Gajendra Purohit

Legend in CSIR-UGC NET & IIT-JAM

~ Unlock Code : GPSIR ~ PhD, CSIR NET (Maths) | Youtuber(800K+165K Sub.)/Dr.Gajendra Purohit (Maths), 17+ Yr. Experience, Author

50M Watch mins | **3M** Watch mins (last 30 days) | **44K** Followers | **2K** Dedications

- **TOP EDUCATOR ON UNACADEMY**
  FOR CSIR NET & IIT JAM

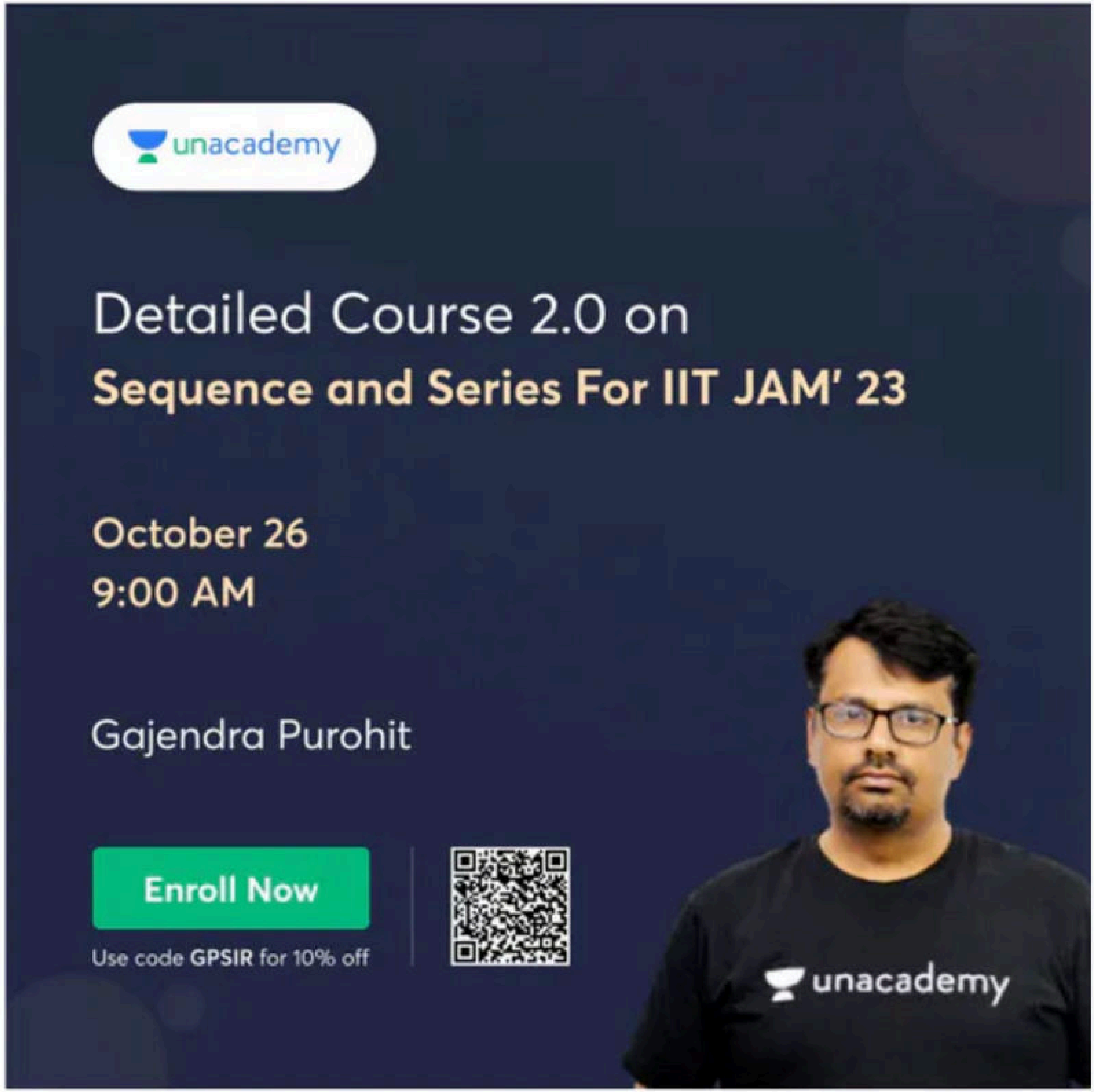
YouTuber with 800K Subscribers

- **AUTHOR OF BEST SELLER BOOK**
  FOR CSIR NET & IIT JAM

Get 10% Off

Referral Code : GP SIR


unacademy
Detailed Course on Group Theory
For CSIR NET 2023
Gajendra Purohit
November 3
Enroll Now
unacademy


unacademy
Detailed Course 2.0 on
Sequence and Series For IIT JAM' 23
October 26
9:00 AM
Gajendra Purohit
Enroll Now
Use code GPSIR for 10% off
unacademy

FEE DETAILS FOR IIT JAM SUBSCRIPTION

No cost EMI available on 6 months & above subscription plans

24 months Save 67%	₹ 908 / mo Total ₹ 21,780
You get 6 months extra for free	Offer expires 15 Jun 2022
12 months Save 54%	₹ 1,248 / mo Total ₹ 14,974
You get 6 months extra for free	Offer expires 15 Jun 2022
9 months Save 45%	₹ 1,497 / mo Total ₹ 13,475
6 months Save 25%	₹ 2,042 / mo Total ₹ 12,252
3 months Save 17%	₹ 2,269 / mo Total ₹ 6,807
1 month	₹ 2,723 / mo Total ₹ 2,723

To be paid as a one-time payment

Have a referral code? Proceed to pay

Get 10% Off

After Using My Referral Code

No cost EMI available on 6 months & above subscription plans

24 months Save 67%	₹ 817 / mo ₹ ~~21,700~~ ₹ 19,602
You get 6 months extra for free	Offer expires 15 Jun 2022
12 months Save 54%	₹ 1,123 / mo ₹ ~~14,974~~ ₹ 13,477
You get 6 months extra for free	Offer expires 15 Jun 2022
9 months Save 45%	₹ 1,348 / mo ₹ ~~13,475~~ ₹ 12,128
6 months Save 25%	₹ 1,838 / mo ₹ ~~12,252~~ ₹ 11,027
3 months Save 17%	₹ 2,042 / mo ₹ ~~6,807~~ ₹ 6,126

GPSIR

Awesome! You get 10% off

Proceed to pay

Function of several variable:

Definition of n-tuples: The Euclidean n-space R^n is the set of all n-tuples $(x_1, x_2, ..., x_n)$ of real numbers on which the two operation of vector addition and scalar multiplication are defined as follow :

(i) Vector addition of two n-tuples:

Let $(x_1, x_2, ..., x_n)$ & $(y_1, y_2, ..., y_n)$ are two vectors then

$(x_1, x_2, ..., x_n) + (y_1, y_2, ..., y_n) = (x_1 + y_1, x_2 + y_2, ... + x_n + y_n)$

(ii) Scalar multiplication:

Let $(x_1, x_2, ..., x_n) \in R^n$ & $\alpha \in R$, then

$\alpha(x_1, x_2, ..., x_n) = (\alpha x_1, \alpha x_2, ..., \alpha x_n)$

Real valued function on n-variables:

Let $S \subseteq R^n$, then a map $f : S \rightarrow R$ is called real valued function on n variables.

Limit of function of two variable:

Let $f : R^2 \rightarrow R$ be a function & $(a, b) \in R^2$, $l \in R$, then we usually denote limit by $\lim\limits_{(x,y)\to(a,b)} f(x,y) = l$.

Important method :

Path method :

If f(x, y) gives same values 'l' along all paths $y = \phi(x)$ passing through (a, b),

Then $\lim\limits_{(x,y)\to(a,b)} f(x,y) = l$.

$y = x$

$y = mx$

$$f(x,y) = \begin{cases} \dfrac{xy}{x^2+y^2} & (x,y) \neq (0,0) \\ 0 & (x,y) = (0,0) \end{cases}$$

$$\lim_{x\to 0} \frac{mx^2}{x^2+m^2x^2} = \frac{m}{1+m^2}$$

$$\lim_{(x,y)\to(0,0)} \left(\frac{xy}{x^2+y^2}\right)$$

$y = mx$

$$\lim_{x\to 0} \frac{x(mx)}{x^2+m^2x^2}$$

$$f = \frac{xy}{x^2+y}$$

$(0,0)$

$$f = \frac{xy}{x+y} \quad \begin{matrix}2\\1\end{matrix}$$

$y = mx$

$$\lim_{x\to 0} \frac{x(mx)}{x+mx}$$

$$\lim_{x\to 0} \frac{x^{\cancel{2}} m}{\cancel{x}(1+m)} = 0$$

$$f = \frac{x}{x^2+y^2} \quad \begin{matrix}1\\2\end{matrix}$$

$$\lim_{x\to 0} \frac{x}{x^2+m^2x^2}$$

$$\lim_{x\to 0} \frac{\cancel{x}}{x^{\cancel{2}}(1+m^2)}$$

$$= \infty$$

Convert function from cartisian form to polar form :

Let f(x, y) is a function of two variable in cartisian form, then put $x = r\cos\theta$ & $y = r\sin\theta$

Then f(x, y) convert into f(r, θ) which is called in polar form.

Bounded function:

A function of two variables $f(x, y)$ is said to be bounded iff $\exists$ $M > 0$ s.t. $|f(x, y)| \le M$; for all (x, y)

Results : If a function $f(x, y)$ is bounded then limit of this function need not be exist.

Results : If limit of function exist then function need not be bounded.

Function from R^n to R^m :

Let $\quad f : R^n \to R^m$

s.t. $\quad f(x_1, x_2, \ldots\ldots, x_n) = (\phi_1, \phi_2, \ldots\ldots, \phi_m)$, where $\phi_i : R^n \to R$

Limit of a function from $R^n \to R^m$:

Let $\quad f : R^n \to R^m$

s.t. $\quad f(x_1, \ldots\ldots, x_n) = (\phi_1, \ldots\ldots, \phi_m)$

f has a limit at point (a, b) iff all ϕ_i have limit at (a, b).

Q.1. Let $L = \lim_{(x,y)\to(2,-2)} \dfrac{\sqrt{x-y}-2}{(x-y)-4}$, then L is

IIT JAM 2016

(a) 1/2 ~~(b) 1/4~~

(c) 1/8 (d) 1

$x-y=t$

$$\lim_{t\to 4} \frac{\sqrt{t}-2}{t-4}$$

$$\lim_{t\to 4} \frac{\frac{1}{2\sqrt{t}}}{1} = \frac{1}{2\sqrt{4}}$$

$$= \frac{1}{4}$$

COMPLETE COURSE ON
MATHEMATICS
FOR IIT-JAM 2022

TOPICS TO BE COVERED

- REAL ANALYSIS
- FUNCTION OF ONE & TWO VARIABLE
- LINAER ALGEBRA
- MODERN ALGEBRA

TOPICS TO BE COVERED

- SEQUENCE & SERIES
- INTEGRAL CALCULUS
- VECTOR CALCULUS
- DIFFERENTIAL EQUATION

FEE DETAILS FOR IIT JAM SUBSCRIPTION

No cost EMI available on 6 months & above subscription plans

24 months	Save 67%	₹ 908 / mo	Total ₹ 21,780	You get 6 months extra for free · Offer expires 15 Jun 2022
12 months	Save 54%	₹ 1,248 / mo	Total ₹ 14,974	You get 6 months extra for free · Offer expires 15 Jun 2022
9 months	Save 45%	₹ 1,497 / mo	Total ₹ 13,475	
6 months	Save 25%	₹ 2,042 / mo	Total ₹ 12,252	
3 months	Save 17%	₹ 2,269 / mo	Total ₹ 6,807	
1 month		₹ 2,723 / mo	Total ₹ 2,723	

To be paid as a one-time payment

Have a referral code? | Proceed to pay

Get 10% Off

After Using My Referral Code

No cost EMI available on 6 months & above subscription plans

24 months	Save 67%	₹ 817 / mo	₹ ~~21,780~~ ₹ 19,602	You get 6 months extra for free · Offer expires 15 Jun 2022
12 months	Save 54%	₹ 1,123 / mo	₹ ~~14,974~~ ₹ 13,477	You get 6 months extra for free · Offer expires 15 Jun 2022
9 months	Save 45%	₹ 1,348 / mo	₹ ~~13,475~~ ₹ 12,128	
6 months	Save 25%	₹ 1,838 / mo	₹ ~~12,252~~ ₹ 11,027	
3 months	Save 17%	₹ 2,042 / mo	₹ ~~6,807~~ ₹ 6,126	

GPSIR

Awesome! You get 10% off

Proceed to pay

FOUNDATION COURSE OF

MATHEMATICS

FOR CSIR-NET

Q.3. Let $l = \lim_{(x,y)\to(0,0)} \frac{x^2y^2}{x^2+y^2}$ and $= 0$ consider the set $A = \{x \in R \mid e^x = l\}$. Then

(a) $A = \phi$

(b) A is singleton

(c) A is countably infinite

(d) A is uncountable

$A = \{x \in R \mid e^x = 0\}$

Q.3. Let $L = \lim_{(x,y)\to(0,0)} \frac{x^2 y}{x^4 + y^2}$, then L is

(a) 0

(b) 1

(c) 1/2

(d) does not exist

Q.4. For $t \in R$, let $[t]$ denote the greatest integer less than or equal to t. Define function

h : $R^2 \to R$ and g : $R \to R$ by

$$h(x,y)=\begin{cases}\dfrac{-1}{x^2-y} & \text{if } x^2\neq y\\ 0 & \text{if } x^2=y\end{cases}$$

and $g(x,y)=\begin{cases}\dfrac{\sin x}{x} & \text{if } x\neq 0\\ 0 & \text{if } x=0\end{cases}$ then which of the following is false **IIT JAM 2022**

(a) $\lim\limits_{(x,y)\to(\sqrt{2},\pi)} \cos\left(\dfrac{x^2 y}{x^2+1}\right)=\dfrac{-1}{2}$

(b) $\lim\limits_{(x,y)\to(\sqrt{2},2)} e^{h(x,y)}=0$

(c) $\lim\limits_{(x,y)\to(e,e)} \log\left(x^{y-[y]}\right)=e-2$

(d) $\lim\limits_{(x,y)\to(0,0)} e^{2y}g(x)=1$

$(2,1)$

$\log x^{y-[y]}$

$\log e^{e-[e]}$

$e-[e]=e-2$

$\dfrac{m}{m}=1$

Q.5. Let S be the set of $(\alpha, \beta) \in R^2$ s.t. $\dfrac{x^{\alpha} y^{\beta}}{\sqrt{x^2 + y^2}} \to 0$ as $(x, y) \to (0, 0)$, then S is

(a) $\{(\alpha, \beta) ; \alpha > 0, \beta > 0\}$

(b) $\{(\alpha, \beta) ; \alpha > 2, \beta > 2\}$

(c) $\{(\alpha, \beta); \alpha + \beta > 1\}$

(d) $\{(\alpha, \beta) ; \alpha + 4\beta > 1\}$

$y = mx$

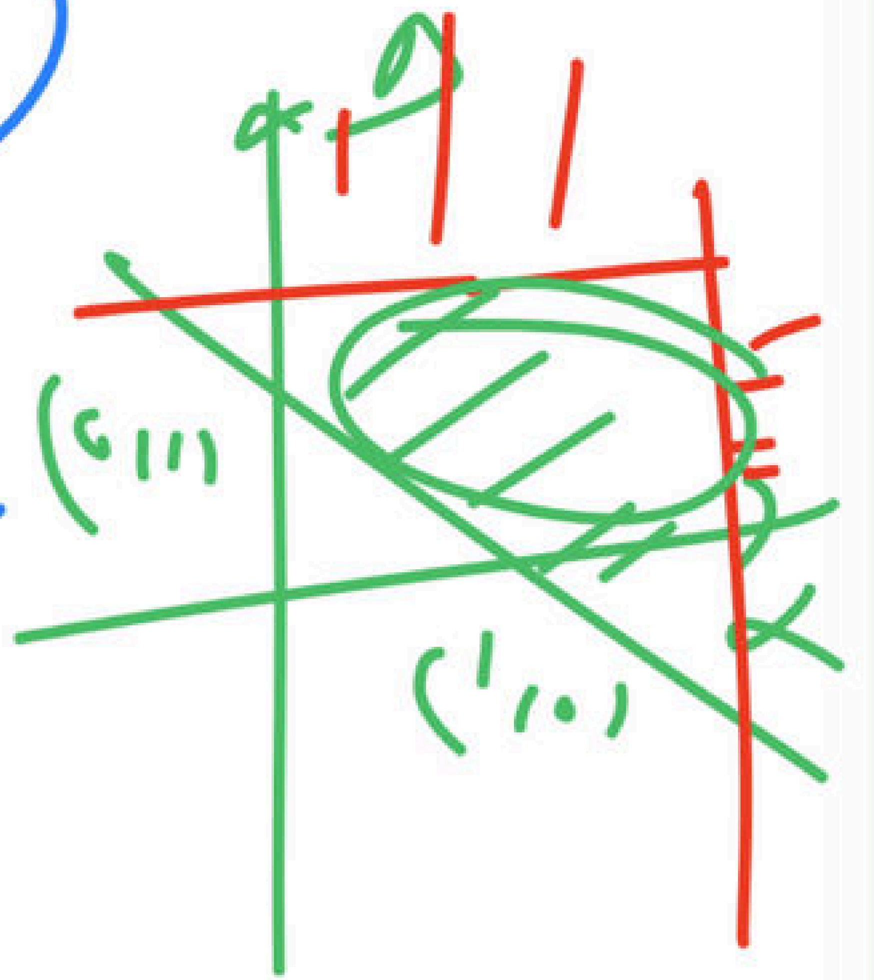
$$\lim_{x \to 0} \frac{x^{\alpha} m^{\beta} x^{\beta}}{\sqrt{x^2 + m^2 x^2}}$$

$$\lim_{x \to 0} \frac{m^{\beta} x^{\alpha+\beta}}{x\sqrt{1+m^2}}$$

$$\lim_{x \to 0} \frac{m^{\beta} x^{\alpha+\beta-1}}{\sqrt{1+m^2}}$$

$\alpha + \beta - 1 > 0$

$\alpha + \beta > 1$



Q.6. Statement – 1 : $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^2y^2}{(x^2+y^2)^2}$ exists.

Statement – 2 : $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^3y^3}{(x^2+y^2)^{3/2}}$ exists.

Then

(a) Statement – 1 is true but statement – 2 is not

(b) Statement – 2 is true but statement – 1 is not

(c) Both statements are true

(d) Both statements are false

Q.7. For what value of α & β, $f(x, y) \to 0$ as $(x, y) \to (0, 0)$. Where $f(x,y) = \dfrac{x^3 + y^3}{x^\alpha - y^\beta}$.

(a) for $\alpha = 1, \beta = 1$ (b) for $\alpha = 2, \beta = 2$

(c) for $\alpha = 3, \beta = 3$ (d) None of these

$$f = \frac{x^3 + y^3}{x - y}$$

$$\lim_{x \to 0} \frac{x^3 + (x + mx^3)^3}{x - (x + mx^3)}$$

$$\lim_{x \to 0} \frac{x^3 + x^3 + mx^3 x^6 + 3mx^4(x + mx^3)}{-mx^3}$$

$$\lim_{x \to 0} \frac{2 + m^3x^2 + 3mx(x + mx^3)}{-m}$$

$-\dfrac{2}{m}$

Q.8. Let $f(x,y)=\dfrac{x.y^2}{x^2+y^4}$. Then $\lim\limits_{(x,y)\to(0,0)} f(x,y)$.

(a) is equal to 1/2 (b) is equal to 2/5

(c) is equal to 3/5 (d) none of the above

$$\frac{xy^2}{x^2+y^4}$$

$$x^2=y^4$$

$$x=y^2$$

$$x=my^2$$

$$\lim_{y\to 0}\frac{my^2\,y^2}{m^2y^4+y^4}$$

$$\lim_{y\to 0}\frac{m\cancel{y^4}}{\cancel{y^4}(m^2+1)}=\frac{m}{m^2+1}$$

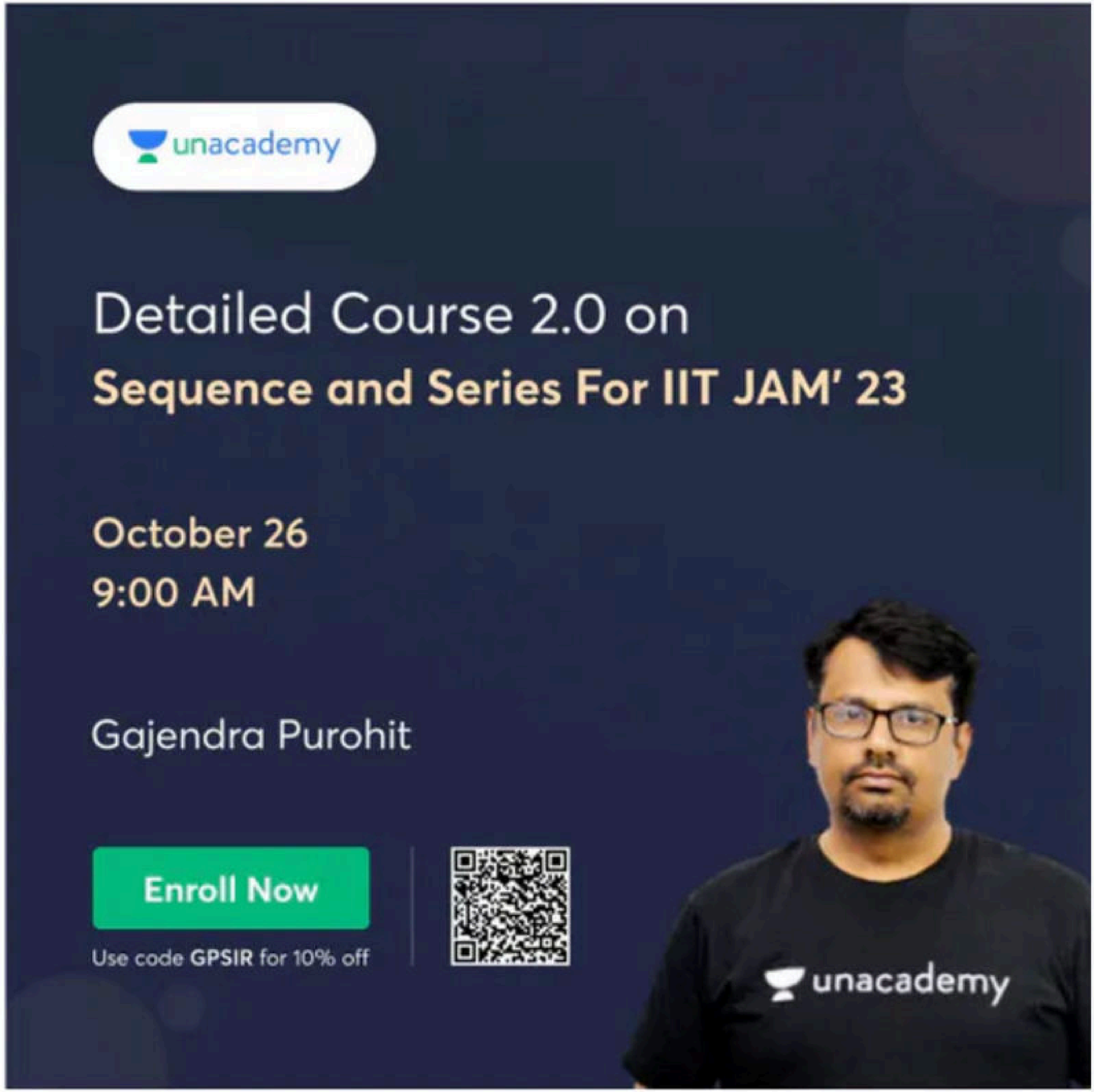
Q.9. Let $R^2 \rightarrow R$ be defined by

$$f(x,y)=\begin{cases}\dfrac{x^2-y^2}{x^2+y^2}, & (x,y)\neq(0,0)\\ 0, & (x,y)=(0,0)\end{cases}$$. Then is equal to

(a) 1/3 (b) 2/3

(c) 4/3 (d) None of the above


unacademy
Detailed Course on Group Theory
For CSIR NET 2023
Gajendra Purohit
November 3
Enroll Now
unacademy


unacademy
Detailed Course 2.0 on
Sequence and Series For IIT JAM' 23
October 26
9:00 AM
Gajendra Purohit
Enroll Now
Use code GPSIR for 10% off
unacademy

unacademy CSIR-UGC NET Search Login

Educator Profile

Gajendra Purohit

#5 Educator in CSIR-UGC NET

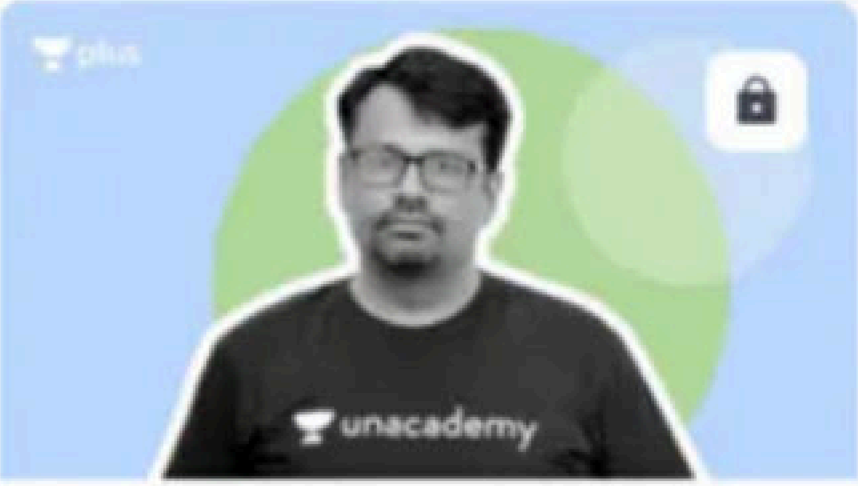
Dr.Gajendra Purohit PhD, CSIR NET (Maths) | Youtuber(330K+30k Sub.)/Dr.Gajendra Purohit (Maths), 17+ Yr. Experience, Author of Bestseller

Follow

11M Watch mins | **1M** Watch mins (last 30 days) | **22k** Followers | **1k** Dedications

CSIR-UGC NET

SEE ALL



HINDI MATHEMATICAL SCIENCES

Course on Linear Algebra, Partial Diff. Equation & Calculus

Starts on Mar 1, 2021 • 24 lessons

Gajendra Purohit

HINDI MATHEMATICAL SCIENCES

Course on Complex Analysis & Integral Equation

Starts on Jan 14, 2021 • 16 lessons

Gajendra Purohit

HINDI MATHEMATICAL SCIENCES

Foundation Course on Mathematics for CSIR 2021

Starts on Dec 7, 2020 • 20 lessons

Gajendra Purohit

Educator highlights

- Works at **Pacific Science College**
- Studied at **M.Sc., NET, PhD(Algebra), MBA(Finance), BEd**
- PhD, NET | Plus Educator For CSIR NET | Youtuber (260K+Subs.) | Director Pacific Science College |
- Lives in **Udaipur, Rajasthan, India**
- Unacademy Educator since

FEE DETAILS FOR IIT JAM SUBSCRIPTION

No cost EMI available on 6 months & above subscription plans

24 months Save 67%	₹ 908 / mo Total ₹ 21,780	You get 6 months extra for free · Offer expires 15 Jun 2022
12 months Save 54%	₹ 1,248 / mo Total ₹ 14,974	You get 6 months extra for free · Offer expires 15 Jun 2022
9 months Save 45%	₹ 1,497 / mo Total ₹ 13,475	
6 months Save 25%	₹ 2,042 / mo Total ₹ 12,252	
3 months Save 17%	₹ 2,269 / mo Total ₹ 6,807	
1 month	₹ 2,723 / mo Total ₹ 2,723	

To be paid as a one-time payment

Have a referral code?

Proceed to pay

Get 10% Off

After Using My Referral Code

No cost EMI available on 6 months & above subscription plans

24 months Save 67%	₹ 817 / mo ₹ ~~21,780~~ ₹ 19,602	You get 6 months extra for free · Offer expires 15 Jun 2022
12 months Save 54%	₹ 1,123 / mo ₹ ~~14,974~~ ₹ 13,477	You get 6 months extra for free · Offer expires 15 Jun 2022
9 months Save 45%	₹ 1,348 / mo ₹ ~~13,475~~ ₹ 12,128	
6 months Save 25%	₹ 1,838 / mo ₹ ~~12,252~~ ₹ 11,027	
3 months Save 17%	₹ 2,042 / mo ₹ ~~6,807~~ ₹ 6,126	

GPSIR

Awesome! You get 10% off

Proceed to pay