Exercises 4.1

5. Write a routine that given the coordinates of a quadrilateral element with four nodes calculates the Jacobian at givencoordinates(ξ,η).

```
clear all
clc
```

```
C = input('Coordenadas (x y):')
```

```
C = 4×2
     0     0
     2     0
     2     6
     4     1
```

```
xi = input ('xi:')
```

```
xi = -1
```

```
eta = input ('eta:')
```

```
eta = -1
```

```
jacobian = C' * quad4_derivs (xi, eta)
```

```
jacobian = 2×2
    1.0000    2.0000
         0    0.5000
```

```
J = det(jacobian)
```

```
J = 0.5000
```

```
function dn = quad4_derivs(xi, eta)
dn = [0.25*(-1.0+eta)   0.25*(-1.0+xi)
      0.25*(+1.0-eta)   0.25*(-1.0-xi)
      0.25*(+1.0+eta)   0.25*(+1.0+xi)
      0.25*(-1.0-eta)   0.25*(+1.0-xi)];
end
```