10/29/20 Quiz Lecture 15 Khush Tated

1) $\iint xy\, dA$ $D = \{\{x, y\} \mid x^2+y^2 \le 1, x \ge 0, y \ge 0\}$

$0 \le \theta \le \frac{\pi}{2}$ because the bounds indicate this is a quarter circle.

With $r=1$, $0 \le r \le 1$,

$$\int_0^{\frac{\pi}{2}}\int_0^1 (r\cos\theta)(r\sin\theta)\, r\, dr\, d\theta$$

↳ Maple provides $(\frac{1}{8})$

2) $$\int_0^1 \int_0^{\sqrt{1-y^2}} e^{x^2+y^2}\, dx\, dy$$

$\sqrt{1-y^2}$ indicates this goes ~~from~~ to $\frac{\pi}{2}$ from 0, and the radius is 1

$$\int_0^{\frac{\pi}{2}}\int_0^1 e^{r^2}\, dr\, d\theta.$$

if $r^2 = u$, $2r\,dr = du$.

$$\int_0^1 \frac{e^u}{2} = \frac{1}{2}(e^1 - e^0) = \frac{e-1}{2}$$

$$\int_0^{\frac{\pi}{2}} \frac{e-1}{2}\, d\theta = \frac{e-1}{2}\,\theta \Big|_0^{\frac{\pi}{2}} = \frac{\pi(e-1)}{4}$$

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