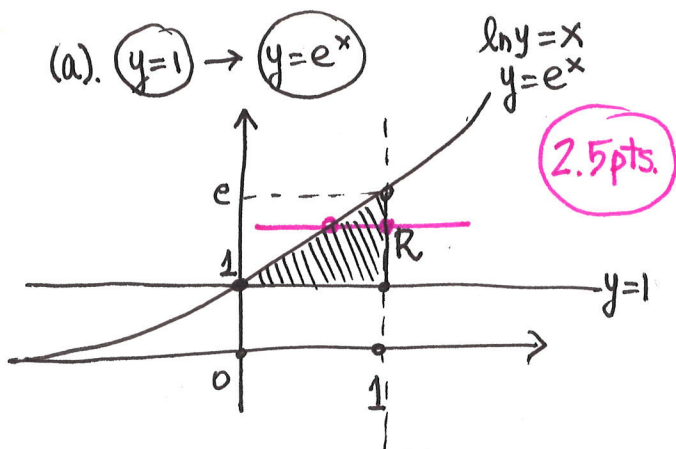NAME: Solutions    Quiz 6

SECTION: _____

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 $dy\, dx$.
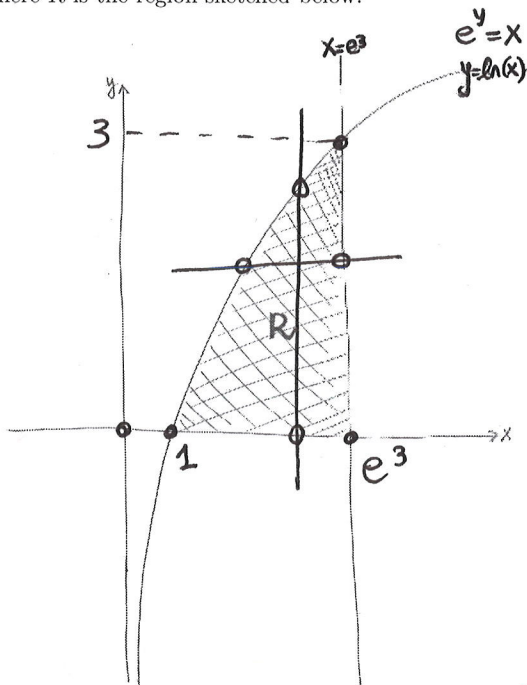
(a). $\boxed{y=1} \rightarrow \boxed{y=e^x}$

$\ln y = x$
$y = e^x$

2.5 pts.

$e$

$R$

$y=1$

$0$    $1$

(b). Horizontal Cross - Sections:

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

(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 $\int\int_R dA$ in two ways, one in terms of $dx\, dy$ and the other in terms of $dy\, dx$, where $R$ is the region sketched below.

$x = e^3$

$e^y = x$
$y = \ln(x)$

$y$

$3$

$R$

$1$    $e^3$    $x$

Horizontal Cross-Sections:

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

(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:

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

(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