QUIZ 1

$$f(x.yy) \approx f(x) + f'(x) \cdot 0.yy$$

$$L(f) = \int_a^b \sqrt{g'(t)^2 + g(t)^2}\, dt \qquad t \in [a,b]$$

$$L(f) = \int_a^b |f'(t)|\, dt \qquad t \in [a,b]$$

$$L(f) = \int_a^b \sqrt{1 + h'(t)^2}\, dt$$

QUIZ 2

$$u = \frac{\nabla f(p)}{|\nabla f(p)|}$$

Tasso max crescita : $|\nabla f(p)|$

Tasso min crescita : $-|\nabla f(p)|$

$$(f \circ x)'(t_0) = \nabla f(x(t_0)) \cdot x'(t_0) = \partial x_1 f(x(t_0)) x_1'(t_0) + \ldots + \partial x_n f(x(t_0)) x_n'(t_0)$$

$$D_u f(p) = \nabla f(p) \cdot u = \partial x f(p) \cdot u_1 + \ldots + \partial n f(p) \cdot u_n$$

QUIZ 3

$$Hess(f(p)) = \begin{pmatrix} \frac{\partial}{\partial x}\frac{\partial}{\partial x} f_p & \frac{\partial}{\partial x}\frac{\partial}{\partial y} f_p \\ \frac{\partial}{\partial y}\frac{\partial}{\partial x} f_p & \frac{\partial}{\partial y}\frac{\partial}{\partial y} f_p \end{pmatrix}$$

$$z = f(p) + \nabla f(p)(x - p)$$

QUIZ 4

$$\int_r \mu\, ds = \int_a^b \mu(r(t))\, |r'(t)|\, dt$$

$$\int_r F \cdot dr = U(r(b)) - U(r(a))$$

QUIZ 5

$$\frac{1}{2}\int_a^b \rho^2(t)\, dt \qquad \text{con} \quad t \in [a,b]$$

$$\varphi'(u,v) = \begin{pmatrix} \partial_u \varphi_1(u,v) & \partial_v \varphi_1(u,v) \\ \partial_u \varphi_2(u,v) & \partial_v \varphi_2(u,v) \end{pmatrix} = \begin{pmatrix} \nabla \varphi_1(u,v) \\ \nabla \varphi_2(u,v) \end{pmatrix}$$

$$\text{Area}(D) = \det(\varphi(u,v)) \cdot \text{Area}(E)$$

$$\int_D f(x,y)\, dx\, dy = \int_E f(\varphi(u,v))\, |\varphi'(u,v)|\, du\, dv$$

QUIZ 6

$$\text{Vol}(\Omega) = \int_\Omega 1\, dx\, dy\, dz$$

$$\text{Vol}(\Omega) = 2\pi\, x_D\, \text{Area}(D) = 2\pi \int_D x\, dx\, dz$$

$$x_B = \frac{\int_D x_i\, dx}{\text{Area}(D)}$$

$$\text{Area}(p) = \int_D |p_x(x,y) \times p_y(x,y)|\, dx\, dy = \int_r x\, ds$$

$$\text{Area}(p) = \int_D \sqrt{1 + |\nabla f(x,y)|^2}\, dx\, dy$$

QUIZ 7

$$\int_p \mu\, d\sigma_p = \int_D \mu(p(u,v))\, |p_u \times p_v(u,v)|\, du\, dv$$

$$2\pi \cdot x_r \cdot \text{Lunghezza}(r) = 2\pi \cdot \int_r x\, ds$$

$$\int_{\partial^+ D} F \cdot T = \int_{\partial^+ D} F_1\, dx + F_2\, dy = \int_{r_1} F_1 \cdot T\, ds + \int_{r_2} F \cdot T\, ds$$

$$\int_{\partial^+ D} F_1(x,y)\, dx + F_2(x,y)\, dy = \int_{\partial^+ D} F \cdot T\, ds = \int_D \partial_x F_2(x,y) - \partial_y F_1(x,y)\, dx\, dy$$

$$\int_a^b \det \begin{pmatrix} F_1(r(t)) & r_1'(t) \\ F_2(r(t)) & r_2'(t) \end{pmatrix} dt = \int_a^b F_1(r(t))\, r_2'(t) - F_2(r(t))\, r_1'(t)\, dt$$

$$\int_{\partial D} F \cdot N_{ext}\, ds = \int_D F_1\, dy - F_2\, dx$$

QUIZ 8

soluzione generale di $y' + a(t)y = b(t)$ è

$$y(t) = B(t)\, e^{-A(t)} + C e^{-A(t)}$$

- A primitiva di a
- B primitiva di $b e^{A}$

Variabili separabili