

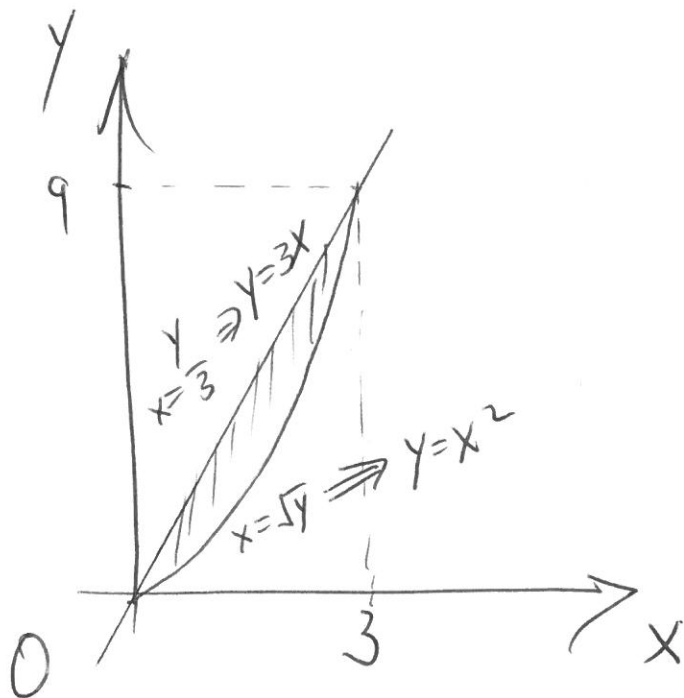
MATH 2000 Lab 2

Friday October 5, 2017

Solns

1. Sketch and shade the region of the double integral and then change the order the iteration

$$\int_0^9 dy \int_{\frac{y}{3}}^{\sqrt{y}} f(x, y) dx$$

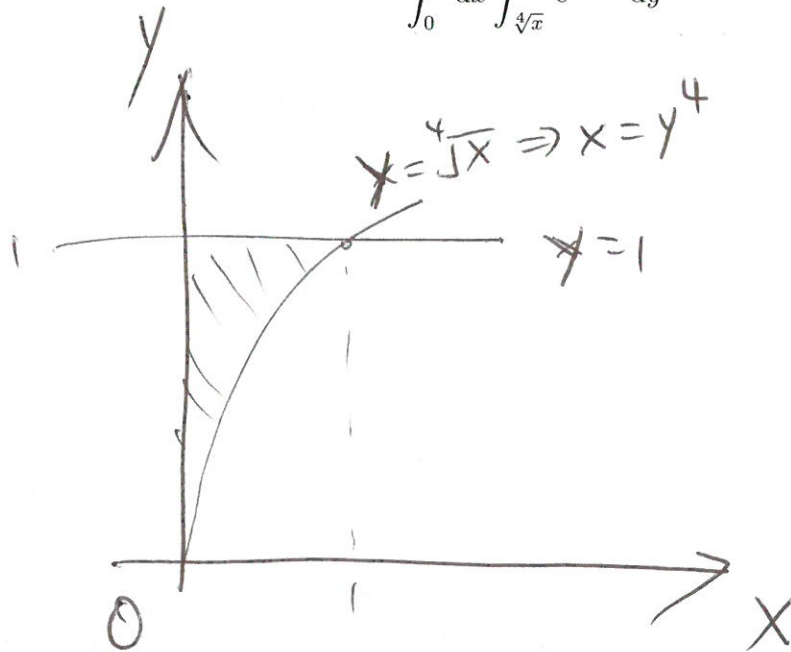


$$\int_0^9 dy \int_{\frac{y}{3}}^{\sqrt{y}} f(x, y) dx$$

$$= \int_0^3 dx \int_{x^2}^{3x} f(x, y) dy$$

2. Evaluate the iterated integral, show all of your work.

$$\int_0^1 dx \int_{\sqrt[4]{x}}^1 e^{-2y^5} dy$$



$$= \int_0^1 dy \int_0^{y^4} e^{-2y^5} dx = \int_0^1 y^4 e^{-2y^5} dy$$

$$t = -2y^5$$

$$= \int_0^{-2} y^4 e^t \frac{dt}{-10y^4} = -\frac{1}{10} \int_0^{-2} e^t dt$$

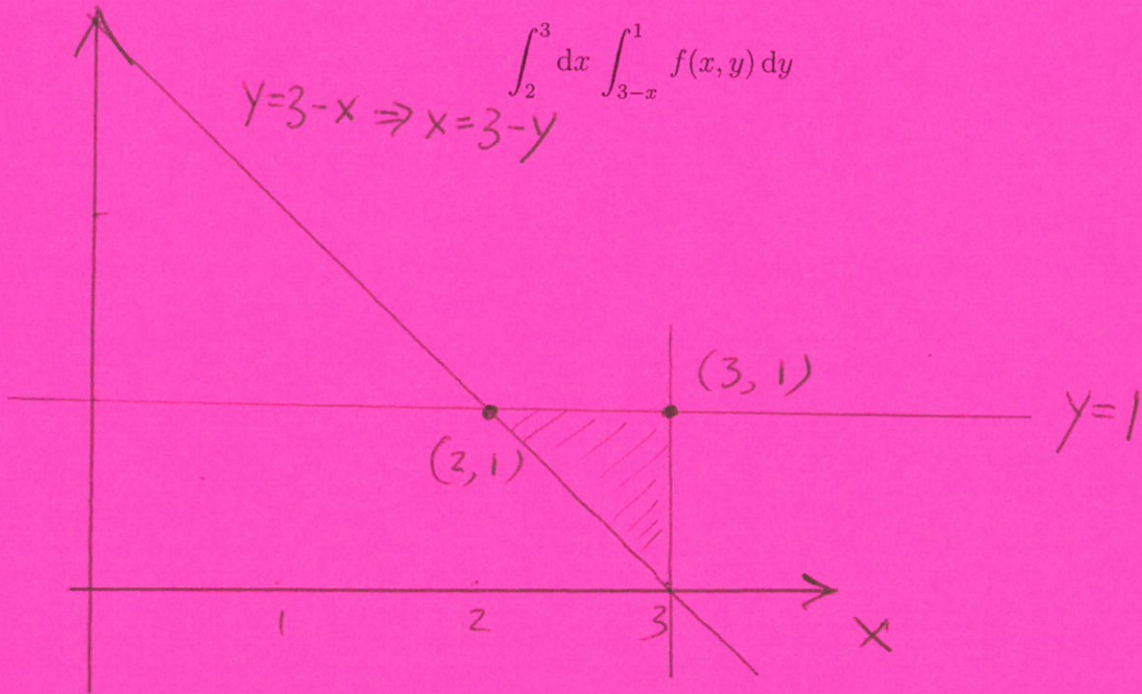
$$= \left. -\frac{1}{10} e^t \right|_0^{-2} = \boxed{\frac{1 - e^{-2}}{10}}$$

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1. Sketch and shade the region of the double integral and then change the order the iteration

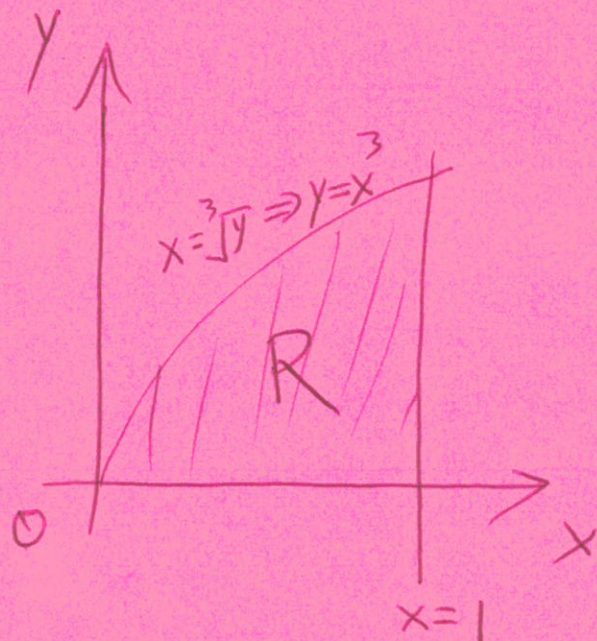


$$\int_2^3 dx \int_{3-x}^1 f(x,y) dy$$

$$= \int_0^1 dy \int_{3-y}^3 f(x,y) dx$$

2. Evaluate the iterated integral, show all of your work.

$$\int_0^1 dy \int_{\sqrt[3]{y}}^1 e^{-3x^4} dx$$



$$\int_0^1 dy \int_{\sqrt[3]{y}}^1 e^{-3x^4} dx = \int_0^1 dx \int_0^{x^3} e^{-3x^4} dy$$

$$= \int_0^1 x^3 e^{-3x^4} dx$$

$$t = -3x^4$$

$$= \int_0^{-3} x^3 e^t \frac{dt}{-12x^3} = -\frac{1}{12} \int_0^{-3} e^t dt$$

$$= -\frac{1}{12} (e^{-3} - e^0) = \boxed{\frac{1 - e^{-3}}{12}}$$