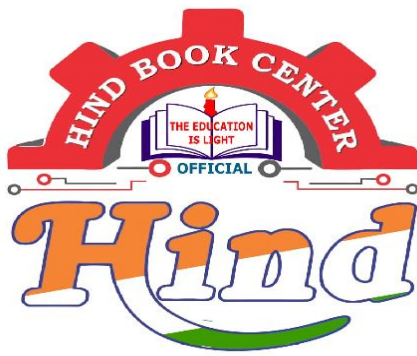




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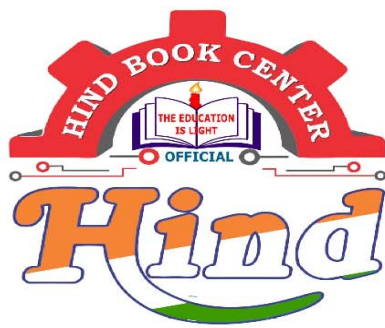
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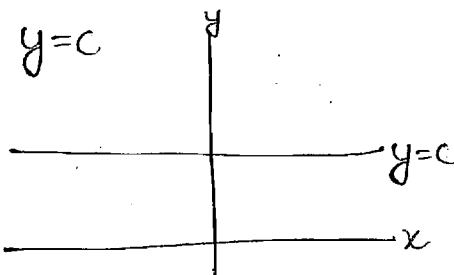
1. Calculus.
2. Diff. Eqⁿs.
3. Linear Algebra
4. Probability
5. Complex Analysis
6. Vector Calculus
7. Numerical Methods
8. Laplace Transforms

Sridhar
drenkatas@gmail.com

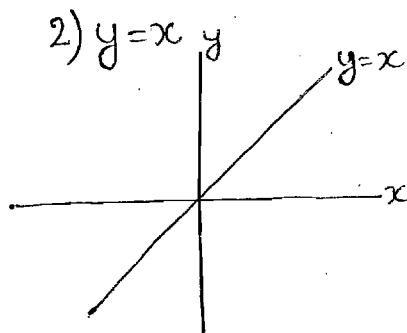
CALCULUS

Functions :

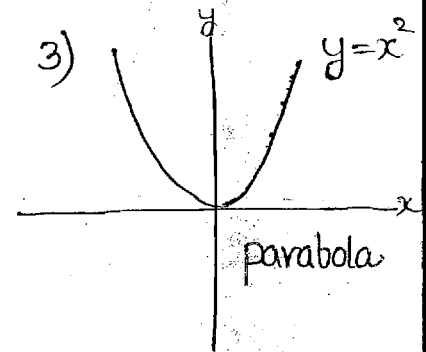
1) $y=c$



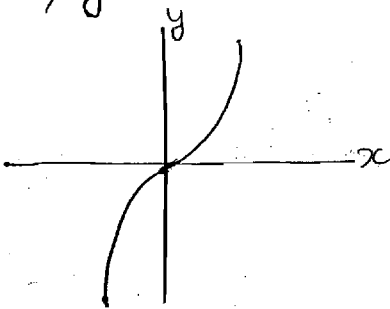
2) $y=x$



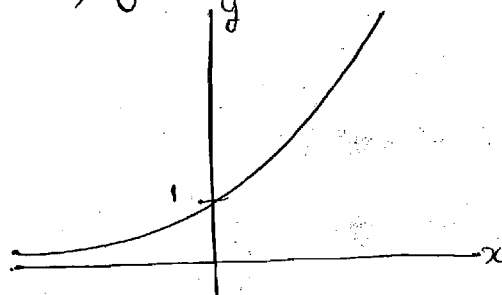
3)



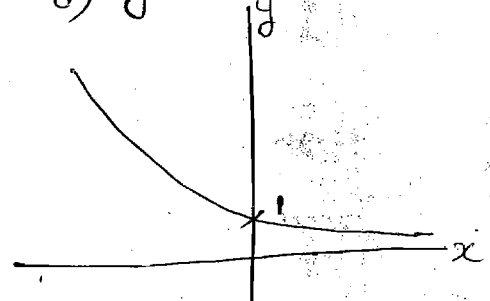
4) $y=x^3$



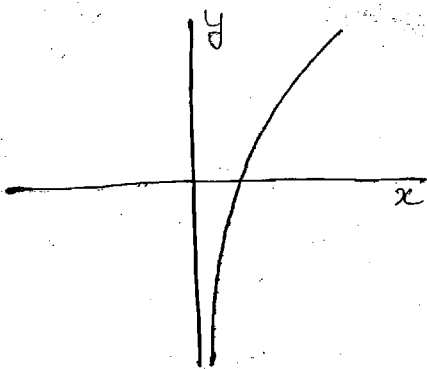
5) $y=e^x$



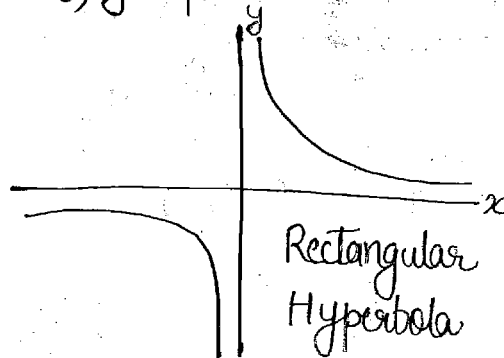
6) $y=e^{-x}$



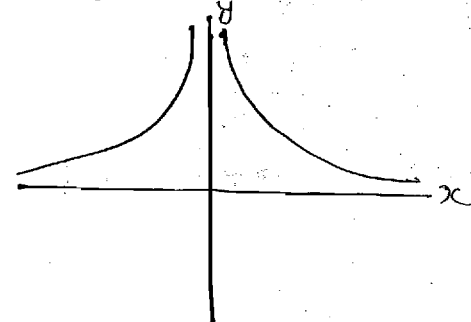
7) $y=\log x$ (In Maths log is base e notation)



8) $y=1/x$

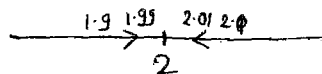


9) $y=1/x^2$



* $f(x) = \frac{x^2-4}{x-2}$ $f(2)$ 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:- $f(x) = \begin{cases} x & x < 0 \\ x+1 & x \geq 0 \end{cases}$