AY2009-1 MA205 Section 36
Lesson 34

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Name: Solution

Hour: C A

15

Quiz 6: Integrating over Rectangular and General Regions

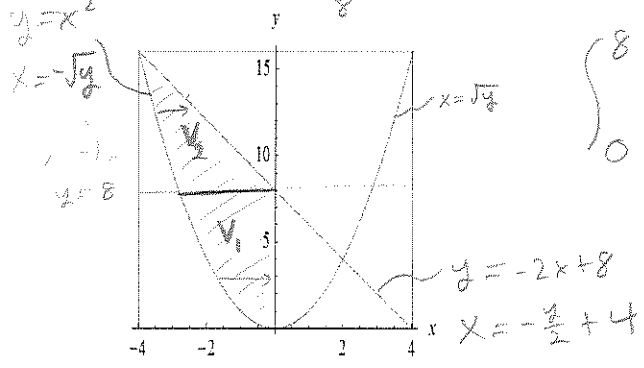
Time: 20 Minutes	References: Basic Calculator and Ref. Sheet	Based out of 100%

1. For the below iterated integral: **shade the appropriate domain space** on the plot and **write the expression with the order of integration reversed** such that your new expression describes the equivalent volume between the surface *f(x,y)* and the region in the *xy*-plane (domain).

$$\int_{-4}^{0}\int_{x^2}^{-2x+8} f(x,y)\,dy\,dx$$

$V_{tot} = V_1 + V_2$

$$\int_0^8 \int_{-\sqrt{y}}^{0} f(x,y)\,dx\,dy + \int_8^{12}\int_{-\sqrt{y}}^{-\frac{y}{2}+4} f(x,y)\,dx\,dy$$



2.

a. Evaluate the following iterated integral **by hand** (show all steps).

$$\int_0^2\int_1^4 3x^2y^2\,dx\,dy$$

$$\frac{3x^3y^2}{3}\Big]_1^4 = \frac{3(64)}{3}y^2 - \frac{3(1)}{3}y^2 = 63y^2$$

$$\int_0^2 63y^2\,dy$$

$$\frac{63y^3}{3}\Big]_0^2 = 21(8)$$

$$= 168 \text{ units}^3$$

b. Compare the iterated integral from 2.a. above with the one below and determine whether the stated equality is **true** or **false** (circle one). Explain your answer.

$$\int_1^4\int_0^2 3x^2y^2\,dy\,dx = 124\ units^3$$

Fubini's Theorem states switching the order of integration over a rectangular region results in the same volume and $124 \neq 168$

3. Would the below iterated integral be a good candidate for solving using polar regions? **Yes** or **No**.

$$\int_0^4\int_0^{y^2}(x^2+y^2)\,dx\,dy$$

The domain space is not circular in nature.