NAME: Solutions

SECTION: _____
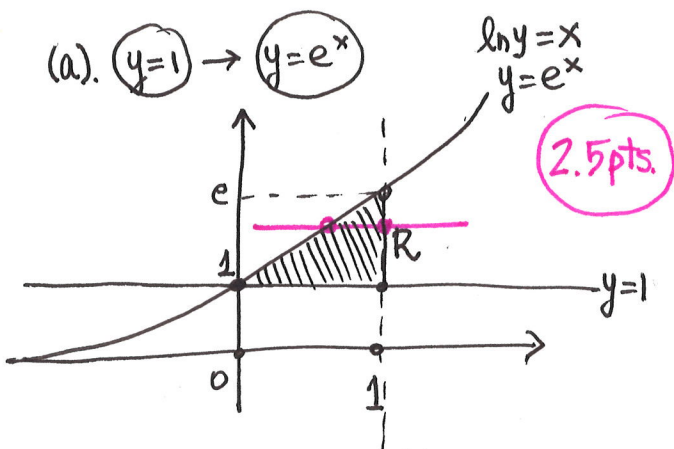
Quiz 5

1. Consider the double integral:

$$\int_0^1 \int_1^{e^x} dy\, dx.$$

a). Sketch the region of integration.

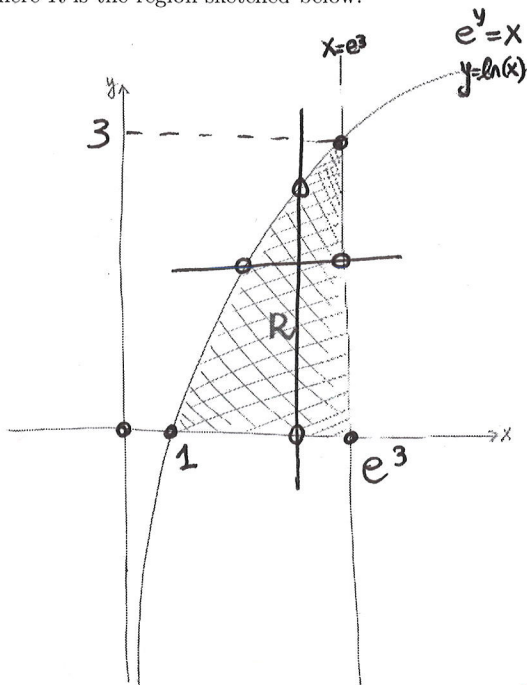b). Use the appropriate cross-sections to express the double integral above in terms of $dx\, dy$ instead of $dy\, dx$.

(a). $y=1$ → $y=e^x$

$\ln y = x$

$y = e^x$

2.5 pts.

$y=1$

(b). Horizontal Cross-Sections:

$$\int_1^e \int_{\ln y}^1 dx\, dy \qquad \text{2.5 pts}$$

½ pt. each – the bounds for x ($\ln y$ & 1)

¼ pt. – correct order of bounds for x

½ pt. each – the bounds for y (1 & e)

¼ pt. – correct order of bounds for y

2. Write the integral $\iint_R dA$ in two ways, one in terms of $dx\, dy$ and the other in terms of $dy\, dx$, where R is the region sketched below.

$x = e^3$

$e^y = x$

$y = \ln(x)$

Horizontal Cross-Sections:

$$\int_0^3 \int_{e^y}^{e^3} dx\, dy \qquad \text{2.5 pts.}$$

½ pt. each – the bounds for x (e^y & e^3)

¼ pt. correct order of bounds for x

½ pt. each – the bounds for y (0 & 3)

¼ pt. correct order of bounds for y

Vertical Cross-Sections:

$$\int_1^{e^3} \int_0^{\ln(x)} dy\, dx \qquad \text{2.5 pts.}$$

½ pt. each – the bounds for y (0 & $\ln(x)$)

¼ pt. – correct order of bounds for y

½ pt. each – the bounds for x (1 & e^3)

¼ pt. – correct order of bounds for x