Exercises 4.1

2. Calculate the integral below and show the Jacobian matrix used.I=∫+∞−∞∫+∞−∞e−x2−y2dxdy

```
clear all
clc
```

```
syms x y r theta

x = r * cos(theta);
y = r * sin(theta);

jacobian = [diff(x, r) diff(x, theta)
            diff(y, r) diff(y, theta)];

J = simplify(det(jacobian));

eqxy = exp(-x^2-y^2);
eqrtheta = eqxy * J;

int(int(eqrtheta, r, 0, inf), theta, 0, 2*pi)
```

ans = π