Date ____ Harshpreet Singh. 2210990303 sh-3finco) Laplace formules. [{f(t)} = se f(t) dt = F(s) E Integrals? [{af(t) + bg(t)} = al {f(t)} + blég(t)} of 67 L{n} = n, 5>0 1 { e a t } = 1, 5 > a $L\{t^n\} = n!$ when n is a natural number. In = [e-ttn-1 dt Lfth? = Inti when n>0 Lésinat = a 5>0 52+a2 at L & cosat } = 5 524 a 2 Lé sinhat à = a $L\{\cos h \ at \} = \frac{s}{s^2 - a^2}$ (4) L{eatf(t)} = F(s-a) First shifting 4 Léf(at)} = $\frac{1}{a}F(\frac{s}{a})$ { Change of scale}

$$L\{f''(t)\}^2 = s''L\{f(t)\}^2 - s''^{-1}f(0) - s''^{-2}f'(0) - s''^{-3}f''(0)$$
... $f''^{-1}(0)$... $\{LT \circ F Destivative s \}$

Lét
$$f(t)$$
 $g = (-1)^m d^n F(s)$ { moltiplication of the distribution of the distribu

Inverse Laplace

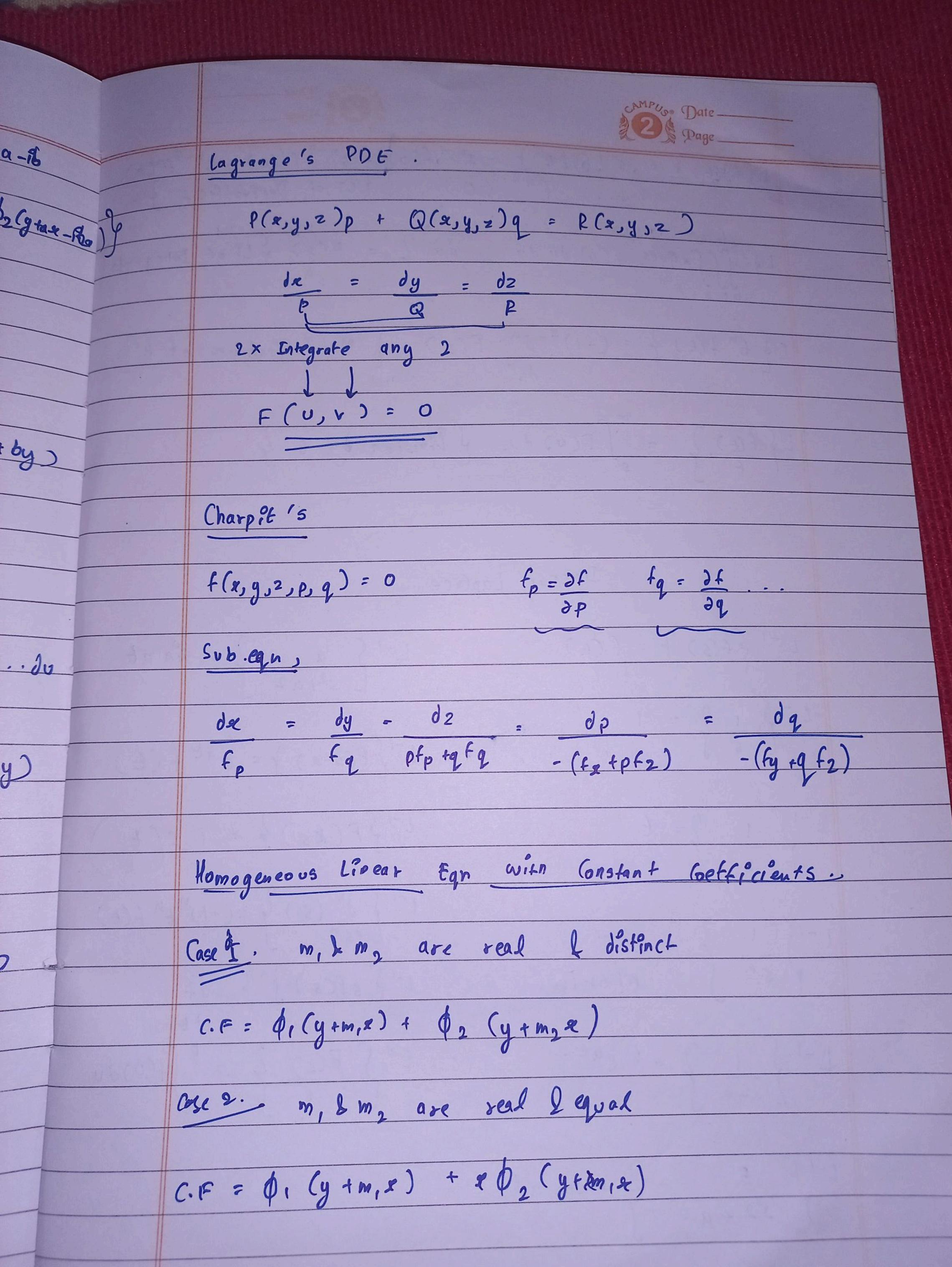
$$L^{-1} \{f(s)\} = f(e)$$
 $L^{-1} \{a\} = 5in at$

$$\frac{1}{s^2 + a^2} \{a\} = 5in at$$

$$1 - \frac{1}{5} = 1$$

$$1 - \frac{1}{5$$

$$\frac{1-i\int_{S^2} \int_{S^2} f(\kappa s)^2 = f(\kappa s)^2 =$$





case 1). if m, k m, are complex m, = a+ ib, m, = a-ib CF = \$\phi_1(y+ax+ibx) + \$\phi_1(y+ax-ibx) + i\delta(\phi_2(y+ax+ibx) - \phi_2(y+ax-ibx)

Rules for Particular Integral.

P.I = 1 eastby = 1 eastby f (Dx, Dy) f(a, b)

, or cos (ax +by)

sin (ax + by) = 1 sin Cax + by) FOR2, DxDy, Dy2) f(-a2,-ab,-62)

3. P.I = 1 2myn = [f(Dx, Dy)] (xmyn)

F(Dx, Dy)

 $\frac{4 \cdot P.I = 1}{F(Dx,Dy)} \frac{f(x,y)}{F(a,b)} \frac{f(x,y)}{F(a,b)} \frac{f(x,y)}{f(x,b)} \frac{f(x,y)}{f(x,y)} \frac{f(x,y)}{f(x,b)} \frac{f(x,y)}{f(x,b)} \frac{f(x,y)}{f(x,b)} \frac{f$

5. P.I = 1 $e^{ax+by} v(x,y) = e^{ax+by} 1$ v(x,y) F(Dx+a, Dy+b)

2"d order PDE.

 $\frac{A \frac{\partial^2 u}{\partial x^2} + B \frac{\partial^2 u}{\partial x \partial y} + C \frac{\partial^2 u}{\partial y^2} + F(x, y, u, \frac{\partial u}{\partial x}) = 0}{\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u$

when B2-4AC < 0 -> Elliptic

When $B^2 - 4AC = 0$ Parabolic

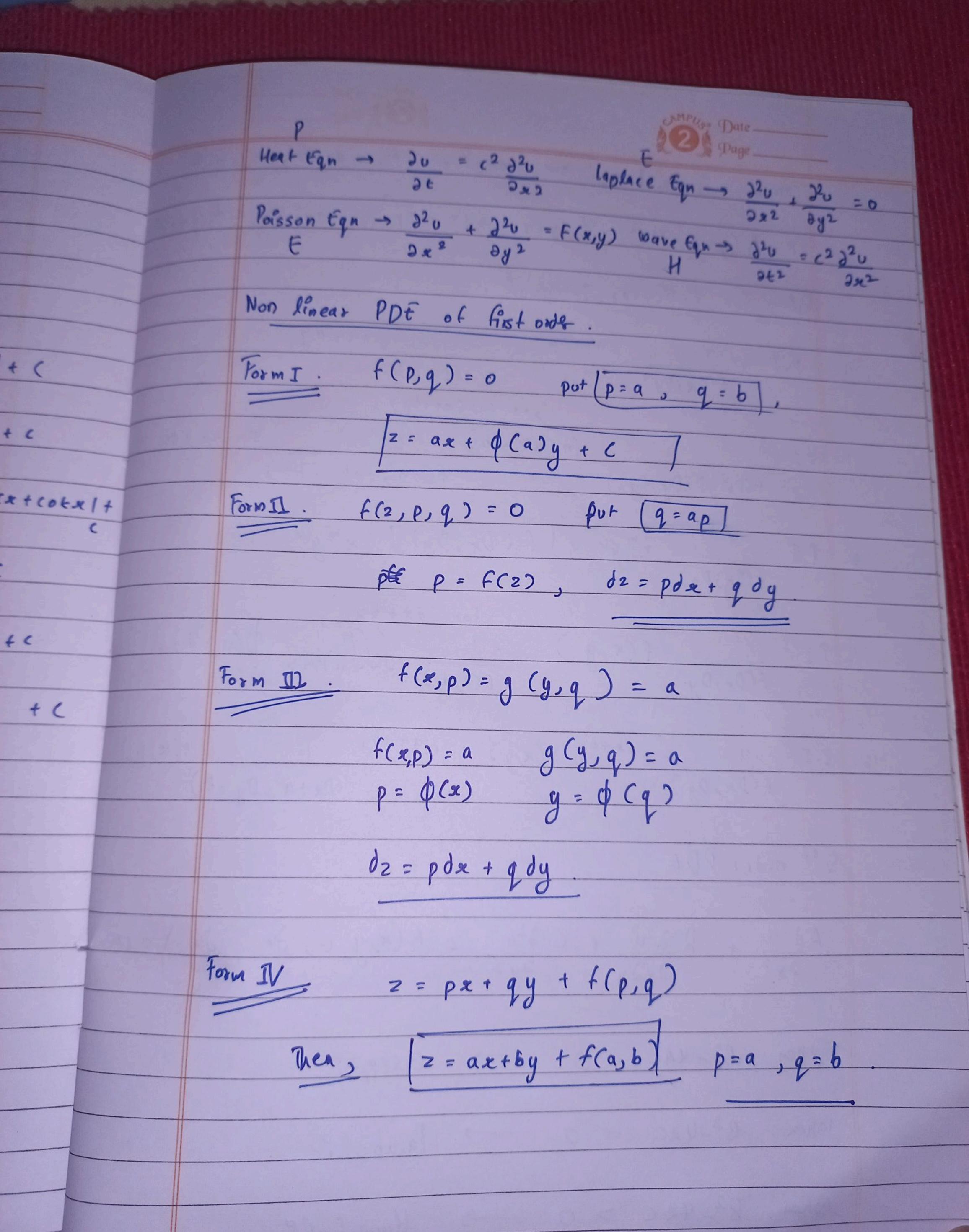
 $B^2 - 4AC > 0 - 9$ Whom Hyperbolie

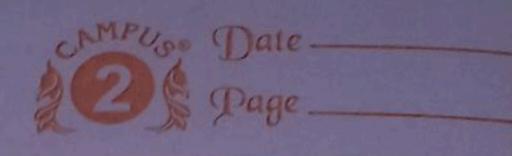
f(x)

C.F

Ose

C.F





General integration & diff. formulas.

$$\int dx = x + c \qquad \int x^n dx = \frac{x^{n+1}}{n+1} + c$$

$$\int \frac{dx}{x} = \ln|x| + C \qquad \int e^{x} dx = e^{x} + C$$

Sinxde = - cosx + c Stanxdx = -lulcosx1+ (

Scose de = sin etc Scot e de = -lu | sin el + c

Secx dx = la secx + tanx 1 + c Scs (x dx = -la scx + cotx)+

Sec2xdx = tanx + c

Csc2xdx = -colx + c

Sec x tank dx = seck + c Scscx cotx dx = -csex + c

 $\int d\alpha = 5in^{-1}x + C$ $\int d\alpha = 1 + an^{-1}x + C$ $\int a^{2}-x^{2}$ α

 $\int \frac{dx}{x} = \frac{1}{a} \sec^{-1} |x| + C$ $\int x \sqrt{x^2 - a^2} = \frac{1}{a} \sec^{-1} |x| + C$

Just remember these lol.