CALCOLARE LE DERIVATE PARZIALI PRIME DELLE SEGUENTI FUNZIONI

1) $z = 2x^3y^2 - 4xy + 3x^2y + 2\sqrt{x^3y}$

$$\frac{\partial f}{\partial x} = f_x(x,y) = 6x^2y^2 - 4y + 6xy + \frac{\cancel{2}\cdot 3x^2y}{\cancel{2}\sqrt{x^3y}}$$

$$\frac{\partial f}{\partial y} = f_y(x,y) = 4x^3y - 4x + 3x^2 + \frac{x^3}{\sqrt{x^3y}}$$

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2) $z = x^2y^3 \ln(4x^2+y^2)$

$$\frac{\partial f}{\partial x}(x,y) = f_x(x,y) = 2xy^3\cdot \ln(4x^2+y^2) + x^2y^3\cdot\frac{8x}{4x^2+y^2} =$$
$$= 2xy^3 \ln(4x^2+y^2) + \frac{8x^3y^3}{4x^2+y^2}$$

$$\frac{\partial f}{\partial y}(x,y) = f_y(x,y) = 3x^2y^2 \ln(4x^2+y^2) + x^2y^3\,\frac{2y}{4x^2+y^2}$$
$$= 3x^2y^2 \ln(4x^2+y^2) + \frac{2x^2y^4}{4x^2+y^2}$$

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3) $z = \dfrac{x+2y}{\ln x}$

$$\frac{\partial f}{\partial x} = f_x = \frac{1\cdot \ln x - (x+2y)\cdot\frac{1}{x}}{(\ln x)^2} = \frac{\ln x - 1 - \frac{2y}{x}}{\ln^2 x} = \frac{x\ln x - x - 2y}{x\ln^2 x}$$

$$\frac{\partial f}{\partial y} = f_y = \frac{2\cdot \ln x - (x+2y)\cdot 0}{(\ln x)^2} = \frac{2}{\ln x}$$

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4) $z = e^{xy(x^2+3y^3)} = e^{x^3y+3xy^4}$

$f_x = (3x^2y+3y^4)\cdot e^{(x^3y+3xy^4)}$; $f_y = (x^3+12xy^3)\,e^{x^3y+3xy^4}$

5) $z = \sqrt{x^2-2y^2}$

$f_x = \dfrac{\cancel{2}x}{\cancel{2}\sqrt{x^2-2y^2}}$; $f_y = \dfrac{-\cancel{4}^{\,2}y}{\cancel{2}\sqrt{x^2-2y^2}} = \dfrac{-2y}{\sqrt{x^2-2y^2}}$