Apunte [illegible]

1) $z = x^2 + y^2$

$z'_x = 2x + 0 = 2x$

$z'_y = 0 + 2y = 2y$

2) $z = x^2 . y^2$

$z'_x = 2x . y^2$

$z'_y = x^2 . 2y = 2x^2 . y$

3) $z = x^y$

$z'_x = y . x^{y-1}$

$z'_y = x^y . \ln x$

4) $z = y^x$

$z'_x = y^x . \ln y$

$z'_y = x y^{x-1}$

5) $z = x^{\operatorname{sen} y}$

$z'_x = \operatorname{sen} y . x^{\operatorname{sen} y - 1}$

$z'_y = x^{\operatorname{sen} y} . \ln x . \cos y$

6) $z = (\operatorname{sen} x)^y$

$z'_x = y . (\operatorname{sen} x)^{y-1} . \cos x$

$z'_y = (\operatorname{sen} x)^y . \ln(\operatorname{sen} x)$

7) $z = x^2 . y^3 + 3xy^2 - 4x^4 - y$

$z'_x = 2xy^3 + 3y^2 - 16x^3$

$z'_y = x^2 . 3y^2 + 3x . 2y - 1$

$z'_y = 3x^2y^2 + 6xy - 1$

8) $z = 4^{x^2 - xy}$

$z'_x = 4^{x^2 - xy} . \ln 4 . (2x - y)$

$z'_y = 4^{x^2 - xy} . \ln 4 . (-x)$

9) $z = e^{x . y}$

$z'_x = e^{x . y} . y$

$z'_y = e^{x . y} . x$

10) $z = e^{\operatorname{sen}(x . y)}$

$z'_x = e^{\operatorname{sen}(x . y)} . \cos(x . y) . y$

$z'_y = e^{\operatorname{sen}(x . y)} . \cos(x . y) . x$

12) $z = \sqrt{\frac{x}{y}} = \frac{\sqrt{x}}{\sqrt{y}} = x^{1/2} . y^{-1/2}$

$z'_x = \frac{1}{2} . x^{1/2 - 1} . y^{-1/2}$

$z'_x = \frac{1}{2} . x^{-1/2} . y^{-1/2}$

$z'_y = x^{1/2} . \left(-\frac{1}{2}\right) . y^{-1/2 - 1}$

$z'_y = -\frac{1}{2} x^{1/2} . y^{-3/2}$

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13) $z = x^2 . \operatorname{sen}(3xy) = A . B$

$A = x^2$

$A'_x = 2x$

$A'_y = 0$

$B = \operatorname{sen}(3xy)$

$B'_x = \cos(3xy) . 3y = 3y . \cos(3xy)$

$B'_y = \cos(3xy) . 3x = 3x . \cos(3xy)$

$z'_x = A'_x . B + A . B'_x$

$z'_x = 2x . \operatorname{sen}(3xy) + x^2 . 3y . \cos(3xy)$

$z'_x = 2x . \operatorname{sen}(3xy) + 3x^2 y . \cos(3xy)$

$z'_y = A'_y . B + A . B'_y$

$z'_y = 0 . (\operatorname{sen}(3xy)) + x^2 \cancel{3x} \cos(3xy)$

$z'_y = 3x^3 . \cos(3xy)$

14) $z = \dfrac{\ln(y^2-3)}{\cos(2x^3-9x)} = \dfrac{A}{B}$

$A = \ln(y^2-3)$

$A'_x = 0$

$A'_y = \dfrac{1}{y^2-3} . 2y$

$A'_y = \dfrac{2y}{y^2-3}$

$B = \cos(2x^3-9x)$

$B'_x = -\operatorname{sen}(2x^3-9x) . (6x^2-9)$

$B'_y = 0.$

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$$z'_x = \frac{A'x \cdot B - A \cdot B'x}{B^2}$$

$$z'_x = \frac{0 \cdot \cos(2x^3-9x) - \ln(y^2-3) \cdot (-\operatorname{sen}(2x^3-9x)) \cdot (6x^2-9)}{(\cos(2x^3-9x))^2}$$

$$z'_x = \frac{\ln(y^2-3) \cdot \operatorname{sen}(2x^3-9x) \cdot (6x^2-9)}{[\cos(2x^3-9x)]^2}$$

$$z'_y = \frac{A'y \cdot B - A \cdot B'y}{B^2}$$

$$z'_y = \frac{\frac{2y}{y^2-3} \cdot \cos(2x^3-9x) - \ln(y^2-3) \cdot 0}{[\cos(2x^3-9x)]^2}$$

$$z'_y = \frac{\frac{2y \cdot \cos(2x^3-9x)}{y^2-3}}{[\cos(2x^3-9x)]^2} = \frac{2y \cdot \cos(2x^3-9x)}{y^2-3} \cdot \frac{1}{[\cos(2x^3-9x)]^2}$$

$$z'_y = \frac{2y \cos(2x^3-9x)}{(y^2-3) \cdot [\cos(2x^3-9x)]^2}$$