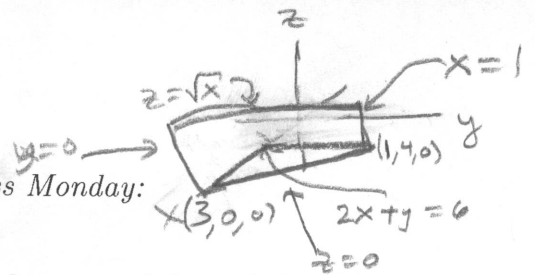


NAME: _____

SOLUTIONS

Triple Integral Quiz

Show your work and bring this to hand in at the beginning of class Monday:

Let E be the solid bounded between the planes $x = 1$, $y = 0$ and $2x + y = 6$, bounded below by $z = 0$ and bounded above by $z = \sqrt{x}$.Set up an iterated integral for $\iiint_E f(x, y, z) dV$ in three different ways.I Only two bounds involving z , so

$$0 \leq z \leq \sqrt{x}$$

xy-projection:

$$0 \leq y \leq 6 - 2x$$

$$1 \leq x \leq 3$$

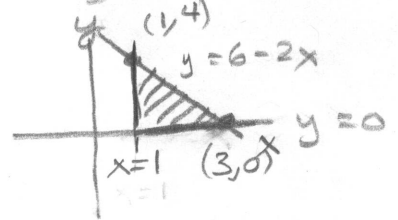
dz inside may be a good choice.

$$y = 6 - 2x$$

$$x = 3 - \frac{1}{2}y$$

$$1 \leq x \leq 3 - \frac{1}{2}y$$

$$0 \leq y \leq 4$$



$$\textcircled{1} \int_1^3 \int_0^{6-2x} \int_0^{\sqrt{x}} f(x, y, z) dz dy dx$$

$$\textcircled{2} \int_0^4 \int_{3-\frac{1}{2}y}^3 \int_0^{\sqrt{x}} f(x, y, z) dz dx dy$$

II Only two bounds involving y , so dy inside may be a good choice.

$$0 \leq y \leq 6 - 2x$$

$$y = 0 \Rightarrow x = 3$$

xz-projection

$$0 \leq z \leq \sqrt{x}$$

$$1 \leq x \leq 3$$

BAD CHOICE

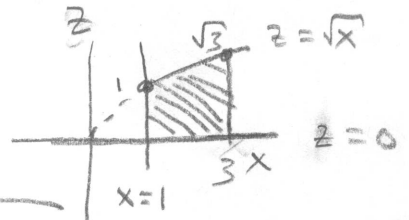
$$1 \leq x \leq 3$$

or

$$0 \leq z \leq 1$$

$$2 \leq x \leq 3$$

$$1 \leq z \leq \sqrt{x}$$



$$\textcircled{3} \int_1^3 \int_0^{\sqrt{x}} \int_0^{6-2x} f(x, y, z) dy dz dx$$

$$\textcircled{4} \int_0^1 \int_1^3 \int_0^{6-2x} f(x, y, z) dy dx dz + \int_1^{\sqrt{3}} \int_{2^2}^3 \int_0^{6-2x} f(x, y, z) dy dx dz$$

III 3 equations involving x BAD CHOICE

But here are those answers anyway.

$$\textcircled{5} \int_0^4 \int_0^1 \int_{3-\frac{1}{2}y}^3 f(x, y, z) dx dz dy + \int_0^4 \int_{\sqrt{3-\frac{1}{2}y}}^3 \int_{3-\frac{1}{2}y}^3 f(x, y, z) dx dz dy$$

$$\textcircled{6} \int_0^1 \int_0^4 \int_{3-\frac{1}{2}y}^3 f(x, y, z) dx dy dz + \int_1^{\sqrt{3}} \int_0^{6-2x^2} \int_{3-\frac{1}{2}y}^3 f(x, y, z) dx dy dz$$