Quiz 3 (11 6 7, 8 )

[2013 2 2] ( 20 , 20 )

\* .

1. (7 )

∫ π2

0

∫ 1

sin θ 4r2er4 cosθ drdθ

2. (6 ) D := {(x, y) : x2 + y2 ≤ 1}

G : D → D (x, y) ↦→ (x(x2 − 3y2),−y(y2 − 3x2))

, .

∫∫D det(G/(x, y))dxdy = 3 area(D)

3. (7 ) D := {(x, y):1 ≤ x2 +y2 ≤ 4,0 ≤ y ≤ x}

F(x, y) =

( xy2,80x3y2) .

1

Quiz 3

1.

∫ π2

∫ 10

∫ arcsin r

4r2er4 cosθ dθdr (4 ) 0 0 =

∫ 1

sin θ 4r2 cosθer4 drdθ = ∫ 10 4r3er4 dr = er4∣∣∣∣10 = e − 1. (7 )

2.

∫∫∫∫det(G/(x, y))dxdy =

9(x2 + y2)2 dxdy (3 ) D ∫ 2π ∫ 1D = 90

0 r4 · r drdθ = 9 × 2π × 16 = 3π. (6 )

3.

∫∫∫divF(x, y)dxdy (2 ) ∂D D = F · nds = ∫∫D(−2yx3 + 160x3y)dxdy

=

∫ π∫ 4

20

1

(− r2 2 cossinθ

3 θ + 160r4 cos3 θsinθ)r drdθ (4 )

=

∫ π4

0 (−2 log 2 tanθsec2 θ + 1680 cos3 θsinθ)dθ = 315 − log 2. (7 )

2