27 (a) $dy = e^{x^2}dx \qquad \int_0^{x_1} dy = \int_0^{x_1} e^{x^2}dx$

$y(x_1) - y(0) = \int_0^{x_1} e^{x^2}dx \qquad y(0) = 0$

$y(x_1) = \int_0^{x_1} e^{x^2}dx \qquad y(x) = \int_0^{x} e^{t^2}dt$

2.4

10) $M(x,y)dx + N(x,y)dy = 0$

$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x} \qquad \frac{\partial M}{\partial y} = 2x \quad \frac{\partial N}{\partial x} = 2x$, so it is exact

$F(x,y) = \int M(x,y)dx + g(y)$

$\frac{\partial F}{\partial y} = \frac{\partial}{\partial y}\int M(x,y)dx + g'(y)$

$N = \frac{\partial}{\partial y}\int (2xy + 3)dx + g'(y)$

$x^2 - 1 = \frac{\partial}{\partial y}\left(x^2y + 3x + C\right) + g'(y)$

$x^2 - 1 = x^2 + g'(y) \qquad g'(y) = -1 \qquad g(y) = -y$

$F = x^2y + 3x + C - y$