$$= f(x) - 2e^{-x}$$

2. $y = \ln|1-x|$ we need to find an expression for $\frac{dy}{dx} + x\frac{d^2y}{dx^2}$

Note that $\frac{dy}{dx} = -\frac{1}{1-x}$ (whatever happens to the absolute value?) and $\frac{d^2y}{dx^2} = -\frac{1}{(1-x)^2}$

this implies that

$$\frac{dy}{dx} + x\frac{d^2y}{dx^2} = -\frac{1}{1-x} - \frac{x}{(1-x)^2}$$

$$= \frac{-1+x-x}{(1-x)^2} = -\frac{1}{(1-x)^2}$$