

NAME: Solutions

Math 2401 (K1-K3)  
2/25/2015

Quiz 5

(5pts.)

1. Find:

$$\iint_R x e^{xy} dA,$$

where  $R$  is the rectangle  $R = [-1, 2] \times [0, 1]$ .

(5pts.)

2. Find:

$$\int_0^3 \int_{x^2}^9 x^3 e^{y^3} dy dx.$$

Hint: Possibly useful fact:  $9^3 = 729$ .

1pt. - correct bounds for dx, dy

$$\textcircled{1} \iint_R x e^{xy} dA = \int_{-1}^2 \int_0^1 x e^{xy} dy dx = \int_{-1}^2 e^{xy} \Big|_{y=0}^{y=1} dx$$

$$= \int_{-1}^2 (e^x - 1) dx = (e^x - x) \Big|_{-1}^2 = e^2 - 2 - e^{-1} - 1 = e^2 - e^{-1} - 3$$

$$\textcircled{2} \int_0^3 \int_{x^2}^9 x^3 e^{y^3} dy dx \rightarrow \text{can't integrate in } y, \text{ so change order of integration}$$

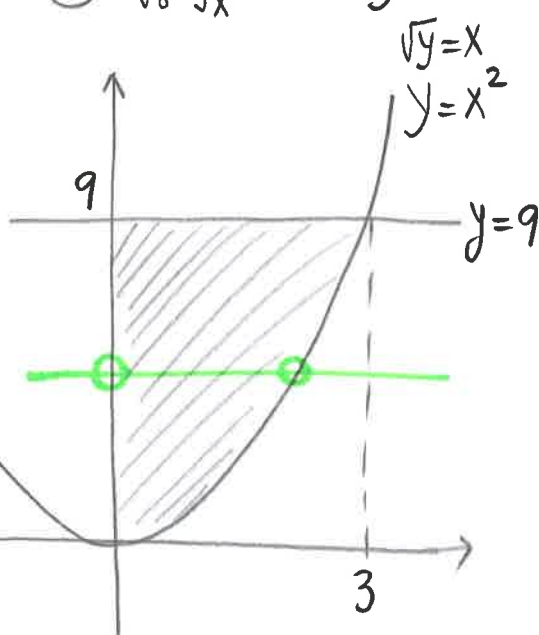
$$\int_0^9 \int_0^{\sqrt{y}} x^3 e^{y^3} dx dy$$

$$= \int_0^9 \frac{x^4}{4} e^{y^3} \Big|_{x=0}^{x=\sqrt{y}} dy$$

$$= \int_0^9 \frac{y^2}{4} e^{y^3} dy$$

$$= \frac{1}{4} \frac{1}{3} e^{y^3} \Big|_{y=0}^9$$

$$= \frac{1}{12} (e^{9^3} - e^0) = \frac{1}{12} (e^{729} - 1)$$



1pt. - bounds for x, y

1pt.

1pt.

1pt.

1/2pt.

for intention