Gradient divergence and; Laplacian

$$\text{grad}f = f = f_x i + f_y j + f_z k \quad \text{(f is a scalar function)}$$
$$\text{div}F = .F = P_x + Q_y + R_z$$
$$\text{anl}F = xF = \begin{vmatrix} i & j & k \\ \partial/\partial x & \partial/\partial y & \partial/\partial z \\ P & Q & R \end{vmatrix}$$
$$\Delta^2 f = f_{xx} + f_{yy} + f_{zz}$$

derivative under the integral sign:

$$\frac{d}{dt}\int_a^{b(t)}(t)f(x,t)dx = f(b,t)b' - f(a,t)a' + \int_a^b f_t(x,t)dx$$

4.3. *TAYLOR's Formula:*

$$f(x,y) = f(a,b) + \sum_{k=1}^{n} \frac{1}{k!}\left[(x-a)\frac{\partial}{\partial x} + (y-b)\frac{\partial}{\partial y}\right]^k f(x,y)\mid_{(a,b)} + R_{n+1}$$

when the remainder is given by

$$R_{n+1} = \frac{1}{(n+1}\left[(x-a)\frac{\partial}{\partial x} + (y-b)\frac{\partial}{\partial y}\right]^{n+1} f(x,y)\mid_{(x^*,y^*)}$$

with $(x^*, y^*)\epsilon(P_0P)$, $P_0(a,b)$, $P(x,y)$.

TAYLOR's Series:

$$f(x,y) = f(a,b) + \sum_{k=1}^{\infty} \frac{1}{k!}\left[(x-a)\frac{\partial}{\partial x} + (y-b)\frac{\partial}{\partial y}\right]^n f(x,y)\mid_{(a,b)}$$

Family	Envelope
$F(x,y,\lambda) = 0$	$F = 0,\ F_\lambda = 0$
$F(x,y,z,\lambda) = 0$	$F = 0,\ F_\lambda = 0$
$F(x,y,z,\lambda,\mu) = 0$	$F = 0,\ F_\lambda = 0,\ F_\mu = 0$

Evolute of a plane curve: is the envelope of it nomels ot the locus of of centers of curvature.