

MATH 102.1 (Term 161)

Quiz 2 (Sects. 6.1 & 6.2)

Duration: 20min

Name: _____

ID number: _____

1.) (5pts) Write the integral given the area of the region bounded by the four lines $y = x$, $y = x - 2$, $y = -x - 1$ and $y = \frac{1}{5}(-x + 3)$ (do not evaluate the integral).

2.) (5pts) Find the volume of the solid generated by revolving the region bounded by the curves $y = x^2$ and $y = \sqrt{x}$ about the line $x = -1$.

1.) $L_1: y = x$; $L_3: y = x - 2$

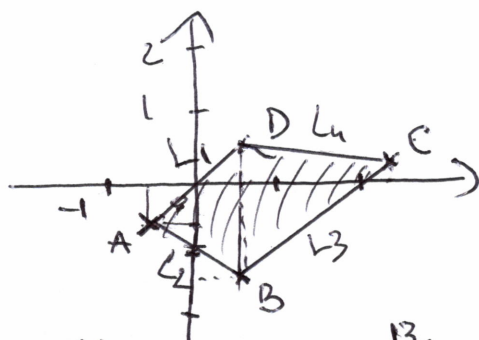
$L_2: y = -x - 1$; $L_4: y = \frac{1}{5}(-x + 3)$

$L_1 \cap L_2 = \{A\}$, $x = -x - 1$, $A \begin{pmatrix} -1/2 \\ -1/2 \end{pmatrix}$

$L_3 \cap L_2 = \{B\}$, $x - 2 = -x - 1$, $B \begin{pmatrix} 1/2 \\ -3/2 \end{pmatrix}$

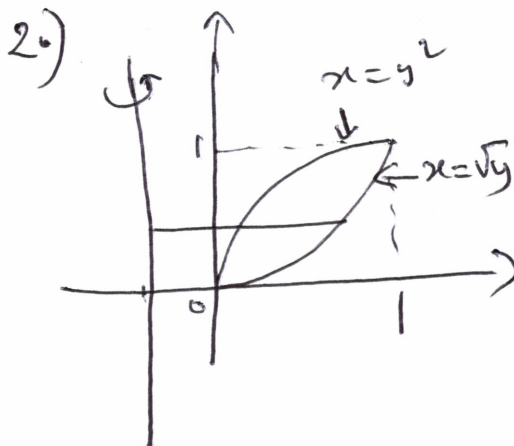
$L_1 \cap L_4 = \{C\}$, $x - 2 = \frac{1}{5}(-x + 3)$, $C \begin{pmatrix} 13/6 \\ 1/6 \end{pmatrix}$

$L_1 \cap L_4 = \{D\}$; $x = \frac{1}{5}(-x + 3)$, $D \begin{pmatrix} 1/2 \\ 1/2 \end{pmatrix}$



$$\text{Area}(R) = \int_{-1/2}^{1/2} [x - (-x - 1)] dx + \int_{1/2}^{13/6} \left[\frac{x}{5} + \frac{3}{5} - (x - 2) \right] dx$$

$$= \int_{-1/2}^{1/2} (2x + 1) dx + \int_{1/2}^{13/6} \left(-\frac{4}{5}x + \frac{13}{5} \right) dx$$



$$V = \int_0^1 \pi \left[(\sqrt{y} + 1)^2 - (y^2 + 1)^2 \right] dy$$

$$= \int_0^1 \pi (y + 2\sqrt{y} - y^4 - 2y^2) dy$$

$$= \pi \left[\frac{y^2}{2} + \frac{4}{3} y^{3/2} - \frac{y^5}{5} - \frac{2y^3}{3} \right]_0^1$$

$$\frac{29\pi}{30}$$