My Introduction

- At present I am Maths Faculty at ETOOS ACADEMY

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- Ex. Sr. Faculty of BANSAL CLASSES (KOTA)
- IIT- Delhi
- Teaching Exp. 8 Yrs.

Rank Produced by Etoos

AIR-24

SURAJ SANJAY JOG

And Many Others

How to Study Maths For IIT-JEE

(i) Write and not read maths

How to Study Maths For IIT-JEE

(i) Write and not read maths

(ii) Try to apply using formulas /tricks given

How to Study Maths For IIT-JEE

(i) Write and not read maths

(ii) Try to apply using formulas /tricks given

(iii) Practice Practice Practice

How to Make
Best use of the Course

Important points / formulas are highlighted

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Best use of the Course

Important points / formulas are highlighted

Complete Assignment before moving to next lecture

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Course Details

Logrithms

Trigonometry Identities (Trigo – Ph1)

Quadratic Equation

Sequence & Series

Trigonometry Ph-2

(Trigonometry Equation)

Course Details

Solutions Of Triangle (Trigo Ph-3)

Straight Lines and Pair of Straight Lines

Circles

Permutation & Combination

Course Details

Binomial Theorem

Functions

ITF

Limit

Continuity

Course Details

Derivability

Method Of Derivative

Indefinite Integration

Definite Integration

Application Of Derivatives

Course Details

Vectors

3D Geometry

Determinant

Matrics

Probability

Course Details

Complex No.

Differential Equation

Area Under Curve

Parabola

Ellipse

Hyperbola

Symbols

≠	(not equal)
<	(less than)
>	(greater than)
≤	(less than or equal to)
≥	(greater than or equal to)
( )	(parentheses)
&	(and)
…	[ellipsis (and so on)]
∴	(therefore)
%	(percent)

Symbols

π	**(pi)**
$\angle$	**(angle)**
$\circ$	**(degree)**
$\perp$	**(perpendicular)**
$\parallel$	**(parallel)**
$\sim$	**(is similar to)**
$\cup$	**(union)**
$\cap$	**(intersection)**
$\in$	**(is a member of)**
$\notin$	**(is not a member of)**

Symbols

$\subset$ (is proper subset of)

$\exists$ (there exists)

$\forall$ [(for all (universal quantifier)]

$\cong$ (is equal to or)

$\equiv$ (is equivalent)

$\wedge$ (and)

$\vee$ (or)

$\subseteq$ (is subset of)

$\supseteq$ (is super set of)

$\Leftrightarrow$ (iff or implies and is implied by)

Symbols

≈ (is approxima)

∞ (infinity)

! (factorial)

∑ (sigma)

√ (square root)

ω (omega)

Γ (gamma)

θ (theta)

϶ (such that)

Φ (phi)

Symbols

Ω	**(omega)**
Δ	**(delta)**
∏	**(pi)**
→	**(arrow)**
∂	**(derivative partial)**
∫	**(integral)**
∝	**(proportional)**
±	**(plus or minus)**
ϕ	**(empty set)**
R	**(set of real number)**

Basic Maths

Revision of Class VIII, IX, X

Basic Maths

Revision of Class VIII, IX, X

- Remember Tables 1-19

Basic Maths

Revision of Class VIII, IX, X

- Remember Tables 1-19
- Remember Squares 1-32

Basic Maths

Revision of Class VIII, IX, X

- Remember Tables 1-19
- Remember Squares 1-32
- Remember Cubes 1-12

Componendo & Dividendo

$$\frac{N-D}{N+D}$$

➡ To be applied both sides of the equation.

- $\left(a^{x}\right)^{y} = a^{xy}$

- $\left(a^{x}\right)^{y} = a^{xy}$
- $\dfrac{a^{x}}{a^{y}} = a^{x-y}$

- $\left(a^{x}\right)^{y} = a^{xy}$
- $\dfrac{a^{x}}{a^{y}} = a^{x-y}$
- $a^{x} \cdot a^{y} = a^{x+y}$

- $\left(a^{x}\right)^{y} = a^{xy}$
- $\dfrac{a^{x}}{a^{y}} = a^{x-y}$
- $a^{x} \cdot a^{y} = a^{x+y}$
- $x^{a} \cdot y^{a} = \left(xy\right)^{a}$

Additive Inverse,

Additive Inverse,

Additive Identity,

Additive Inverse,

Additive Identity,

Multiplicative Inverse,

Additive Inverse,

Additive Identity,

Multiplicative Inverse,

Multiplicative Identity

Set Theory

Classification of Sets

Classification of Sets

- Roster or Tabular Form

Classification of Sets

- Roster or Tabular Form
- Set – Builder Form

Quadratic Equation

Inequalities

Important Algebraic Formulas

- $a^2 - b^2 = (a - b)(a + b)$

Important Algebraic Formulas

- $a^2 - b^2 = (a – b)\ (a + b)$

- $(a + b)^3 = a^3 + b^3 + 3a^2b + 3ab^2$

Important Algebraic Formulas

- $a^2 - b^2 = (a – b)(a + b)$

- $(a + b)^3 = a^3 + b^3 + 3a^2b + 3ab^2$

- $(a – b)^3 = a^3 – b^3 + 3ab^2 – 3a^2b$

Important Algebraic Formulas

- $a^2 - b^2 = (a - b)(a + b)$
- $(a + b)^3 = a^3 + b^3 + 3a^2b + 3ab^2$
- $(a - b)^3 = a^3 - b^3 + 3ab^2 - 3a^2b$
- $a^3+b^3+c^3 - 3abc = (a + b + c)(\Sigma a^2 - \Sigma ab)$

Number Theory

Number Theory

- Natural Number (N)

Number Theory

- Natural Number (N)
- Whole Number (W)

Prime,

Prime,

Composite,

Prime,

Composite,

Twin Prime,

Prime,

Composite,

Twin Prime,

Co- Prime

Integers (I)

Rational Numbers (Q)

Rational Numbers (Q)

- Converting Decimal to p/q form

Rational Numbers (Q)

- Converting Decimal to p/q form
- Example

$$2.5 = ?$$

$$3.\overline{14} = ?$$

Irrational Numbers

Real Numbers (R)

Complex Number (Z)

$$\mathbf{N} \subset \mathbf{W} \subset \mathbf{I} \subset \mathbf{Q} \subset \mathbf{R} \subset \mathbf{Z}$$

Exponential Form

Exponential Form

$$\left(N = a^x\right)$$

Exponential Form

$$\left(N = a^x\right)$$

- $a > 0$ & $a \neq 1$

Exponential Form

$$\left(N = a^{x}\right)$$

- $a > 0 \quad \& \quad a \neq 1$
- a is called 'base' and
  x is called 'exponent'

Logarithmic form

$$\log_a N = x$$

Logarithmic form

$$\log_a N = x$$

$Log_a N$ is defined when $N > O$, $a > o$, $a \neq 1$

Logarithm Form

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1. Examples on value of Logarithm
   Find values :

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- $\log_{81} 27 = ?$

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- $\log_2 (\log_2 4) = ?$

Logarithm Form

1. Examples on value of Logarithm
   Find values :

- $\log_{81} 27 = ?$
- $\log_2 \left(\log_2 4 \right) = ?$
- $\log_{625} 125 = ?$

Logarithm Form

1. Examples on value of Logarithm Find values :

- $\log_{81} 27 = ?$
- $\log_2 \left(\log_2 4\right) = ?$
- $\log_{625} 125 = ?$
- $\log_{1/3} 9\sqrt{3} = ?$

Fundamental Logarithm Identity

$$a^{\log_a N} = N$$

3 Important Deductions

3 Important Deductions

- $\log_N N = 1$

3 Important Deductions

- $\log_N N = 1$

- $\log_{\frac{1}{N}} N = -1$

3 Important Deductions

- $\log_N N = 1$
- $\log_{\frac{1}{N}} N = -1$
- $\log_a 1 = 0$

Examples

Examples

Find values :

- $\log_{\tan 20^\circ} \tan 70^\circ = ?$

Examples

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- $\log_{\tan 20^\circ} \tan 70^\circ = ?$

- $\log_{2-\sqrt{3}} (2+\sqrt{3}) = ?$

Examples

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- $\log_{10} (0.\overline{9}) = ?$

Examples

Find values :

- $\log_{\tan 20^\circ} \tan 70^\circ = ?$

- $\log_{2-\sqrt{3}} (2+\sqrt{3}) = ?$

- $\log_{10} (0.\overline{9}) = ?$

- $\log_5 \sqrt{5.\sqrt{5.\sqrt{5.\sqrt{5 \ldots \infty}}}} = ?$

Examples

(Integer Type)

- The value of :

$$6+\log_{\frac{3}{2}}\left(\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\cdots\cdots}}}\right) \text{ is}$$

[JEE 2012, 4]

Examples

Solve :

- $7^{\log_7 x} + 2x + 9 = 0$

Examples

Solve :

- $7^{\log_7 x} + 2x + 9 = 0$

- $\log(\tan 5)\log(\tan 9)\log(\tan 13)\ldots\ldots\log(\tan 61) = ?$

Antilog/Power form

Antilog/Power form

- $$\text{antilog}_8\left(\frac{2}{3}\right) = ?$$

Antilog/Power form

- $\text{antilog}_8\left(\frac{2}{3}\right) = ?$

- $\text{antilog}_{\frac{1}{100}}\left(-\frac{1}{2}\right) = ?$

Note

It must be noted that whenever the number and the base are on the same side of unity then logarithm of that number to that base is (+ve), however if the number and the base are located on different side of unity them logarithm of that number to that base is (-ve)

Examples

- $\log_{\sqrt{7}} 49 = ?$

Examples

- $\log_{\sqrt{7}} 49 = ?$
- $\log_{10} \sqrt[3]{10} = ?$

Examples

- $\log_{\sqrt{7}} 49 = ?$
- $\log_{10} \sqrt[3]{10} = ?$
- $\log_{\frac{1}{2}}\left(\frac{1}{8}\right) = ?$

Examples

- $\log_{\sqrt{7}} 49 = ?$
- $\log_{10} \sqrt[3]{10} = ?$
- $\log_{\frac{1}{2}}\left(\frac{1}{8}\right) = ?$
- $\log_{2}\left(\frac{1}{32}\right) = ?$

Examples

- $\log_{\sqrt{7}} 49 = ?$
- $\log_{10} \sqrt[3]{10} = ?$
- $\log_{\frac{1}{2}}\left(\frac{1}{8}\right) = ?$
- $\log_{2}\left(\frac{1}{32}\right) = ?$
- $\log_{10}(0.001) = ?$

Principal Properties of Log.

- $\log_a mn = \log_a m + \log_a n$

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- $\log_a mn = \log_a m + \log_a n$

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Principal Properties of Log.

- $\log_a mn = \log_a m + \log_a n$
- $\log_a \frac{m}{n} = \log_a m - \log_a n$
- $\log_a m^x = x \log_a m$
- $\log_{n^y} m = \frac{1}{y} \log_n m$

Note

$\log_2 x^2 = 4$ *and* $2\log_2 x = 4$ will not have the same solution.

Example

1. Let $y = \sqrt{\log_2 3 . \log_2 12 . \log_2 48 . \log_2 192 + 16}$

$- \log_2 12 . \log_2 48 + 10.$

Base Change Theorem

$$\log_b a = \frac{\log_c a}{\log_c b}$$

Base Change Theorem

- $$\log_b a = \frac{\log_c a}{\log_c b}$$

- $$a^{\log_b x} = x^{\log_b a}$$

Examples

1. If $(\log_2 3)(\log_3 4)(\log_4 5)....(\log_n (n+1))=10$, find n

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2. $7^{\log_3 5} + 3^{\log_5 7} - 5^{\log_3 7} - 7^{\log_5 3} = ?$

Examples

1. If $(\log_2 3)(\log_3 4)(\log_4 5)....(\log_n(n+1))=10$, find n

2. $7^{\log_3 5} + 3^{\log_5 7} - 5^{\log_3 7} - 7^{\log_5 3} = ?$

3. Prove that $\log_2 7$ is irrational

Examples

If $\log_a x = b$ for permissible values of a and x then which of the following may be correct :

(A) If a rational and b rational then x can be rational.

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If $\log_a x = b$ for permissible values of a and x then which of the following may be correct :

(A) If a rational and b rational then x can be rational.

(B) If a irrational and b rational then x can be rational.

(C) If a rational and b irrational then x can be rational.

Examples

If $\log_a x = b$ for permissible values of a and x then which of the following may be correct :

(A) If a rational and b rational then x can be rational.

(B) If a irrational and b rational then x can be rational.

(C) If a rational and b irrational then x can be rational.

(D) If a and b are two irrational numbers then x can be rational.

Examples

Number of solutions of $\log_4(x-1) = \log_2(x-3)$ is

(a) 3

(b) 1

(c) 2

(d) 0

[JEE 2001, (Screening)]

Trichotomy

True / False

- $\log_3 5 > \log_{17} 25$

For A Non Negative Number

$$\sqrt[n]{a} = a^{1/n}$$

For A Non Negative Number

$$\sqrt[n]{a} = a^{1/n}$$

‘a’ & N $\geq$ 2, n $\in$ N

Logrithmic Equations

- $Solve\ for\ 'x'\quad 2\log_2 \frac{x-7}{x-1} + \log_2 \frac{x-1}{x+1} = 1$

Logrithmic Equations

- *Solve for 'x'* $2\log_2 \dfrac{x-7}{x-1} + \log_2 \dfrac{x-1}{x+1} = 1$

- *Solve for 'x'* $\log_5\left(5^{1/x} + 125\right) - \log_5(6) = 1 + \dfrac{1}{2x}$

Logrithmic Equations

- *Solve for 'x'* $2\log_2 \frac{x-7}{x-1} + \log_2 \frac{x-1}{x+1} = 1$
- *Solve for 'x'* $\log_5\left(5^{1/x} + 125\right) - \log_5(6) = 1 + \frac{1}{2x}$
- *Solve for 'x'* $\log_5\left(\sqrt[x]{5} + 125\right) - \log_5(6) = 1 + \frac{1}{2x}$

Examples

Solve for 'x'

- $$5^{1+(\log_4 x)} + 5^{(\log_{1/4} x)-1} = \frac{26}{5}$$

Taking Log. Both Sides

Taking Log. Both Sides

- **Solve for x**

$$3^{\log_3^2 x} + x^{\log_3 x} = 162$$

Taking Log. Both Sides

- Solve for x

$$3^{\log_3^2 x} + x^{\log_3 x} = 162$$

- Solve for x

$$(x+1)^{\log_{10}(x+1)} = 100(x+1)$$

Taking Log. Both Sides

- Let (x_0, y_0) the solution of the following equations

$$(2x)^{ln2} = (3y)^{ln3}$$

$$3^{ln}x = 2^{lny}.$$

Then x_0 is

(A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) 6

[JEE 2011,3]

Common and Natural Logarithm

Characteristic & Mantissa

- **Standard form of a positive number**

Examples on Characteristic & Mantissa

Using log 2 = 0.3010 and log 3 = 0.4771, and log 7 = 0.8451

(1) Find the number of digits

(A) 6^{50} (B) 5^{25}

Examples on Characteristic & Mantissa

Using log 2 = 0.3010 and log 3 = 0.4771, and log 7 = 0.8451

(1) Find the number of digits

(A) 6^{50} (B) 5^{25}

(2) Find the number of zeros after decimal before a significant figure start in

(A) $\left(\frac{9}{8}\right)^{-100}$ (B) 3^{-50}

Examples on Characteristic & Mantissa

Let $\log_3 N = \alpha_1 + \beta_1$; $\log_5 N = \alpha_2 + \beta_2$; $\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2, \alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0, 1)$

Examples on Characteristic & Mantissa

Let $\log_3 N = \alpha_1 + \beta_1$; $\log_5 N = \alpha_2 + \beta_2$; $\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2, \alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0,1)$

(i) Find the number of integral and $\alpha_1 = 4$ and $\alpha_2 = 2$

Examples on Characteristic & Mantissa

Let $\log_3 N = \alpha_1 + \beta_1$; $\log_5 N = \alpha_2 + \beta_2$; $\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2, \alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0,1)$

(i) Find the number of integral and $\alpha_1 = 4$ and $\alpha_2 = 2$

(ii) Find the largest integral value of N if $\alpha_1 = 5$, $\alpha_2 = 3$ and $\alpha_3 = 2$

Examples on Characteristic & Mantissa

Let $\log_3 N = \alpha_1 + \beta_1$; $\log_5 N = \alpha_2 + \beta_2$; $\log_7 N = \alpha_3 + \beta_3$

where $\alpha_1, \alpha_2, \alpha_3$ are integers and $\beta_1, \beta_2, \beta_3 \in [0, 1)$

(i) Find the number of integral and $\alpha_1 = 4$ and $\alpha_2 = 2$

(ii) Find the largest integral value of N if $\alpha_1 = 5$, $\alpha_2 = 3$ and $\alpha_3 = 2$

(iii) Find the difference of largest and smallest integral values of N if

$\alpha_1 = 5$, $\alpha_2 = 3$ and $\alpha_3 = 2$

Modulus
(Absolute Value Function)

Examples on Modulus

Solve for x

Examples on Modulus

Solve for *x*

(a) $|x-1|+|x-3|=5$

Examples on Modulus

Solve for *x*

(a) $|x-1|+|x-3|=5$

(b) $|x|-|x-2|=2$

Examples on Modulus

Solve for *x*

(a) $|x-1|+|x-3|=5$

(b) $|x|-|x-2|=2$

(c) $|x+1|+|x+2|=2$

Examples on Modulus

Solve for x

(a) $|x-1|+|x-3|=5$

(b) $|x|-|x-2|=2$

(c) $|x+1|+|x+2|=2$

(d) $|3x-2|+x=11$

Examples on Modulus

Solve for x

(a) $|x-1|+|x-3|=5$

(b) $|x|-|x-2|=2$

(c) $|x+1|+|x+2|=2$

(d) $|3x-2|+x=11$

(e) $|x-2|^{10x^2-1}=|x-2|^{3x}$

More Examples on Modulus

- Least value of x satisfying

  $|x-3|+2|x+1|=4$

More Examples on Modulus

- Least value of x satisfying

  $$|x-3|+2|x+1|=4$$

- If the sum of all solutions of the equation

  $$\left(x^{\log_{10}3}\right)-\left(3^{\log_{10}x}\right)-2=0 \text{ is } \left(a^{\log_b c}\right)$$

  where *b* and *c* are relatively prime and a, b, c $\in$ N.

  Find the value of (a + b + c)

More Examples on Modulus

Solve for 'x'

- $\log_4\left(x^2-1\right)-\log_4(x-1)^2=\log_4\sqrt{(4-x)^2}$

More Examples on Modulus

Solve for 'x'

- $$\log_4\left(x^2-1\right)-\log_4(x-1)^2=\log_4\sqrt{(4-x)^2}$$
- $$2\log_8(2x)+\log_8\left(x^2+1-2x\right)=\frac{4}{3}$$

More Examples on Modulus

Solve for 'x'

- $\log_4\left(x^2-1\right)-\log_4(x-1)^2=\log_4\sqrt{(4-x)^2}$

- $2\log_8(2x)+\log_8\left(x^2+1-2x\right)=\frac{4}{3}$

- $\frac{3}{2}\log_4(x+2)^2+3=\log_4(4-x)^3+\log_4(6+x)^3.$

More Examples on Modulus

Solve for 'x'

- $|x-3|^{3x^2-10x+3}=1$

More Examples on Modulus

Solve for 'x'

- $|x-3|^{3x^2-10x+3}=1$
- $2\log_3(x-2)+\log_3(x-4)^2=0$

More Examples on Modulus

Solve for 'x'

- $|x-3|^{3x^2-10x+3}=1$
- $2\log_3(x-2)+\log_3(x-4)^2=0$
- $|x-1|^{\log_3 x^2-2\log_x 9}=(x-1)^7$

More Examples on Modulus

Solve for 'x'

- $|x-3|^{3x^2-10x+3}=1$
- $2\log_3(x-2)+\log_3(x-4)^2=0$
- $|x-1|^{\log_3 x^2-2\log_x 9}=(x-1)^7$
- $x^{(3/4)(\log_2 x)^2+\log_2 x-(5/4)}=\sqrt{2}$

Log. Inequalities

Log. Inequalities

- For $a > 1$ the inequality $0 < x < y$ & $\log_a x < \log_a y$ are equivalent

Log. Inequalities

- For $a > 1$ the inequality $0 < x < y$ & $\log_a x < \log_a y$ are equivalent

- For $0 < a < 1$ the inequality $0 < x < y$ & $\log_a x > \log_a y$ are equivalent

Assignment

Prilepko (Page No.92-93)

Examples

Solve the following equations :

- $\log_{x-1} 3 = 2$

Examples

Solve the following equations :

- $\log_{x-1} 3 = 2$
- $\log_4\left(2\log_3\left(1+\log_2\left(1+3\log_3 x\right)\right)\right) = \frac{1}{2}$

Examples

Solve the following equations :

- $\log_{x-1} 3 = 2$
- $\log_4\left(2\log_3\left(1+\log_2\left(1+3\log_3 x\right)\right)\right) = \frac{1}{2}$
- $\log_3\left(1+\log_3\left(2^x - 7\right)\right) = 1$

Examples

Solve the following equations :

- $\log_{x-1} 3 = 2$
- $\log_4\left(2\log_3\left(1+\log_2\left(1+3\log_3 x\right)\right)\right) = \frac{1}{2}$
- $\log_3\left(1+\log_3\left(2^x - 7\right)\right) = 1$
- $\log_3\left(3^x - 8\right) = 2 - x$

Examples

Solve the following equations :

- $$\frac{\log_2\left(9-2^x\right)}{3-x}=1$$

Examples

Solve the following equations :

- $$\frac{\log_2\left(9-2^x\right)}{3-x}=1$$
- $$\log_{5-x}\left(x^2-2x+65\right)=2$$

Examples

Solve the following equations :

- $$\frac{\log_2\left(9-2^x\right)}{3-x}=1$$
- $$\log_{5-x}\left(x^2-2x+65\right)=2$$
- $$\log_3\left(\log_9 x+\frac{1}{2}+9^x\right)=2x$$

Examples

Solve the following equations :

- $$\frac{\log_2\left(9-2^x\right)}{3-x}=1$$
- $$\log_{5-x}\left(x^2-2x+65\right)=2$$
- $$\log_3\left(\log_9 x+\frac{1}{2}+9^x\right)=2x$$
- $$\log_3(x+1)+\log_3(x+3)=1$$

Examples

Solve the following equations :

- $\log_7\left(2^x - 1\right) + \log_7\left(2^x - 7\right) = 1$

Examples

Solve the following equations :

- $\log_7\left(2^x - 1\right) + \log_7\left(2^x - 7\right) = 1$
- $\log 5 + \log(x+10) - 1 = \log(21x - 20) - \log(2x - 1)$

Examples

Solve the following equations :

- $\log_7\left(2^x-1\right)+\log_7\left(2^x-7\right)=1$
- $\log 5+\log(x+10)-1=\log(21x-20)-\log(2x-1)$
- $1-\log 5=\frac{1}{3}\left(\log\frac{1}{2}+\log x+\frac{1}{3}\log 5\right)$

Examples

Solve the following equations :

- $\log_7\left(2^x - 1\right) + \log_7\left(2^x - 7\right) = 1$
- $\log 5 + \log(x+10) - 1 = \log(21x - 20) - \log(2x - 1)$
- $1 - \log 5 = \frac{1}{3}\left(\log\frac{1}{2} + \log x + \frac{1}{3}\log 5\right)$
- $\log x - \frac{1}{2}\log\left(x - \frac{1}{2}\right) = \log\left(x + \frac{1}{2}\right) - \frac{1}{2}\log\left(x + \frac{1}{8}\right)$

Examples

Solve the following equations :

- $9^{\log_3(1-2x)} = 5x^2 - 5$

Examples

Solve the following equations :

- $9^{\log_3(1-2x)} = 5x^2 - 5$
- $x^{1+\log x} = 10\,x$

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Examples

Solve the following equations :

- $9^{\log_3(1-2x)} = 5x^2 - 5$

- $x^{1+\log x} = 10x$

- $x^{2\log x} = 10x^2$

- $x^{\frac{\log x + 5}{3}} = 10^{5+\log x}$

Examples

Solve the following equations :

- $x^{\log_3 x} = 9$

Examples

Solve the following equations :

- $x^{\log_3 x} = 9$
- $\left(\sqrt{x}\right)^{\log_5 x - 1} = 5$

Examples

Solve the following equations :

- $x^{\log_3 x} = 9$
- $\left(\sqrt{x}\right)^{\log_5 x - 1} = 5$
- $x^{\log x + 1} = 10^6$

Examples

Solve the following equations :

- $x^{\log_3 x} = 9$
- $\left(\sqrt{x}\right)^{\log_5 x - 1} = 5$
- $x^{\log x + 1} = 10^6$
- $x^{\frac{\log x + 7}{4}} = 10^{\log x + 1}$

Examples

Solve the following equations :

- $x^{\log_{\sqrt{x}}(x-2)} = 9$

Examples

Solve the following equations :

- $x^{\log_{\sqrt{x}}(x-2)} = 9$
- $\left(\dfrac{\log x}{2}\right)^{\log^2 x + \log x^2 - 2} = \log\sqrt{x}$

Examples

Solve the following equations :

- $x^{\log_{\sqrt{x}}(x-2)} = 9$
- $\left(\dfrac{\log x}{2}\right)^{\log^2 x+\log x^2-2} = \log\sqrt{x}$
- $3\sqrt{\log_2 x} - \log_2 8x + 1 = 0$

Examples

Solve the following equations :

- $x^{\log_{\sqrt{x}}(x-2)} = 9$
- $\left(\dfrac{\log x}{2}\right)^{\log^2 x+\log x^2-2} = \log\sqrt{x}$
- $3\sqrt{\log_2 x} - \log_2 8x + 1 = 0$
- $\log^2 x - 3\log x = \log\left(x^2\right) - 4$

Examples

Solve the following equations :

- $\log_{1/3}x - 3\sqrt{\log_{1/3}x} + 2 = 0$

Examples

Solve the following equations :

- $\log_{1/3}x - 3\sqrt{\log_{1/3}x} + 2 = 0$
- $2\left(\log_x \sqrt{5}\right)^2 - 3\log_x \sqrt{5} + 1 = 0$

Examples

Solve the following equations :

- $\log_{1/3}x - 3\sqrt{\log_{1/3}x} + 2 = 0$
- $2\left(\log_x \sqrt{5}\right)^2 - 3\log_x \sqrt{5} + 1 = 0$
- $\log_2^2 x + 2\log_2 \sqrt{x} - 2 = 0$

Examples

Solve the following equations :

- $\log_{1/3} x - 3\sqrt{\log_{1/3} x} + 2 = 0$
- $2\left(\log_x \sqrt{5}\right)^2 - 3\log_x \sqrt{5} + 1 = 0$
- $\log_2^2 x + 2\log_2 \sqrt{x} - 2 = 0$
- $\left(a^{\log_b x}\right)^2 - 5x^{\log_b a} + 6 = 0$

Examples

Solve the following equations :

- $$\log^2(100x) + \log^2(10x) = 14 + \log\left(\frac{1}{x}\right)$$

Examples

Solve the following equations :

- $$\log^2(100x)+\log^2(10x)=14+\log\left(\frac{1}{x}\right)$$
- $$\log_4(x+3)-\log_4(x-1)=2-\log_4 8$$

Examples

Solve the following equations :

- $\log^2(100x) + \log^2(10x) = 14 + \log\left(\frac{1}{x}\right)$
- $\log_4(x+3) - \log_4(x-1) = 2 - \log_4 8$
- $2\log_4(4-x) = 4 - \log_2(-2-x)$

Solve Sheet

To Attain IIT-Level