Integral Calculus

	DATE
	Some standard rusults.
0	$\int m^n dn = m^{n+1} + c$
- m	n+1
0	$\int dn = n + c$
(3)	Jendn = en+c.
4	Jesnada = - cosm +c.
3	Scosnom = sfnn+c
©	Starm on = log(secn)+c = - log(cosn)+c
3	Jeet nom = log (sim)+e
8	Seen dn = log(seen)+tam)+c
6	I cosecondon = log (cosecon - coton) +c. = log (tan m)+c
(3)	Seeman = tann +c.
0	scosec2ndn = -cotn+c
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-X-	Integration by substitution!
7	Integration by substitution! Sometimes integration becomes easier by substitution of some fined terms or functions
	substitution of some fined terms or functions
→	In general to evaluate the integrals
(D).	If (n) ef(n) oln, put f(n) =y Note: put power of emponential
	Note: put power of emponential
	Then f'(n) of = y.
	Consorder a strength
*	
2	(f'(n) Sf(n) 2 dn EgiT= Secon etennen
	f(n) Sf(n) 2 dn EgiT= secon eternadn pud f(n) = y let y = tann 8 dy = secondn
	I Secritario
	$= \int e^{\gamma} \cdot d\gamma$ $= e^{\gamma} = e^{+ann} + c.$
	= et#= et#+C.
•	(C)(-1 1002 S f(m) 2 dm
(3	$\int \int f'(m) \log f(n) dn$ $= -$
	pw +(m) = 4
	·
	(f'(m) 3 fn 3 f(m)? dm
	$ \begin{array}{c c} y & f'(n) & \sin x f(n) & \cos x \\ \hline prot & y & = f(n). \end{array} $
	1 - 3 (1)
5.00 m	
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Trignometric Substitution Sometimes Protegration can be made easter by converting the function from algebric to trignom - etric form. For this, we adopt the following rule. 4 In, m2+02 ferom, put on = aton 0 1 In, on2 - a2 form, put on = a see 8 In, a2-n2 form, put ox = asin 8. => Some standard results got using above ideas. $\frac{1}{\int \frac{dm}{m^2 + \alpha^2}} = \frac{1}{\alpha} \frac{1 + \alpha^{-1}}{\alpha} \frac{m}{\alpha} + c$ $\int \frac{dn}{m^2 - a^2} = \frac{1}{2a} \frac{\log(m - a)}{m + a} + \epsilon(m - a)$ $\frac{dn}{a^2 - n^2} = \frac{1}{2a} \frac{\log(a+n)}{(a-ne)} + c$ (norn) PAGE 13 classmate

4
$$\int dn = \log (n + \sqrt{m^2 + a^2}) + c$$

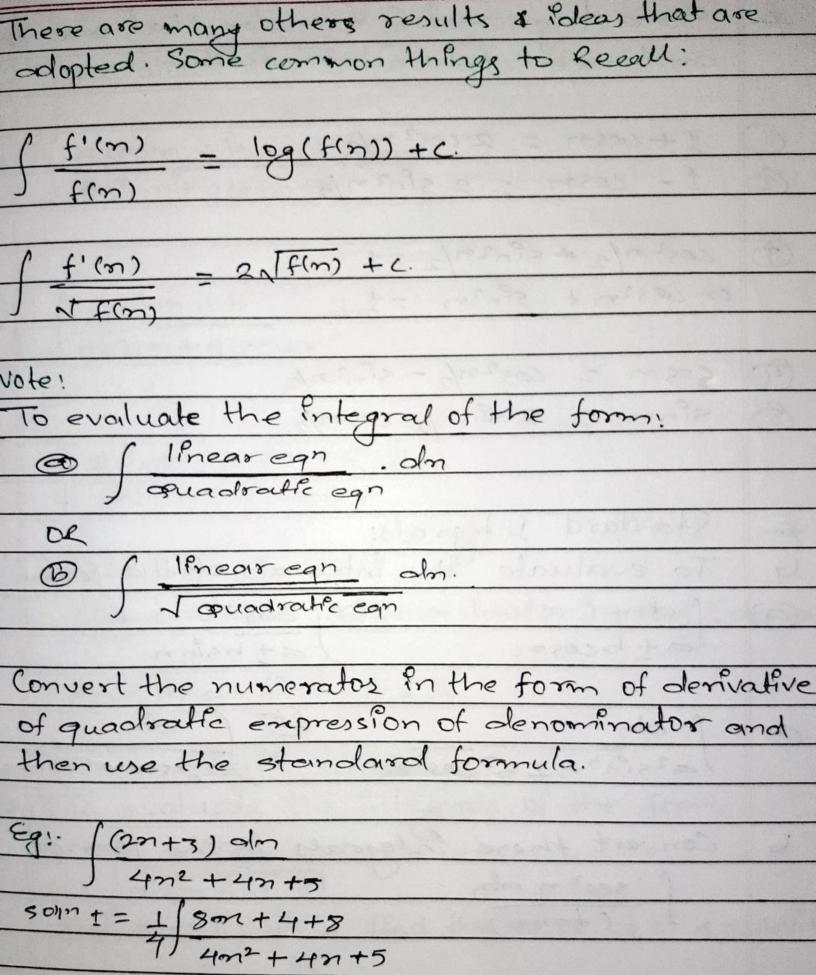
= $\sinh^{-1} m + c$

5. $\int dn = \log (m + \sqrt{m^2 - a^2}) + c$

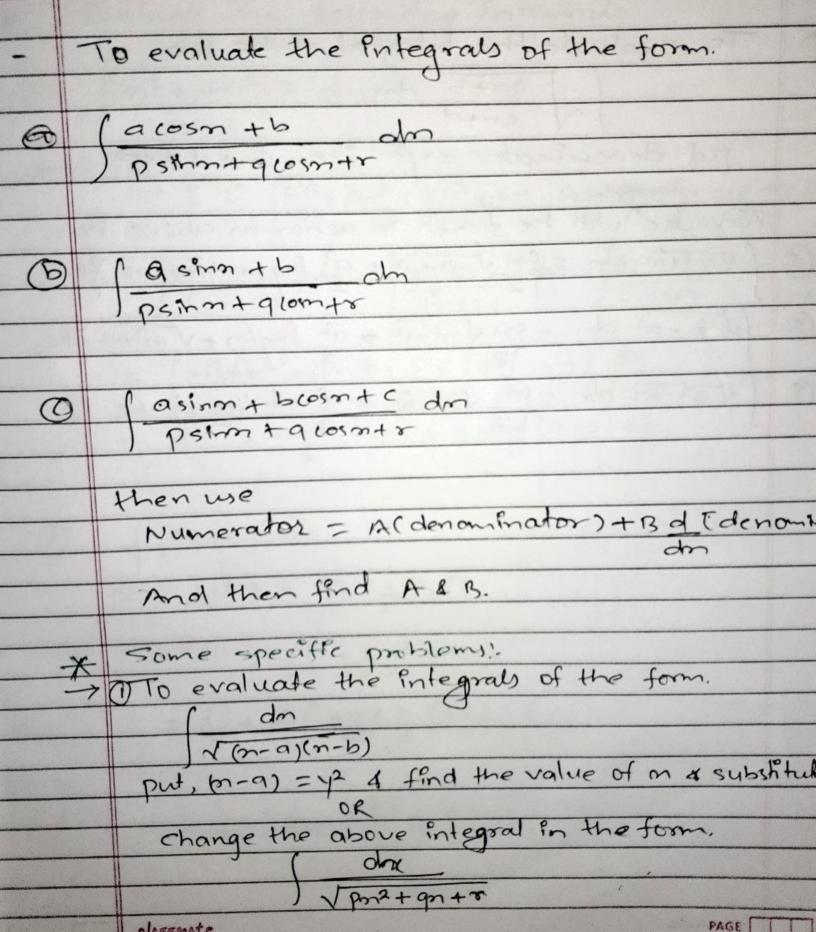
= $\cosh^{-1} m + c$

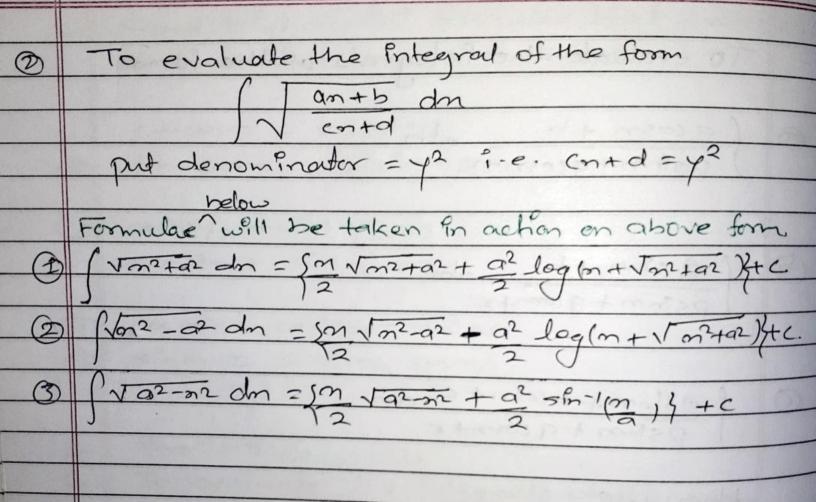
6 $\int dn = \sinh^{-1} m + c$

6 $\int \sqrt{a^2 - n^2} = \sinh^{-1} m + c$



*	Some trignometric fermulae that are commo
	and need to be remember
0	1+cosn = 2 (052 n/2
	1 - cosn = 2 sfn2n/2
3	cos2 n/2 + sPn2n/2 =1
	cr cosin + sinin =1
4	cos m = cos2n/2 - sfn2 n/2
6	spum = 2 spum/2. (05 m/2.
	The second of th
70-	Standard Integrals:
4	To evaluate the Integrals of the form.
0	
	Ja+bcoson Ja+hsinn
in Viet	Charles and the state of the st
0	Jarsin + brimte
	Jaisinin + bi costa Jacos + beimte
	Convert 11 P. 1 . 2 .
4	Convert these integrals in the form of
	f(tann)
	4 then put tann - v 1 10 11
	4 then put tann = y & finally use and of the formula s.a. going to be followed.
	John pe follower

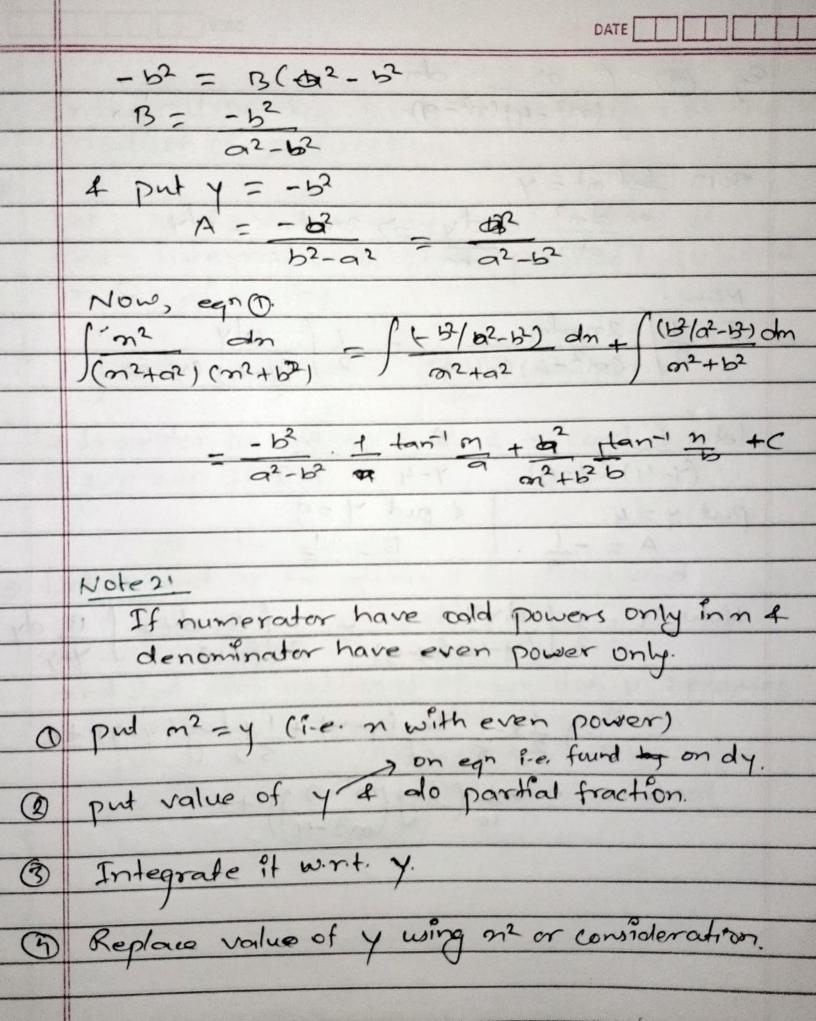




		DATE
4	Integration by using	p partial fraction:
4	The Eder a of partie	I fraction is used if degree
	of denominator is qu	eater than degree of num-
	erator.	of partial fraction: Il fraction is used if degree eater than alegree of num-
	A S MEN LINE OF WELL SHOW	y - Palmy gold to
	Empression in denomin	nator Corresponding p. facella
4.0)	(m-a) (m-b) (m-c	Las A B
	The state of the s	1.a) A + B + C
b)	(m-af (n-b)	
		(ma) (ma) c
(2)	(ma)3	
4)		(ma) + B + C (ma)3
٥.	The second	2,
a)	(an2+bn+c) (pn2+gn+r)	a) A B
		(an2+pn+c) (Postgn+r)
b)	(ma) (pm2+gn+r)	b. A + B
	2	(n-a) (buz tauta)
0	(pm2+qn+r)2	6 A B
		(bustduth) (bustduth)
		15 The William (1961) (1961)
3-0	m ² = 1+.	AB
	(m-a) (n-b)	(n-b)
	1 Se by Da 1. Care	Y DA
<u>b)</u>	m ³ = ±	+ A + B + C
	(n-a) (n-b) (n-c)	(m-a) (m-b) (m-c)

d - + y + bit

+	Some other problems:
6	If both numerator and denough last
	If both numerator and denominator have even powers in hi then
	Step 5: Pert on2 or or or or or
	Step 5: Put on 2 = y or even power = y Step 2: Find partial fraction. Step 3: Replace y by on 2 Step 41 Integrate w.r. + m. Eq.
	steps: Replace is him?
	step 41 Internale 111
	Eg.
	Evaluate p or ² dm (or ² +o ²) (or ² +b ²)
	(22+23)(23+13-1
	$\frac{1et \ t = \int_{0}^{\infty} e^{2} dn}{(n^{2} + a^{2})(n^{2} + b^{2})}$
	(n2+a2) (n2+b3)
1	P. put n2 = 4.
1	Now, $T = \int \frac{1}{(\gamma + a^2)(\gamma + b^2)} dn$
) (4+a2)(4+b2)
	1 1 C The Control of A
	10t, ('Y dn - (A dn - B) dn D
	(1+a) (1+b)) (1+b)2
	1 2 2
	(Y+a2)(Y+b2) - A(Y+b3) + B(Y+a2)
	(Har) CY+13)
	Cry= ACYLIZI
	$cr y = A(y+b^2) + B(y+a^2)$ put $y = -b^2$
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Integration by parts & Integration of the product of 2 functions) let, u 4 v be any two functions of n, then Integration of their product (u, v) wort n is given by Juvan = ufvan - (dy Ivanjan 4 Incorder to choose first & second function, we use ILATE. # short-cuts. > Let u and v be given a functions and den den der and let derivative of 1st function u becomes constant after some finite steps then, [uvdn = uv, - u'v2+u"v3 - u"v4+ -- . until derivate of u becomes constant.

->-	Definite Integrals: let $f(x) = F(n) + C$, then the integral
	les (f(x) = F(m)+c, then the integral
	((moithment of the touther)
	$\int_{a}^{b} f(n) dn = [F(n) + c]_{b}^{b}$
	= F(b) - F(a)
	is called alefinite integral. Here a is lower
	Ismit and b is upper timit.
-4	properties of definite integral:
	THE THE STATE OF T
	$\int_{a}^{a} f(m) dm = 0$
(7)	(been found to and a symbol of
	$\int_{a}^{b} o dn = 0.$
(117)	$\int_{a}^{b} f(m) dm = \int_{a}^{b} f(t) dt$
6	
(1)	of c is an interior point in (a, b) i-e.
	1h
	frandn = ffrandn + ffrandn
	5 f(m) dm = - (9 f(m) dm.
-	09 60
(v)	$\int_{a}^{a} f(m) dm = \int_{a}^{a} f(a-n) dm.$
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