Pg 4

25) $y^2 \sin x \, dx = \left(\frac{1}{x} - \frac{y}{x}\right) dy$

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

$\sin x - x\cos x = \frac{y \ln y + 1}{y} + C$

$\sin x - x\cos x = \ln y + \frac{1}{y} + C$

$0 - \pi(-1) = \ln y + \frac{1}{y} + C$

$\pi = 1 + C \qquad C = \pi - 1$

$\sin x - x\cos x = \ln y + \frac{1}{y} + \pi - 1$

27) (b) For F to be exact

$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x} \qquad \frac{\partial N}{\partial x} = \cos x \cos y - y$

$\frac{\partial M}{\partial y} = \cos x \cos y - y + e^y$

$M = \int \cos x \cos y - y + e^y \, dy = \cos x \sin y - \frac{y^2}{2} + C$

Since $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ C can be any function that depends on x, so $\partial C/\partial y = 0$

$M = \cos x \sin y - \frac{y^2}{2} + f(x)$