6.8 A

1. (1) ~~正确~~错误，积分方向取反了，正确答案应为 $\frac{\pi}{4}$

(2) 解法一错误，$I+\int_{DBA}\frac{-ydx+xdy}{x^2+y^2}=0$，故 $I=-\pi$

解法二正确

2. (5) 设 $\vec{OA}$，则 $\oint_{\vec{AO}+\vec{OA}}(e^x\sin y-my)dx+(e^x\cos y-m)dy$

$=\iint_{\Omega} m\,d\sigma$，其中 Ω 为 $x^2+y^2=ax$ 上半圆周与 x 轴围成的面.

$\therefore$ 原式 $=m\iint_{\Omega}ds=m\cdot\frac{1}{2}\pi(\frac{1}{2}a)^2=\frac{1}{8}m\pi a^2$

$\because\int_{\vec{OA}}(e^x\sin y-my)dx+(e^x\cos y-m)dy=0$

$\therefore\int_{(C)}(e^x\sin y-my)dx+(e^x\cos y-m)dy=\frac{1}{8}m\pi a^2$

9. (1) $\nabla\times\vec{A}=(0,0,0)$ $\therefore A$ 为有势场.

$\therefore \frac{\partial u}{\partial x}=2x\cos y-y^2\sin x$，$\frac{\partial u}{\partial y}=2y\cos x-x^2\sin y$

$\therefore u=x^2\cos y+y^2\cos x+\varphi(z,y)$

$\because\frac{\partial\varphi}{\partial y}=0$ $\therefore\varphi(z,y)=\varphi(z)=C$

$\therefore u=x^2\cos y+y^2\cos x+C$

16(5) 原式 $= \int_0^C 3\pi ab\left(1-\frac{z^2}{c^2}\right)dz - \left[-\iint_{(D)}(x+y+1)\,dxdy\right]$

$= 2\pi abc + ab\int_0^{2\pi} d\theta \cdot \int_0^1 \rho(1+a\rho\cos\theta+b\rho\sin\theta)\,d\rho$

$= ab\pi(2c+1)$