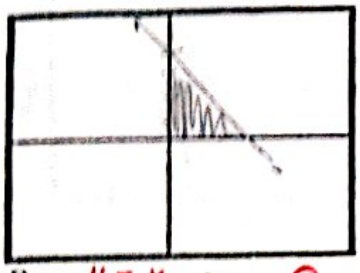
KEY

Volume by Disks/Washers - Homework

1. Find the volume if the region enclosing $y = 4 - x, x = 0, y = 0$ is rotated about the

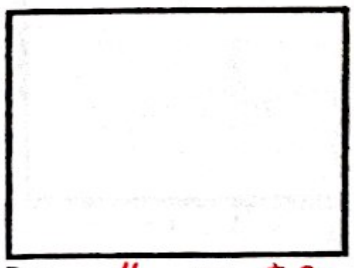
a) x-axis



R = 4 − x r = 0

V = $64\pi/3$

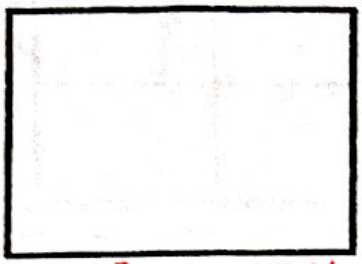
b) the line $y = 4$



R = 4 r = +x

V = $128\pi/3$

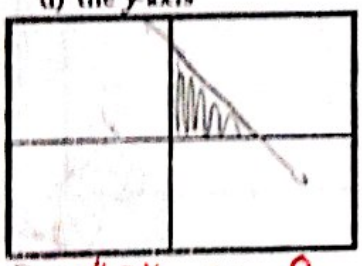
c) the line $y = 5$



R = 5 r = x + 1

V = $176\pi/3$

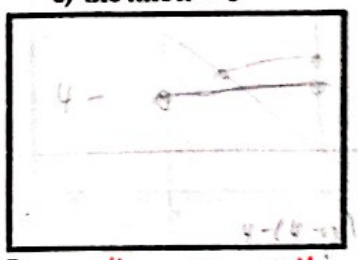
d) the y-axis



R = 4 − y r = 0

V = $64\pi/3$

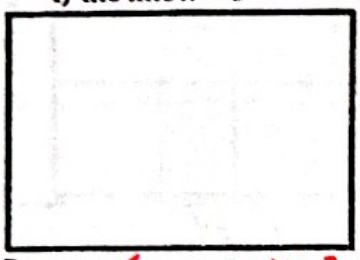
e) the line $x = 4$



R = 4 r = +4

V = $128\pi/3$

f) the line $x = 6$

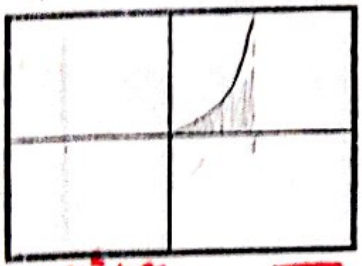


R = 6 r = y + 2

V = $224\pi/3$

2. Find the volume if the region enclosing $y = x^2 + x, y = 0, x = 2$ is rotated about the

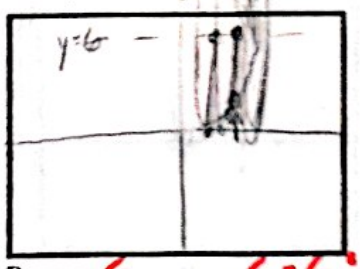
a) x-axis



R = $x^2 + x$ r = —

V = $256\pi/15$

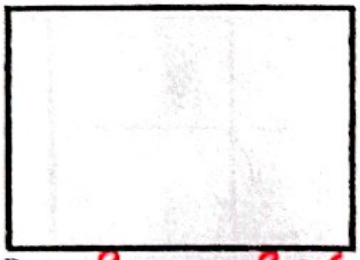
b) the line $y = 6$



R = 6 r = $6 - (x^2 + x)$

V = $584\pi/15$

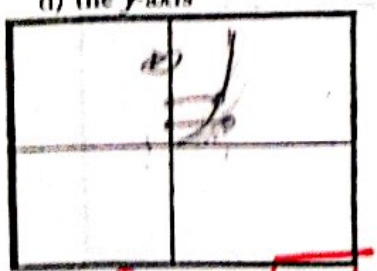
c) the line $y = 9$



R = 9 r = $9 - (x^2 + x)$

V = $1004\pi/15$

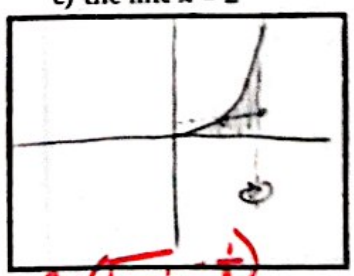
d) the y-axis



R = 2 r = $\sqrt{y + \frac{1}{4}} - \frac{1}{2}$

V = $40\pi/3$

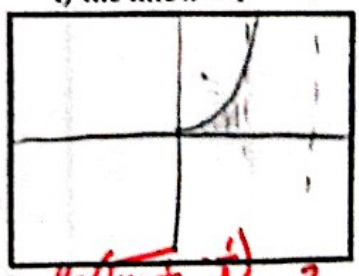
e) the line $x = 2$



R = $2 - (\sqrt{y + \frac{1}{4}} - \frac{1}{2})$ r = —

V = $16\pi/3$

f) the line $x = 4$

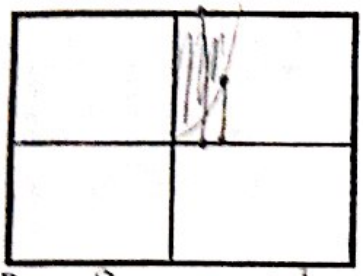


R = $4 - (\sqrt{y + \frac{1}{4}} - \frac{1}{2})$ r = 2

V = 24π

3. Find the volume if the region enclosing $y = x^3, x = 0, y = 8$ is rotated about the

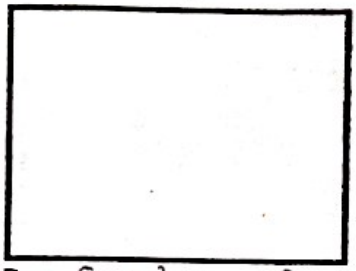
a) x-axis



R = 8 r = x^3

V = $\frac{768\pi}{7}$

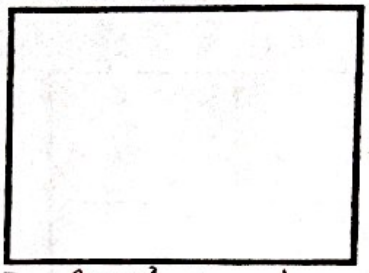
b) the line $y = 8$



R = $8 - x^3$ r = 0

V = $\frac{576\pi}{7}$

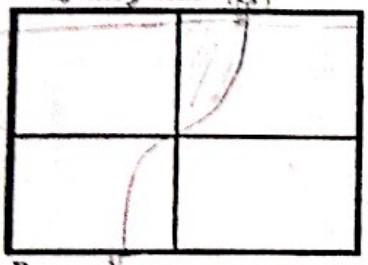
c) the line $y = 9$



R = $9 - x^3$ r = 1

V = $\frac{744\pi}{7}$

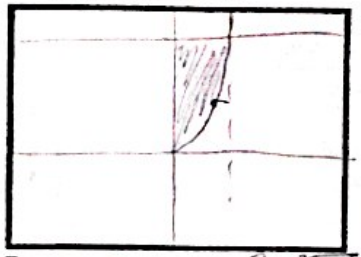
d) the y-axis



R = $\sqrt[3]{y}$ r =

V = $\frac{96\pi}{5}$

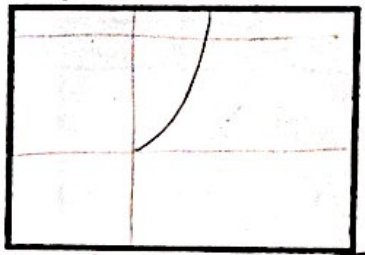
e) the line $x = 2$



R = 2 r = $2 - \sqrt[3]{y}$

V = $\frac{144\pi}{5}$

f) the line $x = 3$

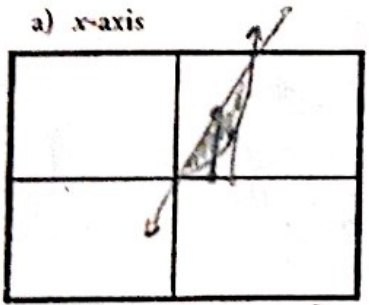


R = 3 r = $3 - \sqrt[3]{y}$

V = $\frac{264\pi}{5}$

4. Find the volume if the region enclosing $y = x^2, y = 2x, x \geq 0$ is rotated about the

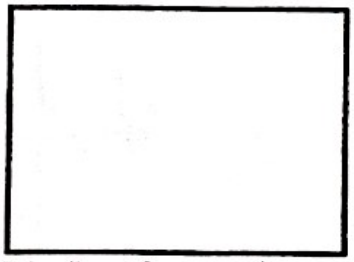
a) x-axis



R = $2x$ r = x^2

V = $\frac{64\pi}{15}$

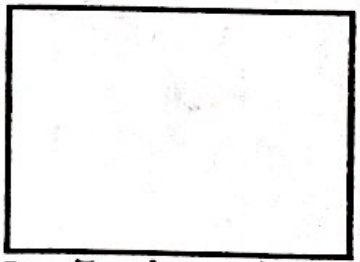
b) the line $y = 4$



R = $4 - x^2$ r = $4 - 2x$

V = $\frac{32\pi}{5}$

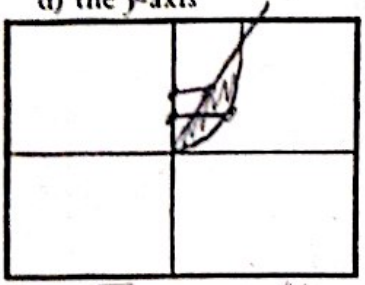
c) the line $y = 7$



R = $7 - x^2$ r = $7 - 2x$

V = $\frac{72\pi}{5}$

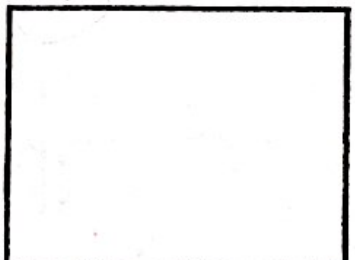
d) the y-axis



R = $\sqrt{y}$ r = $y/2$

V = $\frac{8\pi}{3}$

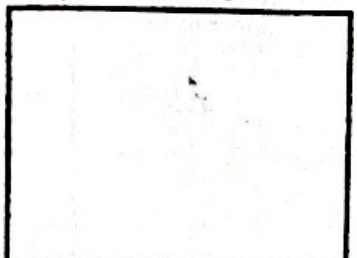
e) the line $x = 2$



R = $2 - \frac{y}{2}$ r = $2 - \sqrt{y}$

V = $\frac{8\pi}{3}$

f) the line $x = 3$



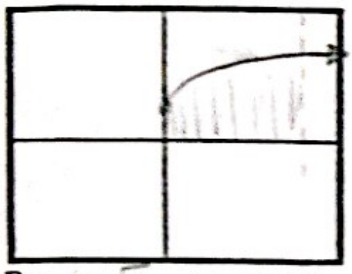
R = $3 - \frac{y}{2}$ r = $3 - \sqrt{y}$

V = $\frac{16\pi}{3}$

Split up d, e, f

5. Find the volume if the region enclosing $y = 1 + \sqrt{x}, x = 0, y = 0, x = 9$ is rotated about the

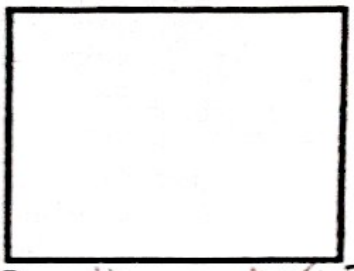
a) x-axis



R = $1+\sqrt{9}$ r = ____

V = ____

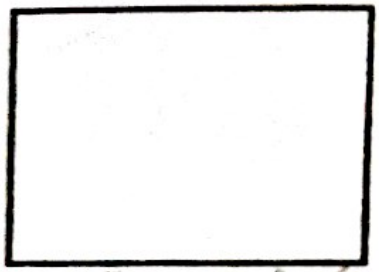
b) the line $y = 4$



R = 4 r = $4-(1+\sqrt{x})$

V = $\frac{261\pi}{2}$

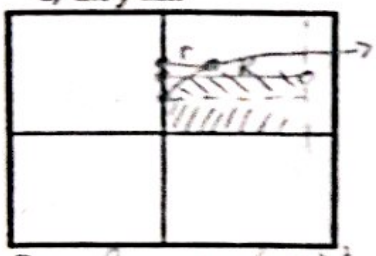
c) the line $y = 5$



R = 5 r = $5-(1+\sqrt{x})$

V = $\frac{369\pi}{2}$

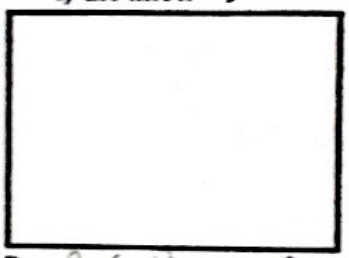
d) the y-axis



R = 9 r = $(y-1)^2$

V = ____

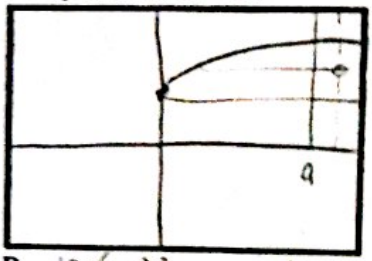
e) the line $x = 9$



R = $9-(y-1)^2$ r = 0

V = $\frac{81\pi + 648\pi}{5}$ $\frac{1053\pi}{5}$

f) the line $x = 10$



R = $10-(y-1)^2$ r = 1

V = $\frac{99\pi - 828\pi}{5}$ $\frac{1323\pi}{5}$

6. Find the volume if the region enclosing $y = \sin x$ and $y = \cos x$ is rotated about where x is a quadrant I angle