

Math 252 Quiz # 1 Solutions

Sobe Life Water

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Hi! This is Sobe Life Water comin' at you with the solutions to quiz # 1. Enjoy! ROCK ON!

1.

$$\begin{aligned}\int_{x=0}^2 \int_{y=-1}^1 (x^2y + y^2x) dy dx &= \int_{x=0}^2 \left[\frac{x^2}{2}y^2 + \frac{1}{3}y^3x \right] \Big|_{y=-1}^1 dx \\ &= \int_{x=0}^2 \left(\frac{x^2}{2} + \frac{1}{3}x \right) - \left(\frac{x^2}{2} - \frac{1}{3}x \right) dx \\ &= \int_{x=0}^2 \frac{2}{3}x dx \\ &= \frac{4}{3}.\end{aligned}$$

2. Notice that $\int e^{x+y} dx = \int e^{x+y} dy = e^{x+y} + C$ via a u -substitution. Several of you didn't integrate correctly and thus missed some points. But for part (a):

$$\begin{aligned}\int_{x=1}^2 \int_{y=0}^1 e^{x+y} dy dx &= \int_{x=1}^2 [e^{x+y}] \Big|_{y=0}^1 dx \\ &= \int_{x=1}^2 e^{x+1} - e^x dx \\ &= [e^{x+1} - e^x] \Big|_{x=1}^2 \\ &= (e^3 - e^2) - (e^2 - e^1).\end{aligned}$$

For part (b):

$$\begin{aligned}\int_{y=0}^1 \int_{x=1}^2 e^{x+y} dx dy &= \int_{y=0}^1 [e^{x+y}] \Big|_{x=1}^2 dx \\ &= \int_{y=0}^1 e^{y+2} - e^{y+1} dx \\ &= [e^{y+2} - e^{y+1}] \Big|_{y=0}^1 \\ &= (e^3 - e^2) - (e^2 - e^1).\end{aligned}$$

3. We did this one in class directly before the quiz. So for the solution I will refer you to the notes, or to your homework. But I will set the integral up for you here, as some of you had the *bounds* of integration incorrect. For this y -simple region,

$$\int \int_D x^3 y dA = \int_{y=-\sqrt{3}/2}^{\sqrt{3}/2} \int_{x=0}^{-4y^2+3} x^3 y dx dy.$$

4. For this one we recall the the area of any elementary region D is given by the formula $\int \int_D 1dA$. So when D is the rectangle $[0, b] \times [0, d]$, we have the area of D to be

$$\int_0^b \int_0^d 1dydx = \int_0^b dx = db.$$

ROCK ON!