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quiz 5

1. $y dx + (e^{-y} + x) dy = 0$
 $M_y = 1$ $N_x = 1$

$\phi = \int M dx + h(y)$
 $= \int y dx + h(y)$
 $= xy + h(y)$

$\phi_x = y = M$
 $\phi_y = x + \frac{dh}{dy} = N$

$x + \frac{dh}{dy} = e^{-y} + x$
 $\frac{dh}{dy} = e^{-y}$

$\int dh = \int e^{-y} dy$
 $h = -e^{-y}$

$\phi = xy - e^{-y} = C$

2. $A = \begin{bmatrix} 3 & 5 & 3 \\ 2 & 3 & -1 \\ -2 & -1 & 1 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & 4 \\ 2 & 3 & -1 \\ -2 & -1 & 1 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & 4 \\ 0 & -1 & -9 \\ -2 & -1 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 2 & 4 \\ 0 & -1 & -9 \\ 0 & 3 & 9 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & 4 \\ 0 & 1 & 9 \\ 0 & 1 & 3 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & 4 \\ 0 & 1 & 9 \\ 0 & 0 & -6 \end{bmatrix}$

$\begin{bmatrix} 1 & 2 & 4 \\ 0 & 1 & 9 \\ 0 & 0 & 1 \end{bmatrix}$

back $x_3 = -7$ $x_2 = 4(2, 3) = 4$ $x_1 = 11 - 2(2) - 4 = 11 - 4 - 8 = -1$