

# Section (21)

Name : .....

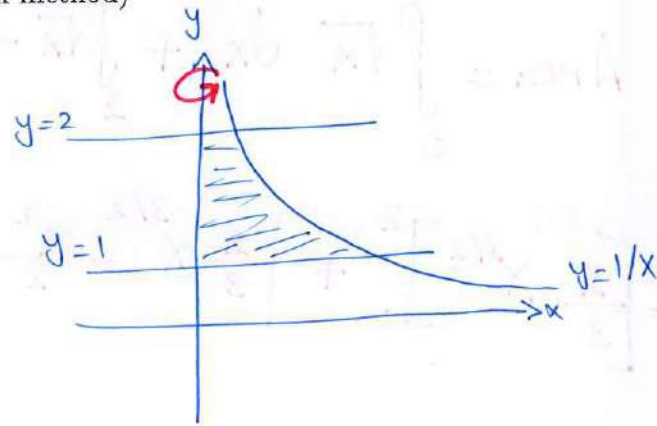
Student Number.....

Section 10/10

Question #1: 3.5 pt.

Find the volume of the solid generated by revolving the area enclosed between the curve  $y = \frac{1}{x}$ , the y-axis and the lines  $y = 1$  and  $y = 2$  about the y-axis (Disk method)

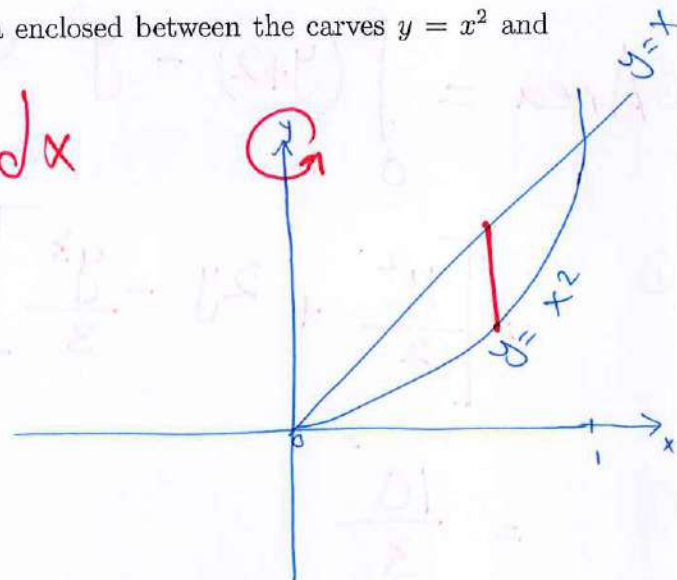
$$\begin{aligned}
 V &= \int_1^2 A(y) dy \\
 &= \int_1^2 \pi \left[ \frac{1}{y} \right]^2 dy \\
 &= \pi \left[ -\frac{1}{y} \right]_1^2 \\
 &= \frac{\pi}{2}
 \end{aligned}$$



Question #2: 3.5 pt

Find the volume of solid generated by revolving the area enclosed between the curves  $y = x^2$  and  $y = x$  about the y-axis (using shell method)

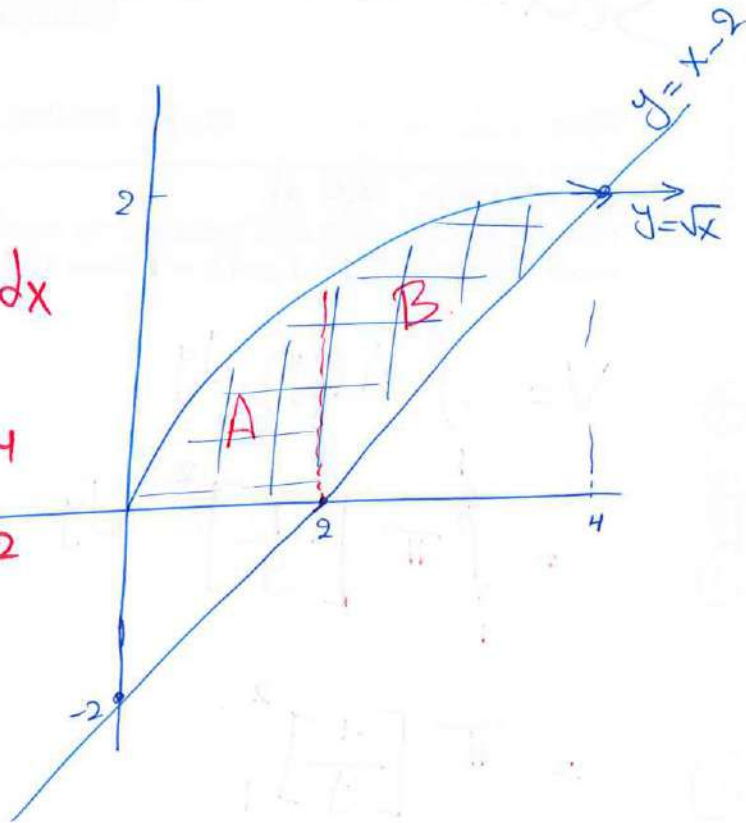
$$\begin{aligned}
 V &= 2\pi \int_0^1 (\text{shell radius}) (\text{shell height}) dx \\
 &= 2\pi \int_0^1 (x)(x - x^2) dx \\
 &= 2\pi \left[ \frac{x^3}{3} - \frac{x^4}{4} \right]_0^1 \\
 &= \frac{\pi}{6}
 \end{aligned}$$



Question #3: 3 Pt.

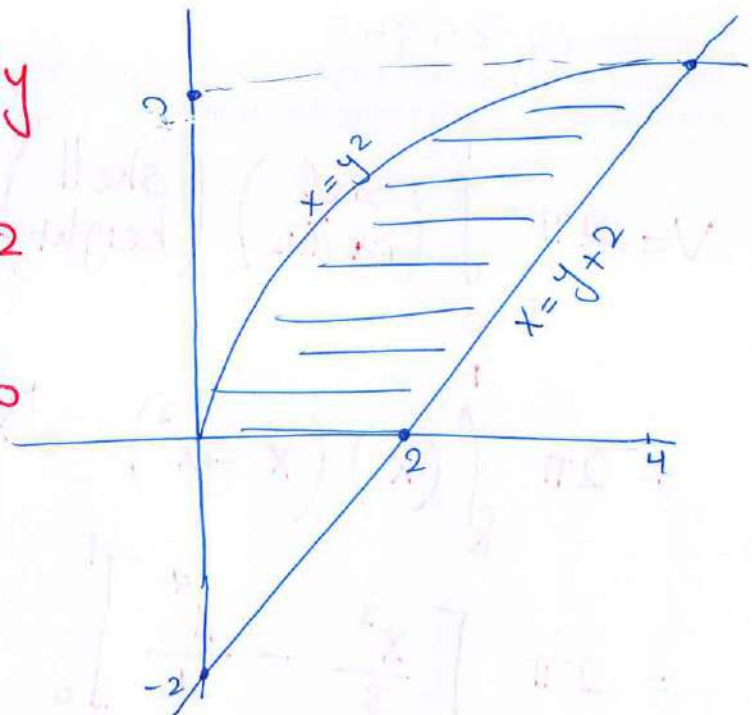
Find the area enclosed between the curve  $x = y^2$ , the x-axis, and the line  $x = y + 2$

$$\begin{aligned} \text{Area} &= \int_0^2 \sqrt{x} \, dx + \int_2^4 \sqrt{x} - (x-2) \, dx \\ &= \left[ \frac{2}{3} x^{3/2} \right]_0^2 + \left[ \frac{2}{3} x^{3/2} - \frac{x^2}{2} + 2x \right]_2^4 \\ &= \frac{10}{3} \end{aligned}$$



OR

$$\begin{aligned} \text{Area} &= \int_0^2 (y+2) - y^2 \, dy \\ &= \left[ \frac{y^2}{2} + 2y - \frac{y^3}{3} \right]_0^2 \\ &= \frac{10}{3} \end{aligned}$$



# Section 6

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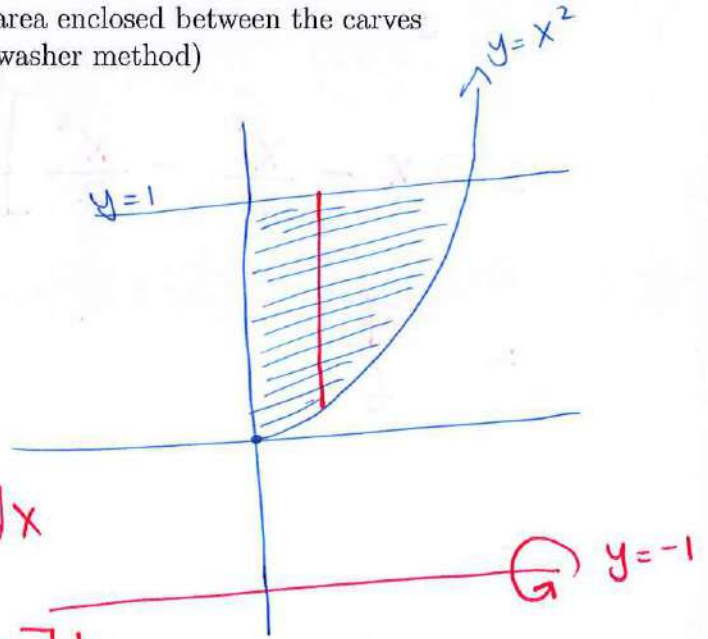
Section 10/10

Question #1: 3.5 Pt.

Find the volume of solid generated by revolving the area enclosed between the curves  $y = x^2$ ,  $y$ -axis, and  $y = 1$  about the  $y = -1$  (using washer method)

Washer Method

$$\begin{aligned} \textcircled{1} \quad V &= \pi \int_0^1 R^2(x) - r^2(x) dx \\ \textcircled{1} \quad &= \pi \int_0^1 (2)^2 - (x^2+1)^2 dx \\ \textcircled{1} \quad &= \pi \int_0^1 4 - x^4 - 2x^2 - 1 dx \\ &= \pi \left[ 3x - \frac{x^5}{5} - \frac{2x^3}{3} \right]_0^1 \\ &= \frac{32\pi}{15} \end{aligned}$$

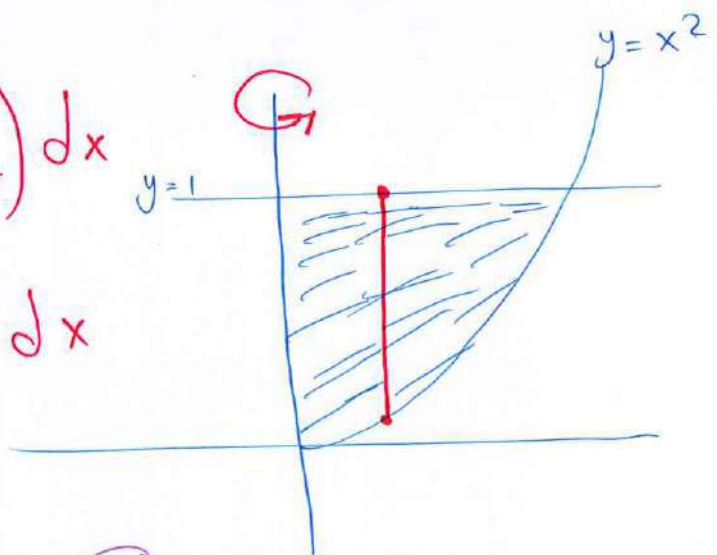


Question #2:

Find the volume of solid generated by revolving the area enclosed between the curves  $y = x^2$ ,  $y$ -axis, and  $y = 1$  about the  $y$ -axis (using shell method) 3.5 Pt.

Shell Method

$$\begin{aligned} \textcircled{1} \quad V &= 2\pi \int_0^1 (\text{shell radius}) (\text{shell height}) dx \\ \textcircled{1} \quad &= 2\pi \int_0^1 (x)(1-x^2) dx \\ &= 2\pi \int_0^1 x - x^3 dx \\ \textcircled{1} \quad &= 2\pi \left[ \frac{x^2}{2} - \frac{x^4}{4} \right]_0^1 = \frac{\pi}{2} \end{aligned}$$





3 Pt.

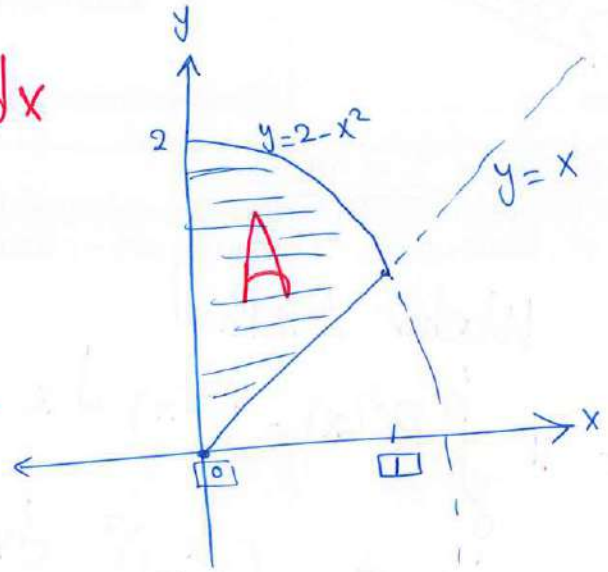
Question #3:

Find the area enclosed between the curve  $y = 2 - x^2$ , the y-axis, and the line  $y = x$

① 
$$\text{Area} = \int_0^1 (2 - x^2) - x \, dx$$

① 
$$= \left[ 2x - \frac{x^3}{3} - \frac{x^2}{2} \right]_0^1$$

① 
$$= \frac{7}{6}$$



$$f(x) = g(x)$$

$$2 - x^2 = x$$

$$x^2 + x - 2 = 0$$

$$(x + 2)(x - 1) = 0$$

$$x = -2 \text{ or } \boxed{x = 1}$$

# Section ①

Name : .....

Student Number.....

Section **10/10**

Question #1: 3.5 pt.

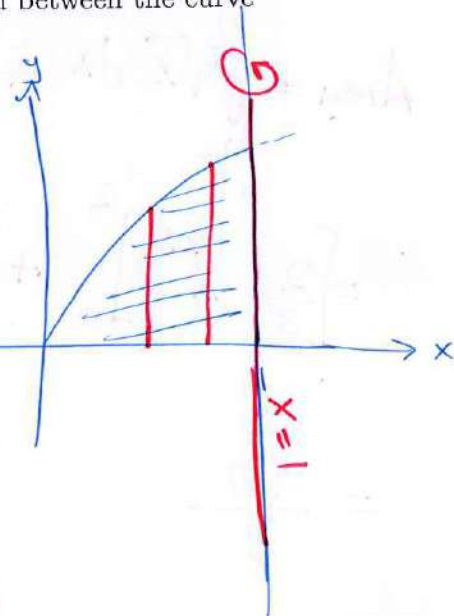
Find the volume of the solid generated by revolving the region enclosed between the curve  $y = 15\sqrt{x}$ ,  $y = 0$ ,  $x = 1$  about the line  $x = 1$  (using Shell Method)

①  $V = 2\pi \int_0^1 (\text{shell radius}) (\text{shell height}) dx$

①  $= 2\pi \int_0^1 (1-x) (15\sqrt{x}) dx$

①  $= 2\pi \left[ 15\left(\frac{2}{3}\right) x^{3/2} - 15\left(\frac{2}{5}\right) x^{5/2} \right]_0^1$

①  $= 8\pi$



Question #2: 3.5 pt.

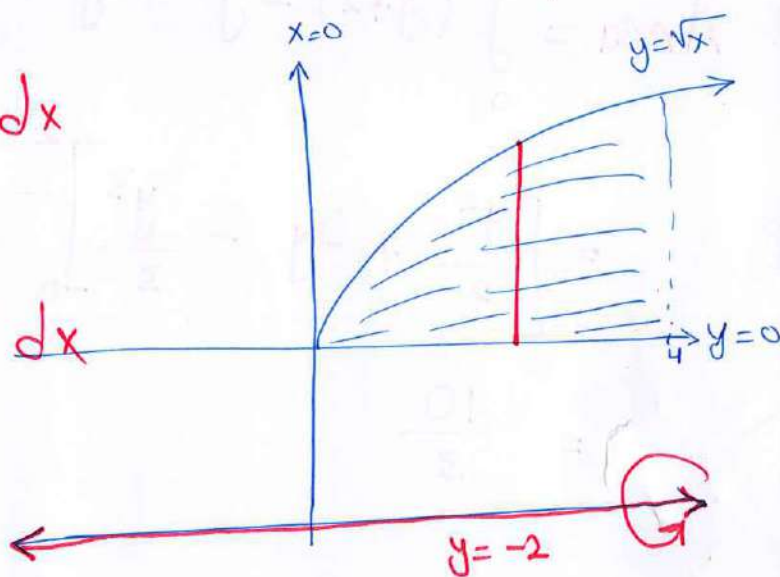
Find the volume of solid generated by revolving the region enclosed between the curves  $y = \sqrt{x}$ ,  $x$ -axis,  $0 \leq x \leq 4$  about the  $y = -2$  using washer method (Don't Evaluate Integral)

Washer Method:-

①  $V = \pi \int_0^4 R^2(x) - r^2(x) dx$

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

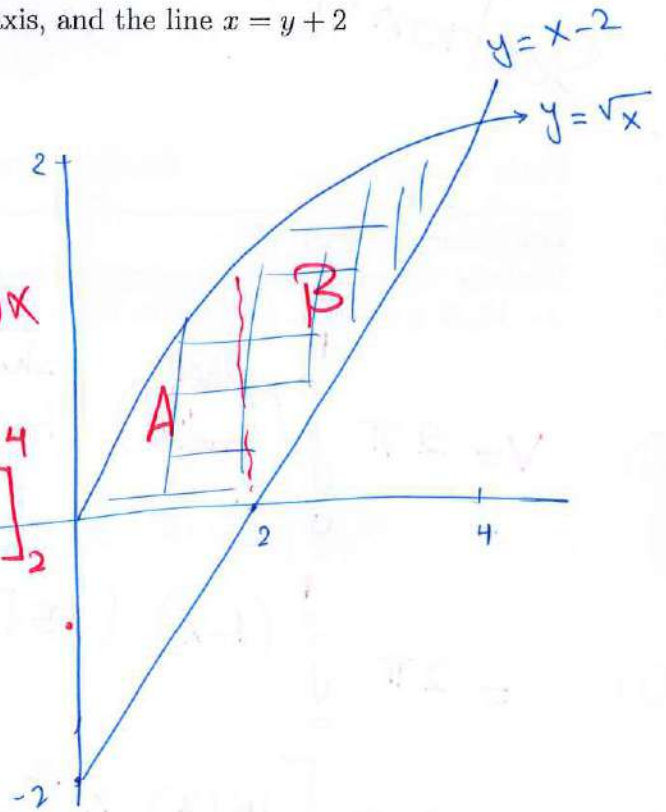
①  $= \pi \int_0^4 x + 4\sqrt{x} dx$



Question #3: 3 pt.

Find the area enclosed between the curve  $x = y^2$ , the x-axis, and the line  $x = y + 2$

$$\begin{aligned} \text{Area} &= \int_0^2 \sqrt{x} \, dx + \int_2^4 \sqrt{x} - (x-2) \, dx \\ &= \left[ \frac{2}{3} x^{3/2} \right]_0^2 + \left[ \frac{2}{3} x^{3/2} - \frac{x^2}{2} + 2x \right]_2^4 \\ &= \frac{10}{3} \end{aligned}$$



0/2

$$\begin{aligned} \text{Area} &= \int_0^2 (y+2) - y^2 \, dy \\ &= \left[ \frac{y^2}{2} + 2y - \frac{y^3}{3} \right]_0^2 \\ &= \frac{10}{3} \end{aligned}$$

