

# HindPhotostat



## Hind Photostat & Book Store

**Best Quality Classroom Topper Hand Written Notes to Crack GATE, IES, PSU's & Other Government Competitive/ Entrance Exams**

### **MADE EASY IES/GATE/PSU MATHEMATICS BY-SRIDHAR SIR**

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

**Visit us:-[www.hindphotostat.com](http://www.hindphotostat.com)**

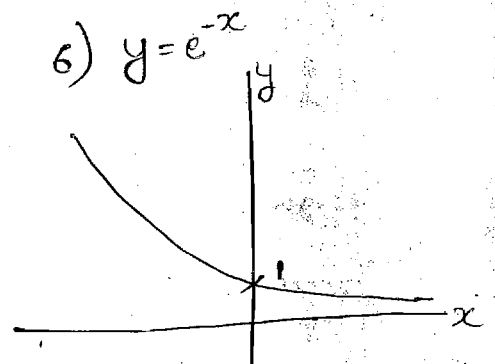
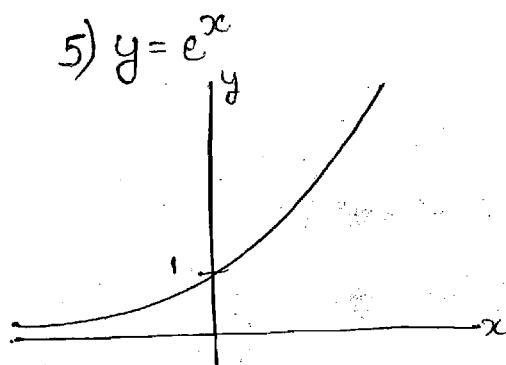
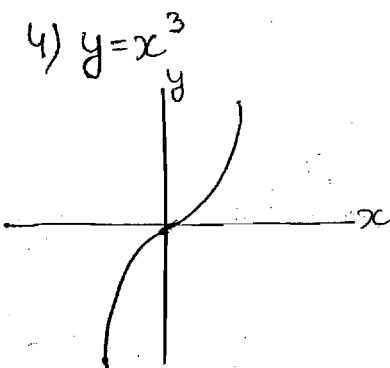
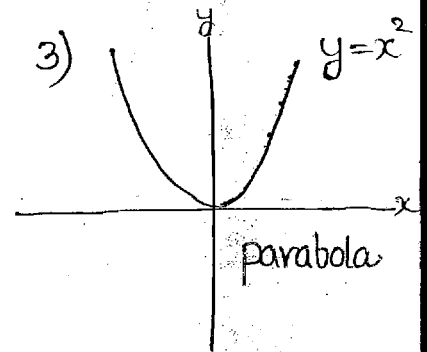
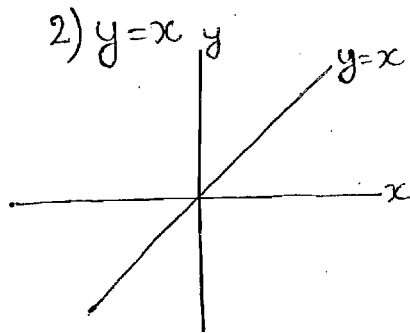
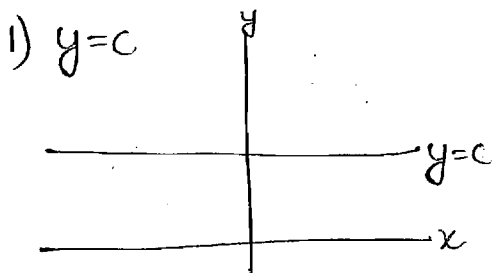
**Courier Facility All Over India  
(DTDC & INDIA POST)  
Mob-9311989030**

1. Calculus.
2. Diff. Eq<sup>n</sup>s.
3. Linear Algebra
4. Probability
5. Complex Analysis
6. Vector Calculus
7. Numerical Methods
8. Laplace Transforms

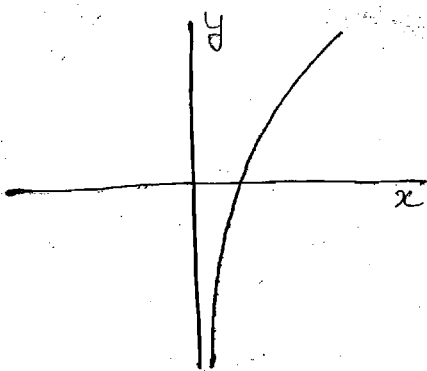
Sridhar  
drenkatas@gmail.com

## CALCULUS

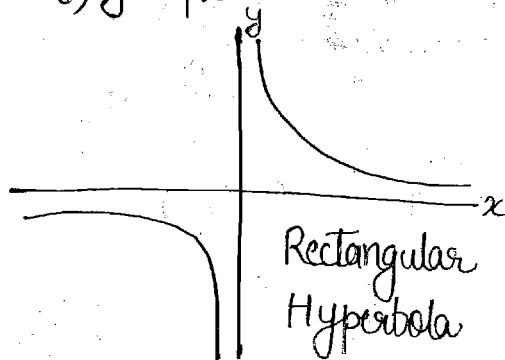
### Functions :



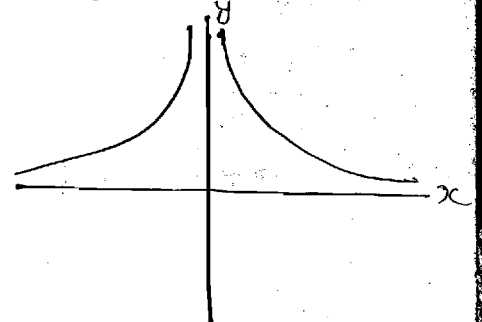
7)  $y = \log x$  (In Maths log is base e notation)



8)  $y=1/x$

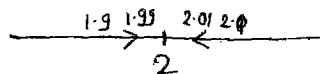


9)  $y=1/x^2$



\*  $f(x) = \frac{x^2-4}{x-2}$        $f(2)$  is not defined.

$\lim_{x \rightarrow 2} f(x) = \lim_{x \rightarrow 2} \frac{x^2-4}{x-2}$



$x \rightarrow 2^-$

$x \rightarrow 2^+$

$x=1.9$      $f(x)=3.9$

$f(x)=4.1$      $x=2.1$

$x=1.99$      $f(x)=3.99$

$f(x)=4.01$      $x=2.01$

$x=1.999$      $f(x)=3.999$

$f(x)=4.001$      $x=2.001$

↓  
4

↓  
4

$\lim_{x \rightarrow a} f(x) = L$  means       $\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x) = L$

i.e.  $\boxed{L.H.L = R.H.L = L}$

Note -  $f(a)$  need not be defined.

\*  $\lim_{x \rightarrow 3} 3x+4 = 13$

$f(x) = 3x+4$   
 $f(3) = 13$

Continuity :-

Def:  $f(x)$  is continuous at  $x=a$  means

$\lim_{x \rightarrow a} f(x) = f(a)$       i.e.  $\boxed{RHL = LHL = f(a)}$

otherwise,  $f(x)$  is discontinuous at  $x=a$

Removable discontinuity -  $L.H.L = R.H.L \neq f(a)$

Ex:-  $f(x) = \frac{x^3-9}{x-3}$  has removable discont. at  $x=3$

$\lim_{x \rightarrow 3} f(x) = 6 \neq f(3)$        $f(3)$  not defined.

Jump discontinuity - (Discont. of first kind)

$LHL \neq RHL$

Ex:-  $f(x) = \begin{cases} x & x < 0 \\ x+1 & x \geq 0 \end{cases}$