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MATHEMATICAL SYMBOLS

Basic math symbol

mantrakshar	HINDI	Symbol Name	Meaning / definition	Example
=	बराबर चिह्न	equals sign	equality	5 = 2+3 ; 5 is equal to 2+3
≠	असमान चिन्ह	not equal sign	inequality	5 ≠ 4 ; 5 is not equal to 4
≈	लगभग समान	approximately equal	approximation	sin(0.01) ≈ 0.01, x ≈ y means x is approximately equal to y
>	सख्त असमानता	strict inequality	greater than	5 > 4; 5 is greater than 4
<	सख्त असमानता	strict inequality	less than	4 < 5;4 is less than 5
≥	असमानता	inequality	greater than or equal to	5 ≥ 4, x ≥ y means x is greater than or equal to y
≤	असमानता	inequality	less than or equal to	4 ≤ 5,x ≤ y means x is less than or equal to y
( )	छोटा कोष्टक	parentheses	calculate expression inside first	2 × (3+5) = 16
{ }	मझला कोष्ठक	flower brackets		
[ ]	बड़ा कोष्ठक	brackets	calculate expression inside first	[1] = 18
+	प्लस चिन्ह	plus sign	addition	1 + 1 = 2
−	घटाव चिन्ह	minus sign	subtraction	2 − 1 = 1
±	जोड़- घटाव चिन्ह	plus - minus	both plus and minus operations	3 ± 5 = 8 or -2
∓	घटाव -जोड़ चिन्ह	minus - plus	both minus and plus operations	3 ∓ 5 = -2 or 8
*	तारांकन	asterisk	multiplication	2 * 3 = 6
×		times sign	multiplication	2 × 3 = 6
·	गुणन बिंदु	multiplication dot	multiplication	2 · 3 = 6
÷	विभाजन चिह्न	division sign / obelus	division	6 ÷ 2 = 3
/		division slash	division	6 / 2 = 3
—	क्षैतिज रेखा	horizontal line	division / fraction	\frac{6}{2}=3
mod	सापेक्ष	modulo	remainder calculation	7 mod 2 = 1
.	अवधि	period	decimal point, decimal separator	2.56 = 2+56/100
ab	शक्ति	power	exponent	23 = 8
$ a^b $	कैरट	caret	exponent	$ 2^3 = 8 $
√a	वर्गमूल	square root	√a · √a = a	√9 = ±3
3√a	घनमूल	cube root	3√a · 3√a · 3√a = a	3√8 = 2

mantrakshar	HINDI	Symbol Name	Meaning / definition	Example
4√a	चौथी जड़	fourth root	4√a · 4√a · 4√a · 4√a = a	4√16 = ±2
n√a	n-वें रूट (कट्टरपंथी)	n-th root (radical)		for n=3, n√8 = 2
%	प्रतिशत	percent	1% = 1/100	10% × 30 = 3
‰	प्रति-मिली	per-mille	1‰ = 1/1000 = 0.1%	10‰ × 30 = 0.3
ppm	प्रति मिलियन	per-million	1ppm = 1/1000000	10ppm × 30 = 0.0003
ppb	प्रति अरब	per-billion	1ppb = 1/1000000000	10ppb × 30 = 3×10-7
ppt	प्रति ट्रिलियन	per-trillion	1ppt = 10-12	10ppt × 30 = 3×10-10

Geometry symbols

Mantrakshar	Hindi	Symbol Name	Meaning / definition	Example
∠	कोण	angle	formed by two rays	∠ABC = 30°
	मापा कोण	measured angle		ABC = 30°
	गोलाकार कोण	spherical angle		AOB = 30°
∟	समकोण	right angle	= 90°	α = 90°
°	अंश	degree	1 turn = 360°	α = 60°
deg	अंश	degree	1 turn = 360deg	α = 60deg
′	प्रधान	prime	arcminute, 1° = 60′	α = 60°59′
″	द्वि प्रधान	double prime	arcsecond, 1′ = 60″	α = 60°59′59″
	रेखा	line	infinite line	
AB	रेखा खंड	line segment	line from point A to point B	
	किरण	ray	line that start from point A	
	वृत्त चाप	arc	arc from point A to point B	= 60°
⊥	लंब	perpendicular	perpendicular lines (90° angle)	AC ⊥ BC
∥	समानांतर	parallel	parallel lines	AB ∥ CD
≅	सर्वगसम	congruent to	equivalence of geometric shapes and size	ΔABC≅ ΔXYZ
~	समानता / समरूप	similarity	same shapes, not same size	ΔABC~ ΔXYZ
Δ	त्रिकोण	triangle	triangle shape	ΔABC≅ ΔBCD
$$ delim{]}{x-y}{]} $$	दूरी	distance	distance between points x and y	$$ delim{]}{x-y = 5}{]} $$
π		pi constant	π = 3.141592654... is the ratio between the circumference and diameter of a circle	c = π·d = 2·π·r
rad		radians	radians angle unit	360° = 2π rad
c		radians	radians angle unit	360° = 2π c
grad		gradians / gons	grads angle unit	360° = 400 grad

Algebra symbols

Mantrakshar	Hindi	Symbol Name	Meaning / definition	Example	
x	X चर	x variable	unknown value to find	when 2x = 4, then x = 2	
≡	समानक	equivalence	identical to		
≜	परिभाषा के बराबर	equal by definition	equal by definition		
:=	परिभाषा के बराबर	equal by definition	equal by definition		
~	लगभग समान	approximately equal	weak approximation	11 ~ 10	
≈	लगभग समान	approximately equal	approximation	sin(0.01) ≈ 0.01	
∝	आनुपातिक	proportional to	proportional to	y ∝ x when y = kx, k constant	
∞	अनंत चिन्ह	lemniscate	infinity symbol		
≪	से अधिक कम	much less than	much less than	1 ≪ 1000000	
≫	से अधिक ज्यादा	much greater than	much greater than	1000000 ≫ 1	
( )		parentheses	calculate expression inside first	2 * (3+5) = 16	
[ ]		brackets	calculate expression inside first	[2] = 18	
{ }		braces	set		
⌊x⌋	फर्श कोष्ठक	floor brackets	rounds number to lower integer	⌊4.3⌋ = 4	
⌈x⌉	छत कोष्ठक	ceiling brackets	rounds number to upper integer	⌈4.3⌉ = 5	
x!	विस्मयादिबोधक चिह्न	exclamation mark	factorial	4! = 1*2*3*4 = 24	
delim{|}{x}{|}	लंबवत सलाखों	vertical bars	absolute value	FALSE	
f (x)		function of x	maps values of x to f(x)	f (x) = 3x+5	
(f ∘ g)		function composition	(f ∘ g) (x) = f (g(x))	f (x)=3x,g(x)=x-1 ⇒(f ∘ g)(x)=3(x-1)	
(a,b)	खुला अंतराल	open interval	<m> (a,b) = {x	a < x < b} </m>	x∈ (2,6)
[a,b]	बंद अंतराल	closed interval	<m> [a,b] = {x	a ≤ x ≤ b} </m>	x ∈ [2,6]
Δ	बदलाव चिन्ह	delta	change / difference	Δt = t1 - t0	
Δ		discriminant	Δ = b2 - 4ac		
∑		sigma	summation - sum of all values in range of series	∑ xi= x1+x2+...+xn	
∑∑		sigma	double summation		
∏		capital pi	product - product of all values in range of series	∏ xi=x1•x2•...•xn	
e		e constant / Euler's number	e = 2.718281828...	e = lim (1+1/x)x , x→∞	

Mantrakshar	Hindi	Symbol Name	Meaning / definition	Example	
γ		Euler-Mascheroni constant	γ = 0.5772156649...		
φ	सुनहरा अनुपात	golden ratio	golden ratio constant		
π		pi constant	π = 3.141592654...is the ratio between the circumference and diameter of a circle	c = π·d = 2·π·r	

LINEAR Algebra symbols

hindi	Symbol	Symbol Name	Meaning / definition	Example
	·	dot	scalar product	a · b
	×	cross	vector product	a × b
	A⊗B	tensor product	tensor product of A and B	A ⊗ B
	\langle x,y \rangle	inner product		
	[ ]	brackets	matrix of numbers	
	( )	parentheses	matrix of numbers	
	A	determinant	determinant of matrix A	
	det(A)	determinant	determinant of matrix A	
	<m>delim{vert}{x}{vert}</m>	double vertical bars	norm	
	AT	transpose	matrix transpose	(AT)ij = (A)ji
	A†	Hermitian matrix	matrix conjugate transpose	(A†)ij = (A)ji
	A*	Hermitian matrix	matrix conjugate transpose	(A*)ij = (A)ji
	A -1	inverse matrix	A A-1 = I	
	rank(A)	matrix rank	rank of matrix A	rank(A) = 3
	dim(U)	dimension	dimension of matrix A	dim(U) = 3

Probability and statistics symbols

MANTRAKSHAR	HINDI	Symbol Name	Meaning / definition	Example
P(A)	प्रायिकता या संभाव्यता फलन	probability function	probability of event A	P(A) = 0.5
P(A ⋂ B)		probability of events intersection	probability that of events A and B	P(A⋂B) = 0.5
P(A ⋃ B)		probability of events union	probability that of events A or B	P(A⋃B) = 0.5
{P(A vert B)}		conditional probability function	probability of event A given event B occured	P(A . B) = 0.3
f (x)		probability density function (pdf)	P(a ≤ x ≤ b) = ∫ f (x) dx	

MANTRAKSHAR	HINDI	Symbol Name	Meaning / definition	Example
F(x)		cumulative distribution function (cdf)	F(x) = P(X≤ x)	
μ	आबादी माध्य	population mean	mean of population values	μ = 10
E(X)		expectation value	expected value of random variable X	E(X) = 10
E(X□Y)		conditional expectation	expected value of random variable X given Y	E(X □Y=2) = 5
var(X)	प्रसरण	variance	variance of random variable X	var(X) = 4
σ2	प्रसरण	variance	variance of population values	σ2 = 4
std(X)	मानक विचलन	standard deviation	standard deviation of random variable X	std(X) = 2
σX	मानक विचलन	standard deviation	standard deviation value of random variable X	σX = 2
		median	middle value of random variable x	
cov(X,Y)	सहप्रसरण	covariance	covariance of random variables X and Y	cov(X,Y) = 4
corr(X,Y)		correlation	correlation of random variables X and Y	corr(X,Y) = 0.6
ρX,Y		correlation	correlation of random variables X and Y	ρX,Y = 0.6
∑	संकलन	summation	summation - sum of all values in range of series	
∑∑		double summation	double summation	
Mo	बहुलक	mode	value that occurs most frequently in population	
MR		mid-range	MR = (xmax+xmin)/2	
Md		sample median	half the population is below this value	
Q1		lower / first quartile	25% of population are below this value	
Q2		median / second quartile	50% of population are below this value = median of samples	
Q3		upper / third quartile	75% of population are below this value	
x		sample mean	average / arithmetic mean	x = (2+5+9) / 3 = 5.333
s 2		sample variance	population samples variance estimator	s 2 = 4
s		sample standard deviation	population samples standard deviation estimator	s = 2
zx		standard score	zx = (x-x) / sx	
X ~		distribution of X	distribution of random variable X	X ~ N(0,3)
N(μ,σ2)	प्रसामान्य बंटन	normal distribution	gaussian distribution	X ~ N(0,3)
U(a,b)		uniform distribution	equal probability in range a,b	X ~ U(0,3)
exp(λ)		exponential distribution	f (x) = λe-λx , x≥0	
gamma(c, λ)		gamma distribution	f (x) = λ c xc-1e-λx / Γ©, x≥0	

MANTRAKSHAR	HINDI	Symbol Name	Meaning / definition	Example
χ 2(k)		chi-square distribution	f (x) = xk/2-1e-x/2 / (2k/2 Γ(k/2))	
F (k1, k2)		F distribution		
Bin(n,p)		binomial distribution	f (k) = nCk pk(1-p)n-k	
Poisson(λ)		Poisson distribution	f (k) = λke-λ / k!	
Geom(p)		geometric distribution	f (k) = p(1-p) k	
HG(N,K,n)		hyper-geometric distribution		
Bern(p)		Bernoulli distribution		

Combinatorics Symbols

HINDI	symbol	Symbol Name	Meaning / definition	Example
	n!	factorial	n! = 1·2·3·…·n	5! = 1·2·3·4·5 = 120
	nPk	permutation	_{n}P_{k}=\frac{n!}{(n-k)!}	5P3 = 5! / (5-3)! = 60
	nCk	combination	_{n}C_{k}=\binom{n}{k}=\frac{n!}{k!(n-k)!}	5C3 = 5!/[3!(5-3)!]=10

set theory symbols

Hindi	Symbol	Symbol Name	Meaning / definition	Example
	{ }	set	a collection of elements	A = {3,7,9,14}, B = {9,14,28}
	A ∩ B	intersection	objects that belong to set A and set B	A ∩ B = {9,14}
	A ∪ B	union	objects that belong to set A or set B	A ∪ B = {3,7,9,14,28}
	A ⊆ B	subset	A is a subset of B. set A is included in set B.	{9,14,28} ⊆ {9,14,28}
	A ⊂ B	proper subset / strict subset	A is a subset of B, but A is not equal to B.	{9,14} ⊂ {9,14,28}
	A ⊄ B	not subset	set A is not a subset of set B	{9,66} ⊄ {9,14,28}
	A ⊇ B	superset	A is a superset of B. set A includes set B	{9,14,28} ⊇ {9,14,28}
	A ⊃ B	proper superset / strict superset	A is a superset of B, but B is not equal to A.	{9,14,28} ⊃ {9,14}
	A ⊅ B	not superset	set A is not a superset of set B	{9,14,28} ⊅ {9,66}
	2A	power set	all subsets of A	
	\mathcal{P}(A)	power set	all subsets of A	
	A = B	equality	both sets have the same members	A={3,9,14}, B={3,9,14}, A=B
	Ac	complement	all the objects that do not belong to set A	
	A \ B	relative complement	objects that belong to A and not to B	A = {3,9,14}, B = {1,2,3},A-B = {9,14}
	A - B	relative complement	objects that belong to A and not to B	A = {3,9,14}, B = {1,2,3}, A-B = {9,14}

Hindi	Symbol	Symbol Name	Meaning / definition	Example
	A Δ B	symmetric difference	objects that belong to A or B but not to their intersection	A = {3,9,14}, B = {1,2,3}, A Δ B = {1,2,9,14}
	A ⊖ B	symmetric difference	objects that belong to A or B but not to their intersection	A = {3,9,14}, B = {1,2,3}, A ⊖ B = {1,2,9,14}
	a∈A	element of , belongs to	set membership	A={3,9,14}, 3 ∈ A
	x∉A	not element of	no set membership	A={3,9,14}, 1 ∉ A
	(a,b)	ordered pair	collection of 2 elements	
	A×B	cartesian product	set of all ordered pairs from A and B	A×B = {(a,b)∣a∈A , b∈B}
	∣A∣	cardinality	the number of elements of set A	A={3,9,14}, ∣A∣=3
	#A	cardinality	the number of elements of set A	A={3,9,14}, #A=3
	∣	vertical bar	such that	A={x∣3<x<14}
		aleph-null	infinite cardinality of natural numbers set	
		aleph-one	cardinality of countable ordinal numbers set	
	Ø	empty set	Ø = { }	C = {Ø}
	U}	universal set	set of all possible values	
	{N}0	natural numbers / whole numbers set (with zero)	\mathbb{N}0 = {0,1,2,3,4,...}	0 ∈ \mathbb{N}0
	{N}1	natural numbers / whole numbers set (without zero)	\mathbb{N}1 = {1,2,3,4,5,...}	6 ∈ \mathbb{N}1
	{Z}	integer numbers set	\mathbb{Z} = {...-3,-2,-1,0,1,2,3,...}	-6 ∈ \mathbb{Z}
	{Q}	rational numbers set	\mathbb{Q} = {x ∣ x=a/b, a,b∈\mathbb{Z}}	2/6 ∈ \mathbb{Q}
	{R}	real numbers set	\mathbb{R} = {x ∣ -∞ < x <∞}	6.343434∈\mathbb{R}
	{C}	complex numbers set	\mathbb{C} = {z ∣ z=a+bi, -∞<a<∞, -∞<b<∞}	6+2i ∈ \mathbb{C}

logic symbols

Hindi	Symbol	Symbol Name	Meaning / definition	Example	
	·	and	and	x · y	
	<m> </m>		caret / circumflex	and	<m> x y </m>
	&	ampersand	and	x & y	
	+	plus	or	x + y	
	v	reversed caret	or	x v y	

Hindi	Symbol	Symbol Name	Meaning / definition	Example	
	∣	vertical line	or	x ∣ y	
	x'	single quote	not - negation	x'	
	x	bar	not - negation	x	
	¬	not	not - negation	¬ x	
	!	exclamation mark	not - negation	! x	
	⊕	circled plus / oplus	exclusive or - xor	x ⊕ y	
	~	tilde	negation	~ x	
	⇒	implies			
	⇔	equivalent	if and only if (iff)		
	↔	equivalent	if and only if (iff)		
	∀	for all			
	∃	there exists			
	∄	there does not exists			
	∴	therefore			
	∵	because / since			

calculus and analysis symbols

HINDI	Symbol	Symbol Name	Meaning / definition	Example		
	\lim_{x\to x0}f(x)	limit	limit value of a function			
	ε	epsilon	represents a very small number, near zero	ε → 0		
	e	e constant / Euler's number	e = 2.718281828...	e = lim (1+1/x)x , x→∞		
	y'	derivative	derivative - Lagrange's notation	(3×3)' = 9×2		
	<m>y</m> | second derivative | derivative of derivative | (3×3) = 18x					
	y(n)	nth derivative	n times derivation	(3×3)(3) = 18		
	<m>dy/dx</m>	derivative	derivative - Leibniz's notation	d(3×3)/dx = 9×2		
	<m>d	**2y/dx**	**2</m>**	second derivative	derivative of derivative	d2(3×3)/dx2 = 18x
	<m>d	**ny/dx**	**n</m>**	nth derivative	n times derivation	
	\dot{y}	time derivative	derivative by time - Newton's notation			
		time second derivative	derivative of derivative			
	Dx y	derivative	derivative - Euler's notation			
	Dx2y	second derivative	derivative of derivative			
	<m>deltaf(x,y)/deltax</m>	partial derivative		∂(x2+y2)/∂x = 2x		

HINDI	Symbol	Symbol Name	Meaning / definition	Example		
	∫	integral	opposite to derivation	∫ f(x)dx		
	∫∫	double integral	integration of function of 2 variables	∫∫ f(x,y)dxdy		
	∫∫∫	triple integral	integration of function of 3 variables	∫∫∫ f(x,y,z)dxdydz		
	∮	closed contour / line integral				
	∯	closed surface integral				
	∰	closed volume integral				
	[a,b]	closed interval	[a,b] = {x □ a ≤ x ≤ b}			
	(a,b)	open interval	(a,b) = {x □ a < x < b}			
	i	imaginary unit	i ≡ √-1	z = 3 + 2i		
	z*	complex conjugate	z = a+bi → z*=a-bi	z* = 3 - 2i		
	z	complex conjugate	z = a+bi → z = a-bi	z = 3 - 2i		
	Re(z)	real part of a complex number	z = a+bi → Re(z)=a	Re(3 - 2i) = 3		
	Im(z)	imaginary part of a complex number	z = a+bi → Im(z)=b	Im(3 - 2i) = -2		
	□z□	absolute value/magnitude of a complex number	□z□ = □a+bi□= √(a2+b2)	□3 - 2i□ = √13		
	arg(z)	argument of a complex number	The angle of the radius in the complex plane	arg(3 + 2i) = 33.7°		
	∇	nabla / del	gradient / divergence operator	∇f (x,y,z)		
		vector				
		unit vector				
	x * y	convolution	y(t) = x(t) * h(t)			
		Laplace transform	F(s) = {f (t)}			
		Fourier transform	X(ω) = {f (t)}			
	δ	delta function				
	∞	lemniscate	infinity symbol			

1) 1+2)×(1+5
2) 1+2)*(1+5