If the number 18601X57Y is divisible by 72, Find the value of (X + Y)?

A) 6 B) 2 C) 8 D) 4

$\frac{18601X57Y}{72}|_R$

$72 \rightarrow 8 \times 9$

For 8: $\frac{57Y}{8}|_R = 0$

$Y = 6$

For 9: $\frac{1+8+6+1+5+7+X+Y}{9}|_R = 0$

$\frac{28+X+Y}{9}|_R = \frac{28+6+X}{9}|_R = \frac{34+X}{9}|_R$

$X = 2$

$X + Y = 6 + 2 = 8$

#NumberSystem #Factorization #GeneralAptitude

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If the number 715X423 is divisible by 3 (X denotes the missing digit in the thousandths place), then the smallest whole number in the place of X is _____ . [GATE 2018, 1 MARK (EC)]

A) 0 B) 2 C) 5 D) 6

$\frac{715X423}{3}\ /R = 0$ $\quad \frac{7+1+5+X+4+2+3}{3}\ /R = \frac{22+X}{3}\ /R$

$= \frac{1+X}{3}\ /R$

$X = 2$

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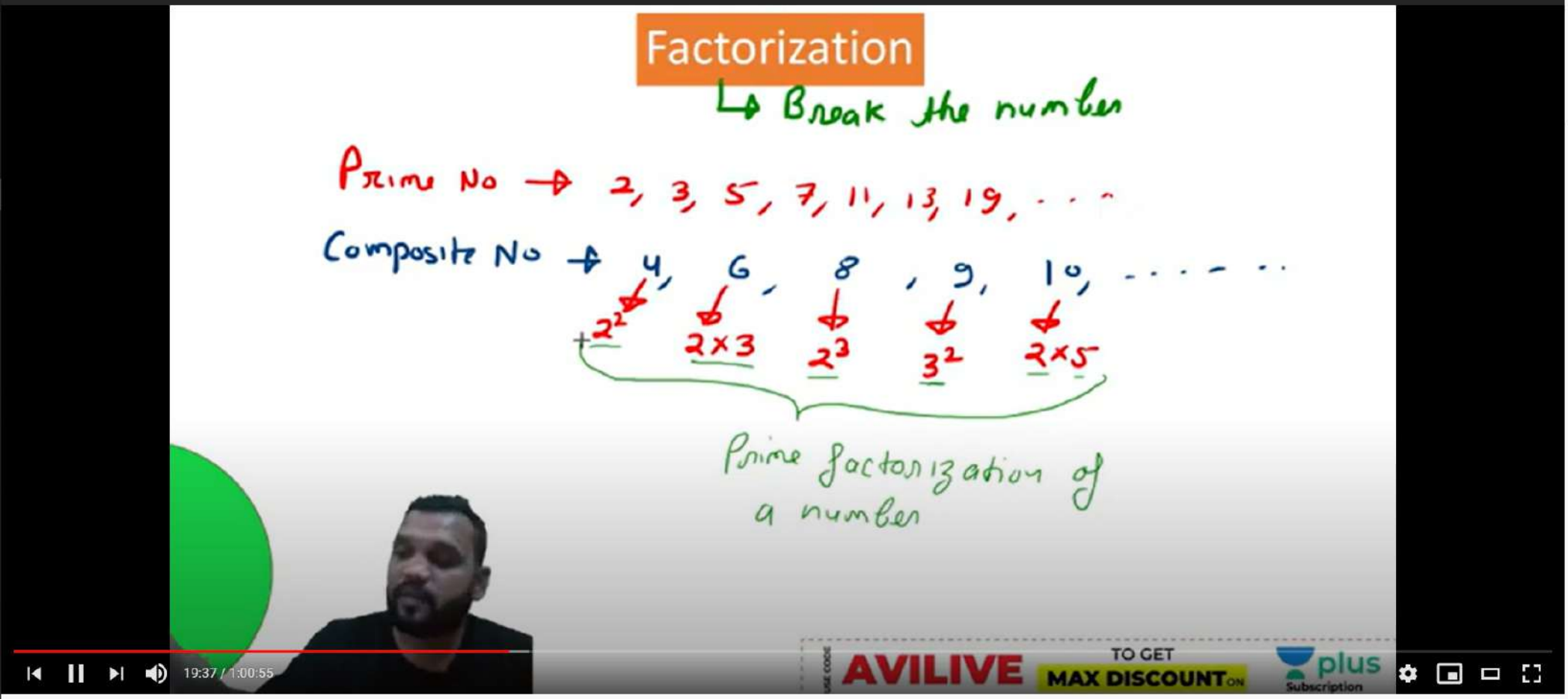

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Mahima Sharma Let's crack it.....

Number of factor:-

Eg $12 = \underbrace{2^2 \times 3}_{\text{factorization}}$, Factors of 1, 2, 3, 4, 6, 12

$(2^0, 2^1, 2^2)$ $(3^0, 3^1)$

$3 \times 2 = 6$

$2^0 \times 3^0$, $2^1 \times 3^0$, $2^2 \times 3^0$, $2^0 \times 3^1$, $2^1 \times 3^1$, $2^2 \times 3^1$

1 2 4 3 6 12

No of factors $= 3 \times 2 = 2$

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Number of factor:-

Eg $12 = 2^{2} \times 3^{1}$, Factors of 1, 2, 3, 4, 6, 12

factorization

$(2^0, 2^1, 2^2)$ $(3^0, 3^1)$

3 × 2 = 6

$2^0 \times 3^0$, $2^1 \times 3^0$, $2^2 \times 3^0$, $2^0 \times 3^1$, $2^1 \times 3^1$, $2^2 \times 3^1$

1 2 4 3 6 12

No of factors = $3 \times 2 = (2+1)(1+1)$

$= 6$

#NumberSystem #Factorization #GeneralAptitude

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If $N = P_1^{a} \times P_2^{b} \times P_3^{c} \times P_4^{d} \ldots\ldots\ldots$

No of factor $= (a+1)(b+1)(c+1)(d+1) \ldots\ldots$

Eg $120 = 12 \times 10 = 2^2 \times 3 \times 2 \times 5 = 2^3 \times 3^1 \times 5^1$

↳ Prime factorization

No of factors $= (3+1)(1+1)(1+1) = 4 \times 2 \times 2 = 16$

Eg $75 \Rightarrow 3 \times 5^2$

$(2+1)(1+1) = 6$

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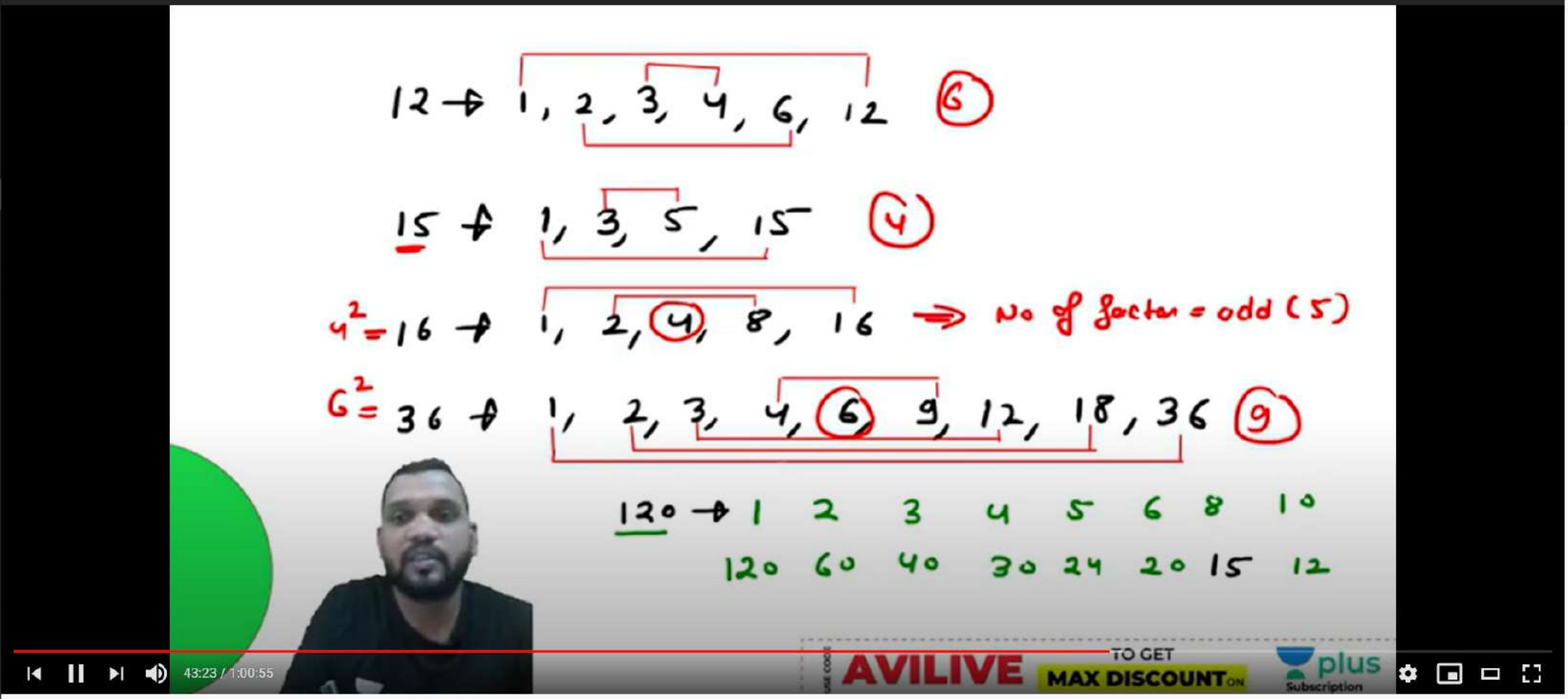

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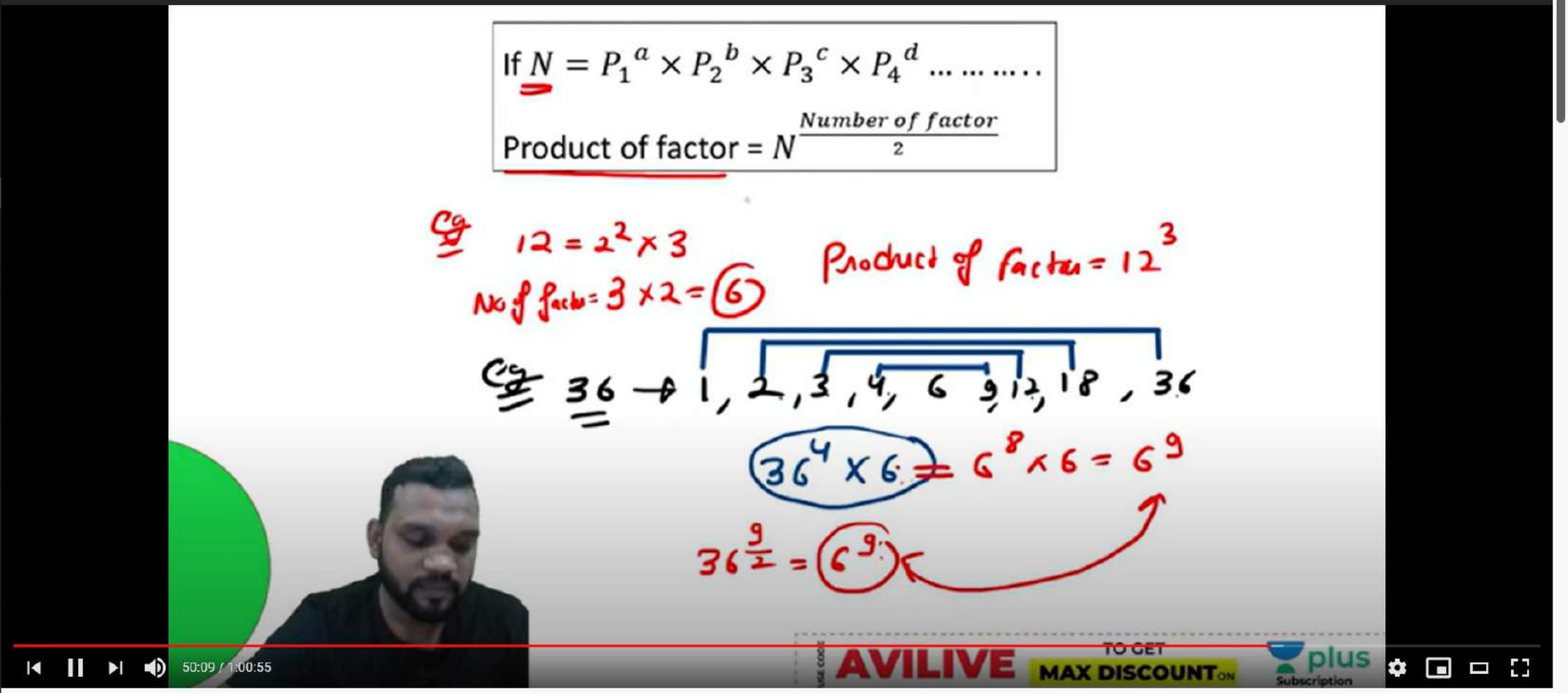
Mahima Sharma 6



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1) A prime number has 2 factor

3 → 1, 3 7 → 1, 7

2) Only the square of a prime number has exactly 3 factors.

$3^2 \rightarrow (2+1) = 3$

$7^2 \rightarrow (2+1) = 3$

3) Only a perfect square has odd number of factor and other every number has even number of factors.

53:00 / 1:00:55

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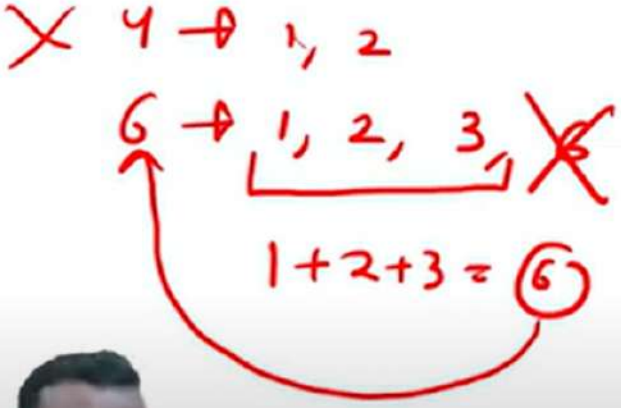
***Perfect Number*:-** If sum of all factors of a number(excluding no) is equal to original number then number is called perfect number.



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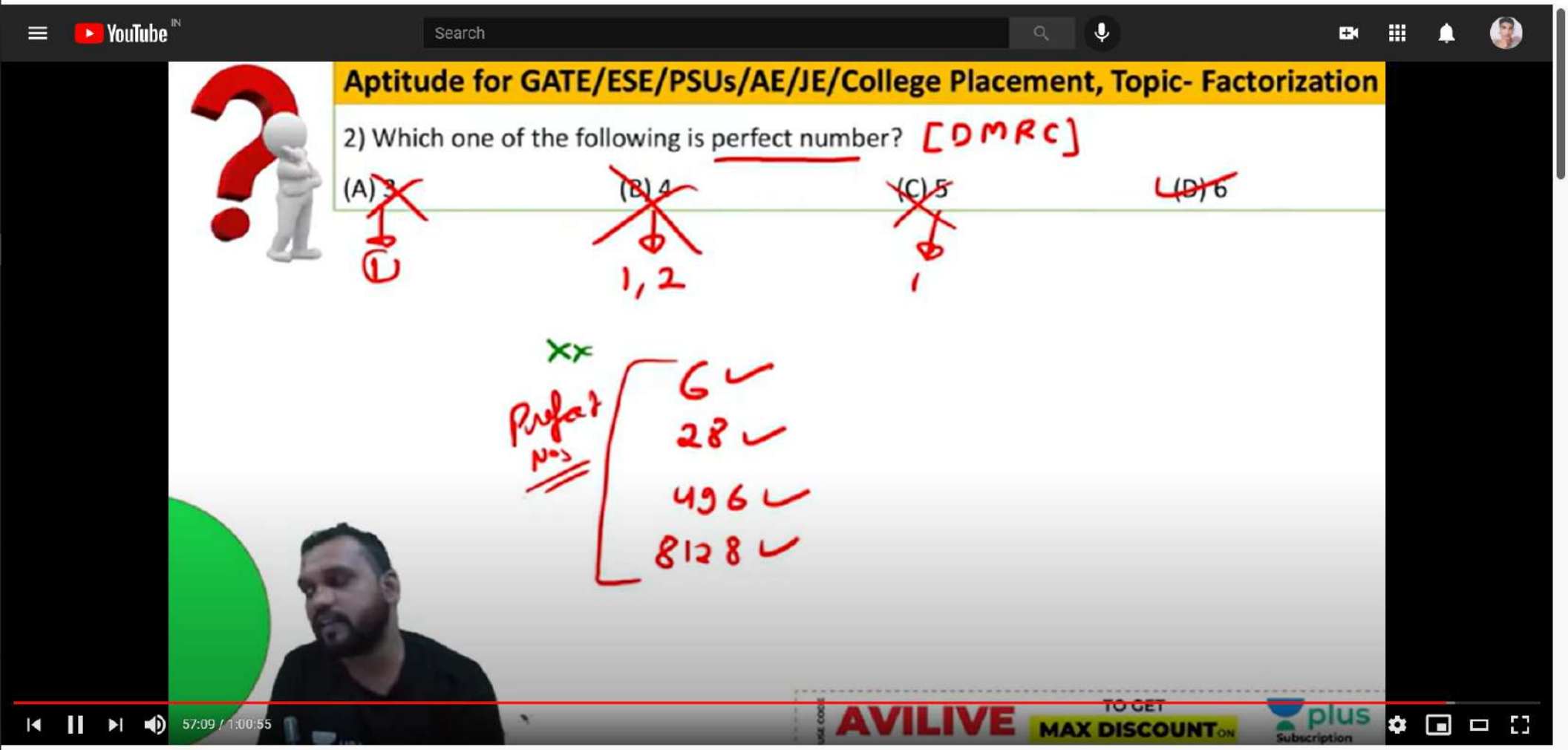

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Home Work Question

How many number less than 1000 will have exactly 3 factors?

(A) 5 (B) 31 (C) 11 (D) 9

(Prime No)^2 → Exactly 3 factor

$2^2, 3^2, 5^2, 7^2, 11^2, 13^2, 17^2, 19^2, 23^2, 29^2, 31^2$, ~~$37^2$~~

#Factorial #NumberSystem #GeneralAptitude

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Factorial → ! or L

$9! = 9 \times 8! = 9 \times 8 \times 7! = 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$

$\frac{49 \times 50 \times 51}{3!}\Big|_R = 0$

$\frac{123 \times 124 \times 125}{3!}\Big|_R = 0$

$3 \times 4 \times 5$ divisible by $3!$

$3 \times 4 \times 5 \times 6$ " " $4!$

$(n-1)n(n+1)$ " " $3!$

Note:- Product of n consecutive number is always divisible by $n!$

14:31 / 1:06:15

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Harsh good evening sir

Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Factorial

MSQ

1) $(n^2-4)n(n^2-1)$ where n > 48, is divisible by which number

A) 24 B) 20 C) 48 D) 49

$(n^2-4)n(n^2-1) = (n^2-2^2)n(n^2-1^2)$ $\left[a^2-b^2=(a-b)(a+b)\right]$

$=(n-2)(n+2)n(n-1)(n+1)$

$=(n-2)(n-1)n(n+1)(n+2)$

↳ 5 Consecutive numbers

$5! = 5\times4\times3\times2\times1 = 120$

Factors of 120 →

1	2	3	4	5	6	8	10
120	60	40	30	24	20	15	12

$\frac{36}{6}|_R = 0$ 6 → 1, 2, 3, 6

$\frac{32}{8}|_R = 0$ 8 → 1, 2, 4, 8

#Factorial #NumberSystem #GeneralAptitude

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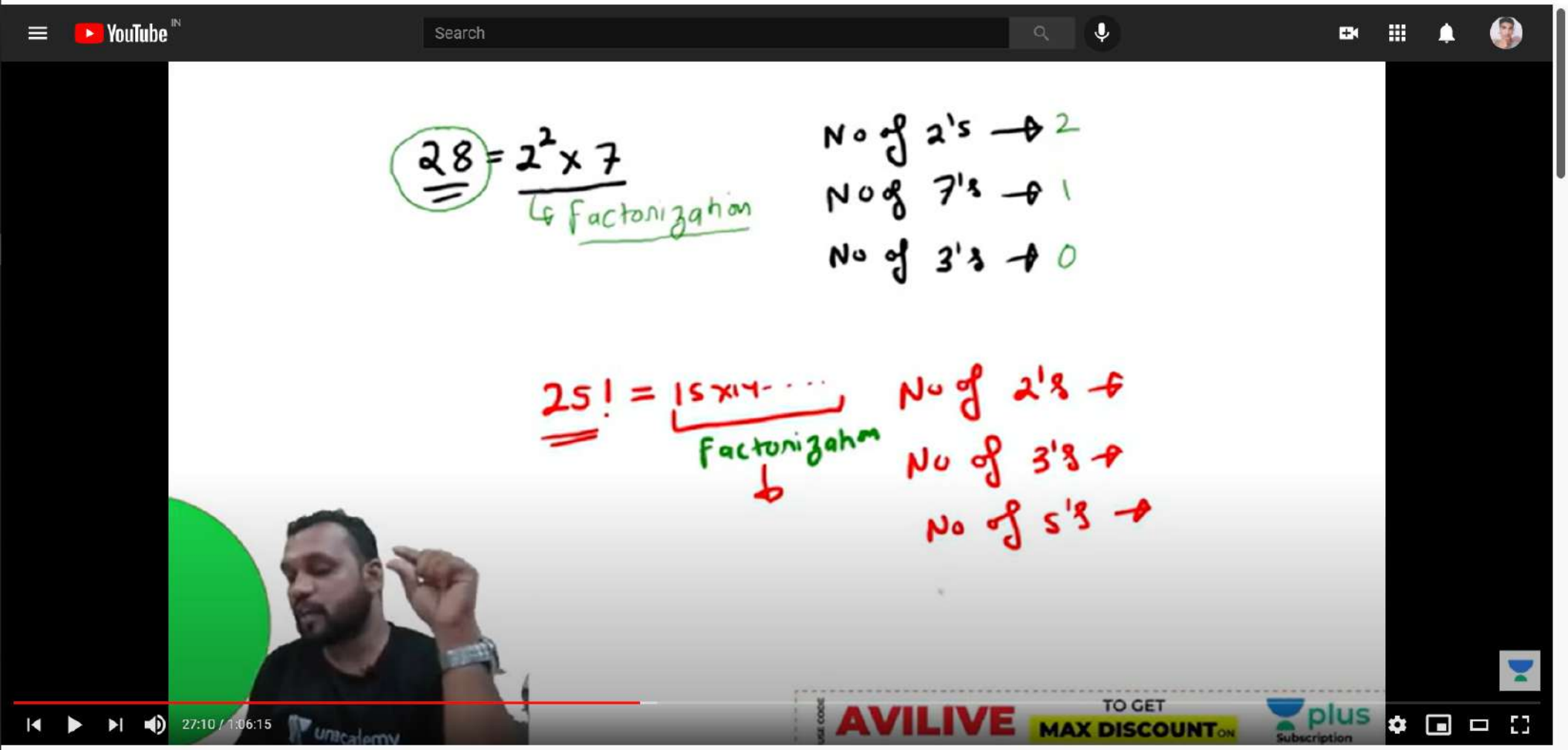

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Kuldeep Salvi yes sir

❖ What is highest power of 2 in 10!

$10! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10$

$8 = 2^3$

multiple of 2 $= \left[\frac{10}{2}\right] = 5$

" " $4 = \left[\frac{10}{4}\right] = 2$

" " $8 = \left[\frac{10}{8}\right] = 1$

Total $2 = 5 + 2 + 1 = 8$

$\left[\frac{10}{2}\right] + \left[\frac{10}{4}\right] + \left[\frac{10}{8}\right] = \left[\frac{10}{2}\right] + \left[\frac{10}{2}\right]\frac{1}{2} + \left[\frac{10}{4}\right]\frac{1}{2}$

$\Rightarrow$

2	10
2	5
2	2
	1

$\Rightarrow 8$

#Factorial #NumberSystem #GeneralAptitude

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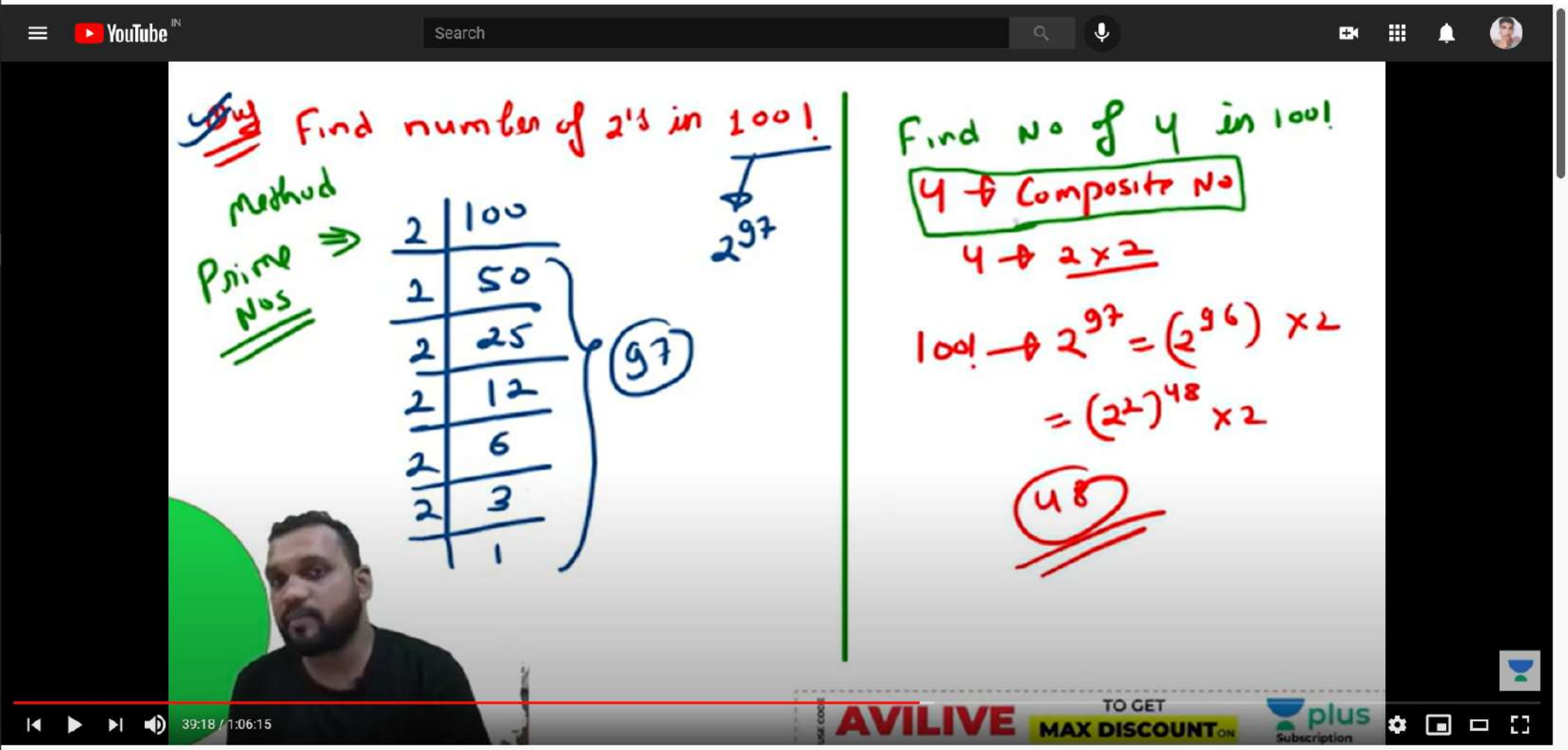

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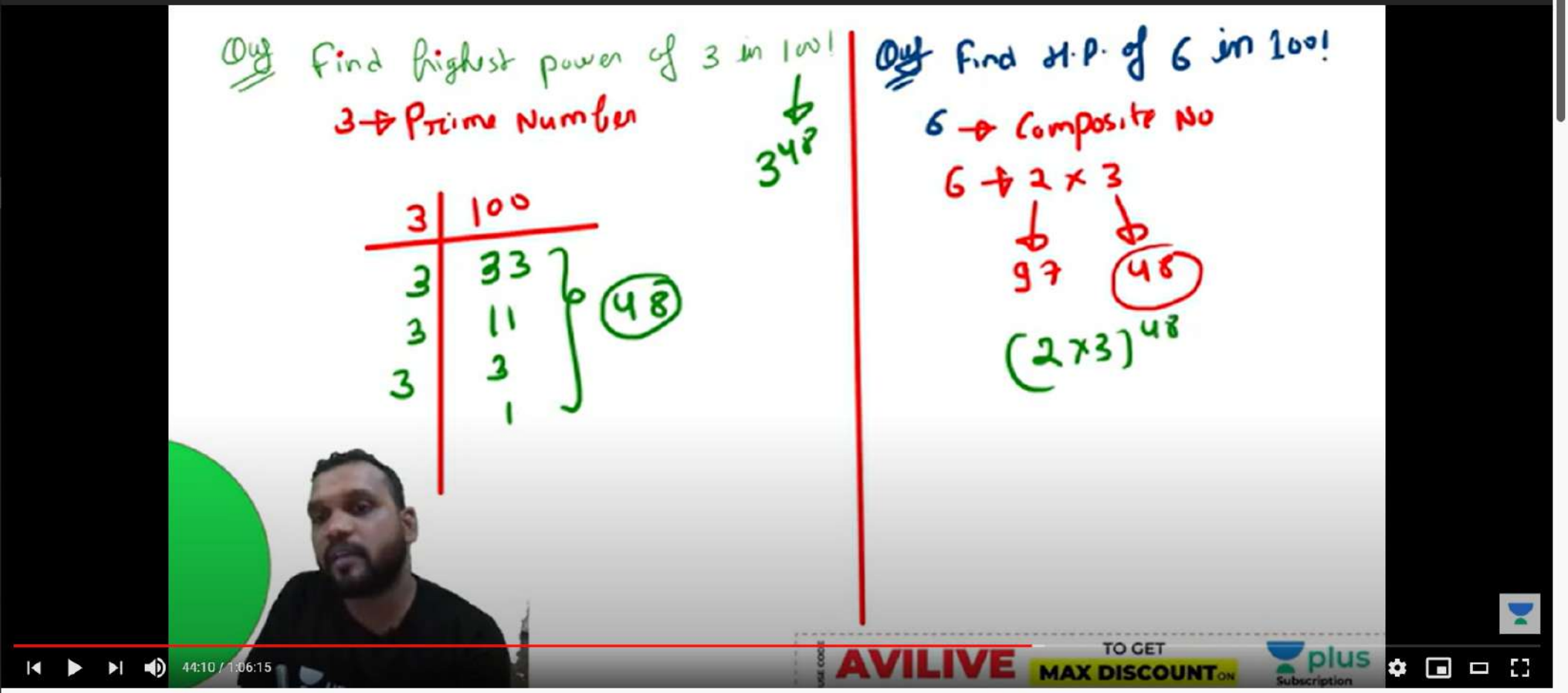
last page sir,



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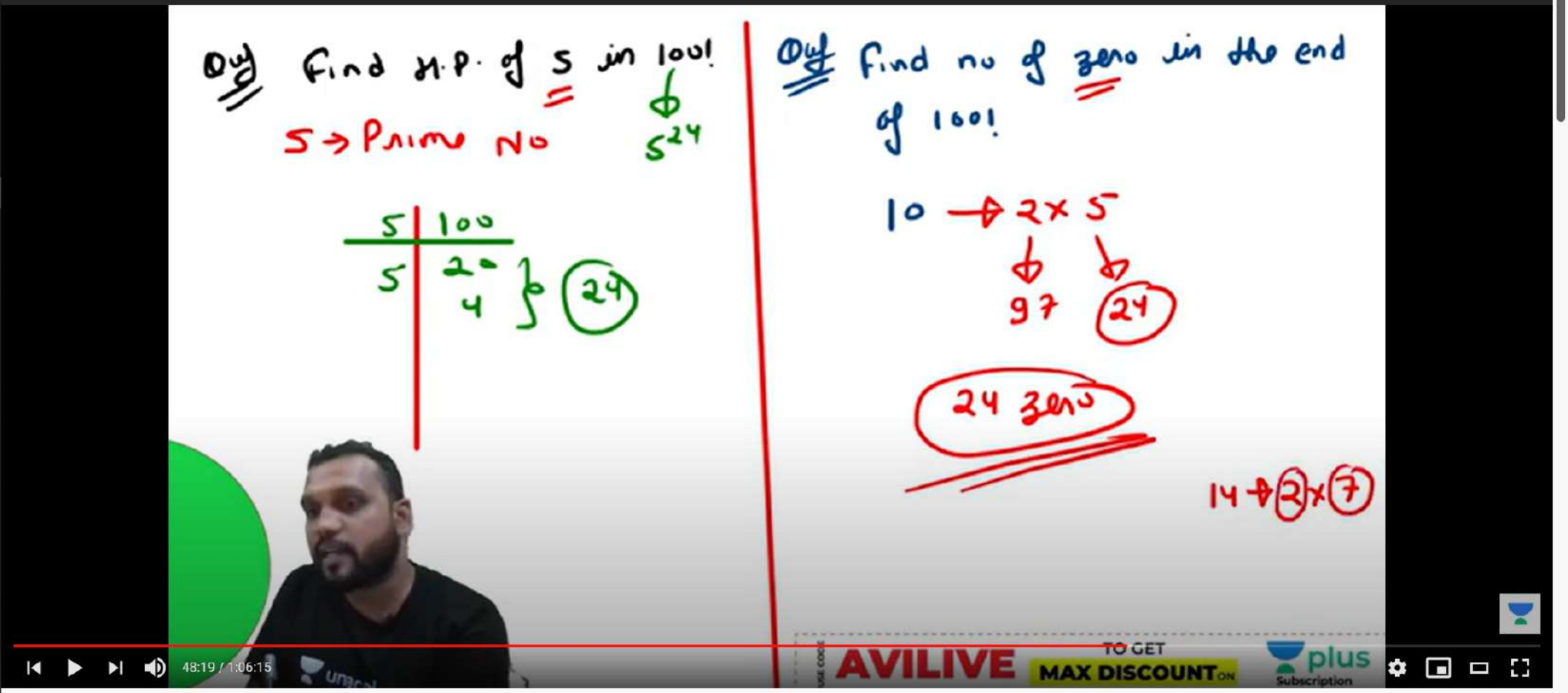

#Factorial #NumberSystem #GeneralAptitude

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Home Work Question

The highest power of 3^2 which exactly divides 20! is [DRDO-2009]

(A) 3 (B) 2 (C) 5 (D) 4

$3 \mid 20$

$3 \mid 6$

2

$3^8 \Rightarrow (3^2)^4$

#Bases_BaseConversion #NumberSystem #GeneralAptitude

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