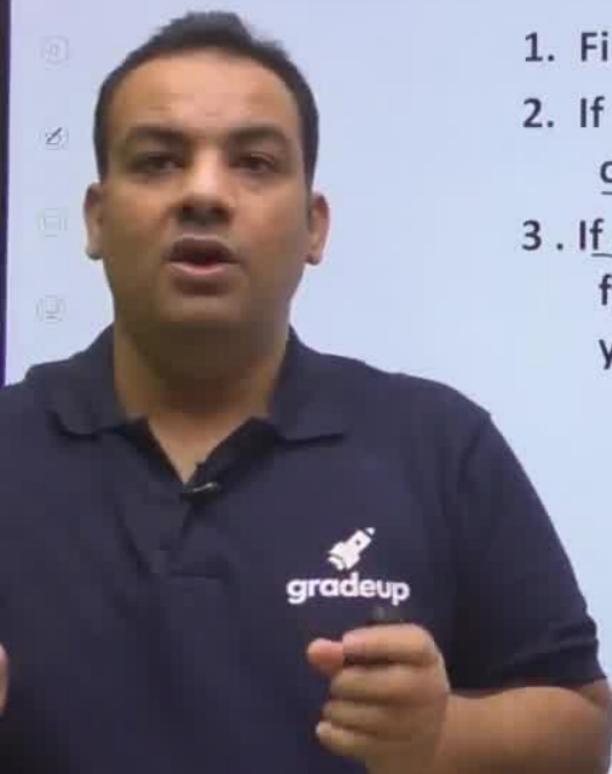
$$= \frac{(-1)^{91}}{3} = -\frac{1}{3} \Rightarrow = 2$$

$$2 \times 2^5$$



Points to Remember while solving questions on Remainders

1. Find a power (check for the power where remainder is 1 or -1)
2. If you are using Fermat Theorem then always check for its condition .
- 3 . If some factor is getting cancelled then while calculating the final answer you have to multiply by the same factor by which you have cancelled .



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6 - Remainder...

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Notes

12:31 PM

The image shows a person from the side, wearing a dark blue t-shirt with the slogan "Prep Hai Set Hai" printed on it. The person is pointing their right index finger towards a computer screen. The screen displays a Microsoft PowerPoint slide. At the top of the slide, there's a navigation bar with tabs like File, Home, Insert, Draw, Design, Transitions, Animations, Slide Show, Review, View, MathType, and Help. The "Slide Show" tab is currently selected. Below the navigation bar, there are several options: "From Beginning", "From Current Slide", "Present", "Custom Slide Show", "Rehearse with Coach", "Set Up", "Rehearse Timings", "Record Single Show", "Record Slide Show", "Play Recordings", "Show Media Controls", and "Captions & Subtitles". A large watermark for "gradeup" with the tagline "Sahi Prep Hai Toh Life Set Hai" is centered on the slide. Below the watermark, there are two green-bordered boxes: one containing the text "Practise topic-wise quizzes" and another containing "Keep attending live classes". Further down, there's a "GET IT ON Google Play" button with the Google Play logo and a five-star rating below it. At the bottom of the slide, it says "Click to add notes". The overall background is a light blue color.

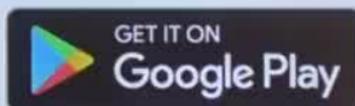


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