LESSON 19

MA 26100·FALL 2023

DR. HOOD

WARM UP

(Spring 15 Exam 2 #4)

Find the volume of the solid which lies below the plane:

$3x + 2y - z + 1 = 0$ and above the rectangle

$R = \{(x, y) | -1 \le x \le 1, 1 \le y \le 2\}$

a) 11

b) 13

c) 21/2

d) 23/2

e) 8

$z = 3x + 2y + 1 = f(x,y)$

$V = \iint_R f(x,y)\, dA = \int_{-1}^{1}\int_{1}^{2} 3x + 2y + 1 \, dy\, dx$

$= \int_{-1}^{1} \left[3xy + y^2 + y\right]_1^2 dx = \int_{-1}^{1} 3x[2-1] + [2^2 - 1^2] + [2-1]\, dx$

$= \int_{-1}^{1} 3x + 4 \, dx = \left[\frac{3x^2}{2} + 4x\right]_{-1}^{1}$

$= \frac{3}{2} + 4 - \left(\frac{3}{2} - 4\right) = 8$

LESSON 19

ANNOUNCEMENTS

- HW 17 and HW 18 due tonight at 11:59pm
- Exam 1 scores released
  - If you took the exam on Tues Oct 3, your score should be posted
  - ADA and Alternate exam scores should be posted in the next week or so.

EXAM 1 SCORES

- Only 1 student left the Test/Quiz number blank
- Several students entered incorrect PUID
  - 2 points were deducted from total score
- Statistics:
  - Mean: 76.7
  - Median: 84
  - Standard Deviation: 20
- If you believe there was a mistake in the grading, wait to receive your booklet, then contact your lecturer (Dr. Hood for LEC 200 or 600).

POLL 1

Consider the region D between the functions $y = \sqrt{x}$ and $y = x^3$

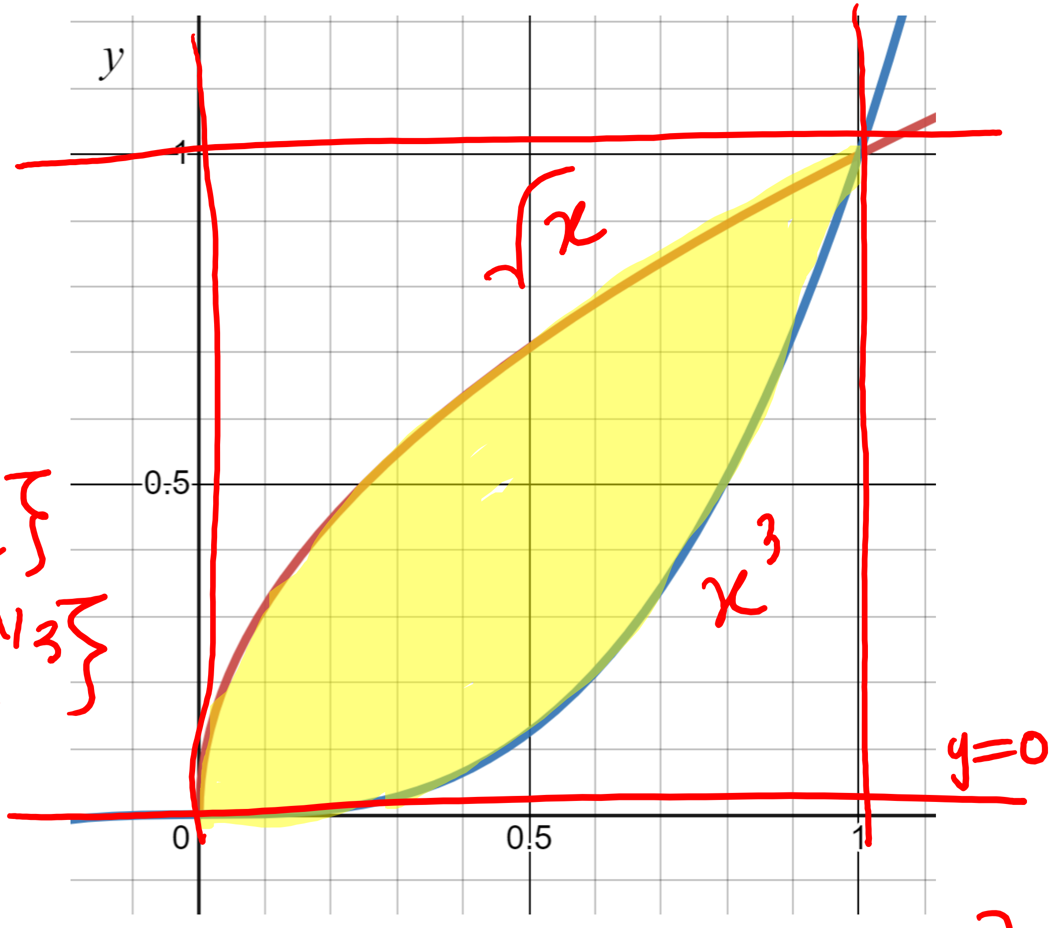
What type of region is it?

a) Type I

b) Type II

c) Type I and Type II

d) Neither



Type I

$D = \{(x,y) : 0 \le x \le 1,\ x^3 \le y \le \sqrt{x}\}$

$= \{(x,y) : 0 \le y \le 1,\ y^2 \le x \le y^{1/3}\}$

Type II

$y = \sqrt{x} \longrightarrow x = y^2$

$y = x^3 \longrightarrow x = y^{1/3}$

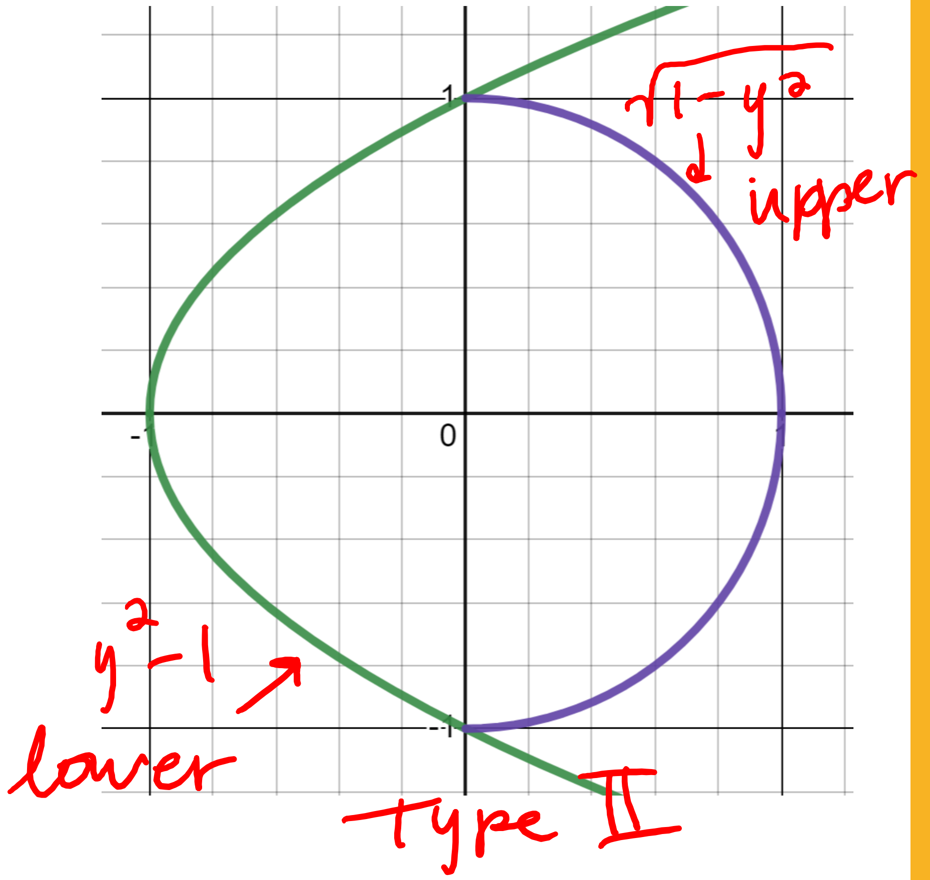
POLL 2

Set up the integral $\iint_D f(x,y)dA$ for the region D bounded by $x = y^2 - 1$ and $x = \sqrt{1-y^2}$.

a) $\int_{-1}^{1}\int_{\sqrt{1-y^2}}^{y^2-1} f(x,y)dx\,dy$

b) $\int_{-1}^{1}\int_{y^2-1}^{\sqrt{1-y^2}} f(x,y)dx\,dy$

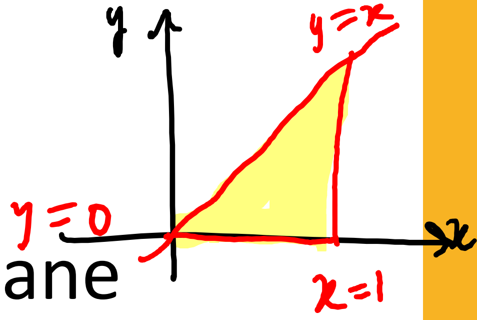
c) $\int_{y^2-1}^{\sqrt{1-y^2}}\int_{-1}^{1} f(x,y)dy\,dx$



POLL 3

(Spring 2023 Exam 2 #6)

Evaluate $\iint_R \frac{\sin(x)}{x}\, dA$ where R is the region in the xy-plane bounded by the x-axis, the line $y = x$, and the line $x = 1$. Integrate with respect to y first, then with respect to x.



$a)\ 1 - \cos(1)$

$b)\ -1 + \cos(1)$

$c)\ 2 + \cos(1)$

$$\int_0^1 \int_0^x \frac{\sin(x)}{x}\, dy\, dx$$

$$= \int_0^1 \frac{\sin(x)}{x} \Big[y \Big]_0^x dx = \int_0^1 \frac{\sin(x) \cdot x}{x}\, dx$$

$$= \Big[-\cos(x) \Big]_0^1 = -\cos(1) + 1$$

POLL 4

(Spring 2022 Exam 2 #10)

Change the order of integration for the double integral

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

You do not need to compute the integral.

a) $\int_0^2 \int_{\sqrt{y}}^{y/2} f(x,y)dx\,dy$

b) $\int_0^4 \int_{y/2}^{\sqrt{y}} f(x,y)dx\,dy$

MUDDIEST POINT

What was the muddiest point from today's lecture?

a) Type I and Type II regions
b) Setting up the double integral
c) Switching the order of integration
d) Volumes of solids
e) None – understood everything today