Aplicar la ecuación 6 para encontrar dy/dx

28. $\cos(xy) = 1 + \operatorname{sen} y$

$$y' = \frac{dy}{dx} = \frac{-F_x}{F_y}$$

Escribimos la ecuación en la forma: $F(x,y)=0$

$$\cos(xy) - \operatorname{sen} y - 1 = 0$$

$$F_x = \frac{\partial F}{\partial x} = -y \operatorname{sen}(xy)$$

$$F_y = \frac{\partial F}{\partial y} = -x \operatorname{sen}(xy) - \cos y$$

Entonces

$$\frac{dy}{dx} = \frac{-F_x}{F_y} = -\frac{(-y \operatorname{sen}(xy))}{(-x \operatorname{sen}(xy) - \cos y)} = -\frac{y \operatorname{sen}(xy)}{x \operatorname{sen}(xy) + \cos(y)}$$

30. $e^y \operatorname{sen} x = x + xy$

Escribimos la funcion en la forma: $F(x,y)=0$

$$e^y \operatorname{sen} x - xy - x = 0$$

$$F_x = \frac{\partial F}{\partial x} = e^y \cos(x) - y - 1$$

$$F_y = \frac{\partial F}{\partial y} = e^y \operatorname{sen} x - x$$

Entonces

$$\frac{dy}{dx} = \frac{-F_x}{F_y} - \frac{e^y \cos(x) - y - 1}{e^y \operatorname{sen}(x) - x}$$

32.- Con las ecuaciones 7 hallo $\partial z/\partial x$ y $\partial z/\partial y$

$$x^2 - y^2 + z^2 - 2z = 4 \Rightarrow x^2 - y^2 + z^2 - 2z - 4 = 0$$

$$\frac{\partial z}{\partial x} = \frac{\frac{\partial F}{\partial x}}{\frac{\partial F}{\partial z}} \qquad \frac{\partial z}{\partial y} = -\frac{\frac{\partial F}{\partial y}}{\frac{\partial F}{\partial z}}$$

Entonces:

$$\boxed{\frac{\partial z}{\partial x}} = \frac{\partial F}{\partial x} = 2x \qquad \frac{\partial F}{\partial z} = 2z - 2$$

$$\frac{\partial z}{\partial x} = -\frac{\frac{\partial F}{\partial x}}{\frac{\partial F}{\partial z}} = \frac{-2x}{2z-2}$$

$$\boxed{\frac{\partial z}{\partial y}} = \frac{\partial F}{\partial y} = 2y$$

$$\frac{\partial z}{\partial y} = -\frac{\frac{\partial F}{\partial y}}{\frac{\partial F}{\partial z}} = \frac{-2y}{2z-2}$$

33.- $e^z = xyz$

Escribimos la ecuación en la forma $F(x,y,z) = 0$

$$e^z - xyz = 0$$

Entonces:

$$\boxed{\frac{\partial z}{\partial x}} = \frac{\partial F}{\partial x} = -yz \qquad \frac{\partial F}{\partial z} = e^z - xy$$

$$\frac{\partial z}{\partial x} = -\frac{\frac{\partial F}{\partial x}}{\frac{\partial F}{\partial y}} = -\frac{(-yz)}{(e^z - xy)} \Rightarrow \frac{yz}{xy - e^z}$$

$$\boxed{\frac{\partial z}{\partial y}} = \frac{\partial F}{\partial y} = -xz$$

$$\frac{\partial z}{\partial y} = -\frac{\frac{\partial F}{\partial y}}{\frac{\partial F}{\partial z}} = -\frac{(-xz)}{e^z - xy} = \frac{xz}{xy - e^z}$$