KEY

Name:	ID:	Sec: 8(1:10-2:00) 9(2:10-3:00)

MATH-102 Term-152 CQ4

(circle one letter and show all your work)

1) The volume of the solid generated by revolving the region bounded by the curves $y = \frac{1}{x}$, $y = 0$, $x = 1$ and $x = 3$ about the line $x = 3$ is

(a) $\int_1^3 (2\pi(x-3)/x^2)dx$

(b) $\int_0^3 (6\pi x/x)dx$

(c) $\int_1^3 (2\pi(3-x)/x)dx$

(d) $\int_0^1 (2\pi(3-x)/x)dx$

(e) $\int_1^3 (2\pi(x-3)/x)dx$

(f) None of the above

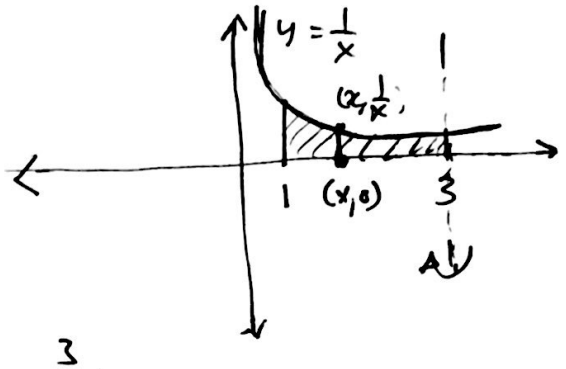
about x-axis

it is a disk

$r = \frac{1}{x}$

$A = \pi \frac{1}{x^2}$

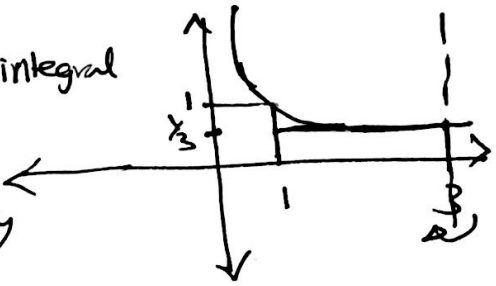
$V = \int_1^3 \frac{\pi}{x^2} dx = \pi \int_1^3 \frac{dx}{x^2}$



about the line x = 3 splitted into disk for $0 \le y \le 1/3$ and integral

$V_1 = \pi r^2 h = \pi (2)^2 (\frac{1}{3}) = 4\pi/3$

$V_2 = \int_{1/3}^{1} \pi (2^2 - (\frac{1}{y})^2) dy = \int_{1/3}^{1} \pi (4 - \frac{1}{y^2}) dy$



2) The base of a solid is a triangular region bounded by the lines $y = x$, $y = 1$, and $x = 0$. If the cross-sections of the solid perpendicular to the y-axis are semi-circles with diameters running across the base of the solid, then the volume of the solid is

(a) $\pi/36$

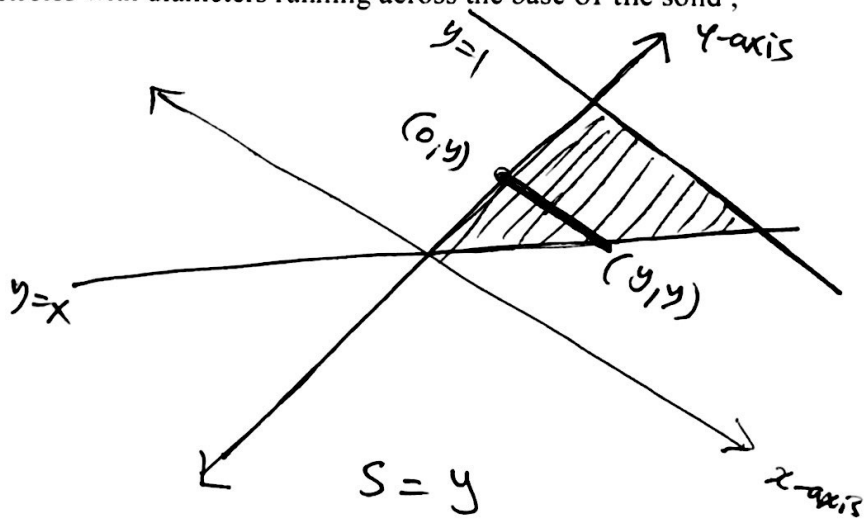
(b) $3\pi/8$

(c) $\pi/16$

(d) $\pi/24$

(e) $\pi/4$

(f) None of the above



$V = \int_0^1 \frac{1}{8}\pi y^2 dy$

$= \frac{1}{8}\left[\frac{\pi}{3} y^3\right]_0^1$

$= \frac{\pi}{24}$

$S = y$

$r = \frac{1}{2} y$

Semi-circle $= A = \frac{1}{2}\pi(\frac{1}{2}y)^2$

$= \frac{1}{8}\pi y^2$

3) The volume of the solid generated by revolving the region bounded by the curves $y = \sqrt{x}$, $y = 0$, and $x = 4$ about the line x-axis is

(a) 2π

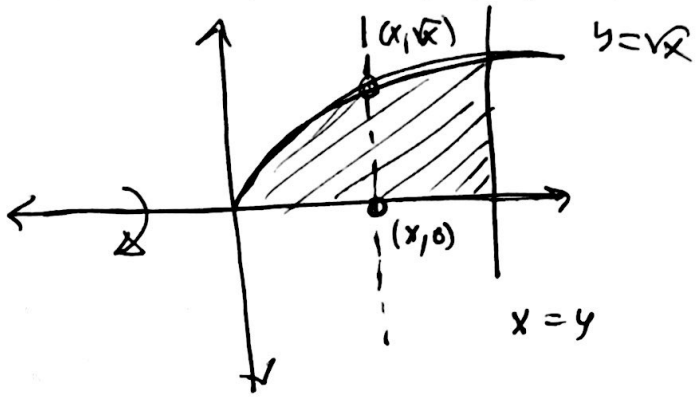
(b) 4π

(c) 6π

(d) 8π

(e) 10π

(f) None of the above



it is a disk

$r = \sqrt{x}$

$A = \pi x$

$$V = \int_0^4 \pi x \, dx = \pi \left[\frac{1}{2}x^2\right]_0^4$$

$$= \frac{\pi}{2}\left[16 - 0\right] = 8\pi$$