Subject: Session 63

Year. Month. Date. ( )

1. $M_{yx} = 6x + 6y = N_y = 6x$

$f_x = 3x^2 + 6xy$

$\Rightarrow f = x^3 + \frac{3x^2}{3} y + g(y)$

$\Rightarrow f_y = 3x^2 + g'y$

$= 3x^2 + 6y \Rightarrow g'y = 6y \Rightarrow g(y) = 3y^2 + C$

$\Rightarrow f = x^3 + 3x^2y + 3y^2 + C$

2. $M_y = 2xy = N_x = 2xy$

$f_x = x + xy^2$

$\Rightarrow f = \frac{x^2}{2} + \frac{x^2y^2}{2} + g(y)$

$\Rightarrow f_y = 0 + x^2y + g(y)' \Rightarrow$

$= x^2y + 3y^2 \Rightarrow g(y)' = 3y^2 \Rightarrow g(y) = y^3 + C$

$\Rightarrow f = \frac{x^2}{2} + \frac{x^2y^2}{2} + y^3 + C$

$\int_0^{x_1} x\,dx + \int_0^{y_1} x_1^2 y^2 + 3y^2\,dy = x_1^2/2 + x_1^2 y^2/2 + y_1^3$