4) $z = \sqrt{2x+y^2}$ in $A(9;2)$ DIFFERENZIALE PRIMO

$$df(x_0,y_0) = f_x(x_0,y_0)(x-x_0) + f_y(x_0,y_0)(y-y_0)$$

$$df(9,2) = \frac{\partial f}{\partial x}(9,2)(x-9) + \frac{\partial f}{\partial y}(9,2)(y-2)$$

$$f_x(9,2) = \frac{2}{2\sqrt{2x+y^2}} = \frac{1}{\sqrt{2x+y^2}}\Big|_{(9,2)} = \frac{1}{\sqrt{22}}$$

$$f_y(9,2) = \frac{2y}{2\sqrt{2x+y^2}}\Big|_{(9,2)} = \frac{2}{\sqrt{22}}$$

$$df(9,2) = \frac{1}{\sqrt{22}}(x-9) + \frac{2}{\sqrt{22}}(y-2) = \frac{1}{\sqrt{22}}(x+2y-13)$$

3) $z = x^4y + xy^4$ DIFF. SECONDO IN $A(2;1)$

$$d^2f(x_0,y_0) = f_{xx}(x_0,y_0)(x-x_0)^2 + 2f_{xy}(x_0,y_0)(x-x_0)(y-y_0) + f_{yy}(x_0,y_0)(y-y_0)^2$$

$f_x = 4x^3y + y^4$ $f_{xx} = 12x^2y$ $f_{xx}(2,1) = 48$

$f_{xy} = 4x^3 + 4y^3$ $f_{xy}(2,1) = 32 + 4 = 36$

$f_y = x^4 + 4xy^3$ $f_{yy} = 12xy^2$ $f_{yy}(2,1) = 24$

$$d^2f(2,1) = 48(x-2)^2 + 2\cdot 36(x-2)(y-1) + 24(y-1)^2$$

$$d^2f(2,1) = 48(x-2)^2 + 72(x-2)(y-1) + 24(y-1)^2$$