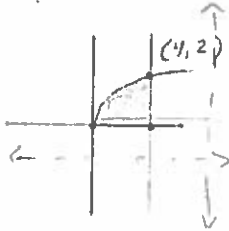


Washer Method
AP CALCULUS

Answers
NAME _____

Write but do not evaluate an integral that gives the volume of the solid formed by revolving the region about the given line(s).

1. $y = \sqrt{x}$ $y^2 = x$
1. $x = 4$
 $y = 0$

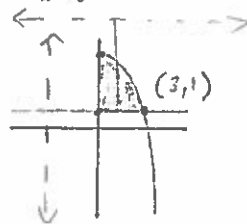


- a. $y = -2$
b. $x = 7$

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

(B) $V = \pi \int_0^7 (7 - y^2)^2 - (3)^2 dy$

2. $y = 10 - x^2$ $\sqrt{10 - y} = x$
2. $y = 1$
 $x = 0$

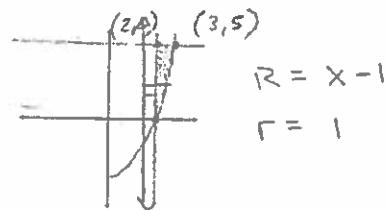


- a. $x = -4$
b. $y = 12$

(A) $V = \pi \int_1^{10} (\sqrt{10 - y} + 4)^2 - (4)^2 dy$

(B) $V = \pi \int_0^3 (1 - y)^2 - (2 + x^2)^2 dx$

3. $y = x^2 - 4$
3. $x = 2$
 $y = 5$

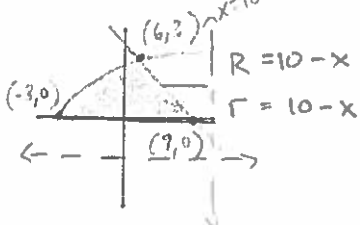


- a. x -axis
b. $x = 1$

(A) $V = \pi \int_2^5 (5 - 0)^2 - (x^2 - 4)^2 dx$

(B) $V = \pi \int_0^5 (\sqrt{y + 4} - 1)^2 - (1)^2 dy$

4. $y = \sqrt{x + 3}$ $y^2 - 3 = x$
 $y = 9 - x$ $x = 9 - y$

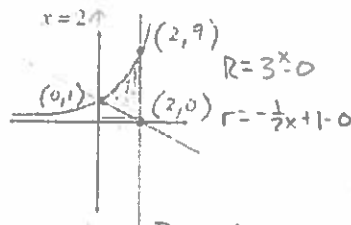


- a. $y = -2$
b. $x = 10$

(A) $V = \pi \int_{-3}^6 (\sqrt{x + 3} + 2)^2 - (2)^2 dx$
 $+ \pi \int_6^9 (11 - x)^2 - (2)^2 dx$

(B) $V = \pi \int_0^3 (13 - y^2)^2 - (1 + y)^2 dy$

5. $y = 3^x$ $\log_3 y = x$
5. $y = -\frac{1}{2}x + 1$ $-2y + 2 = x$
 $x = 2$

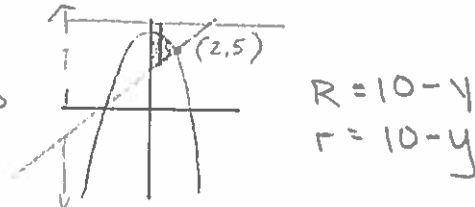


- a. x -axis
b. y -axis

(A) $V = \pi \int_0^2 (3^x)^2 - (-\frac{1}{2}x + 1)^2 dx$

(B) $V = \pi \int_0^1 (2)^2 - (-2y + 2)^2 dy$
 $+ \pi \int_1^9 (2)^2 - (\log_3 y)^2 dy$

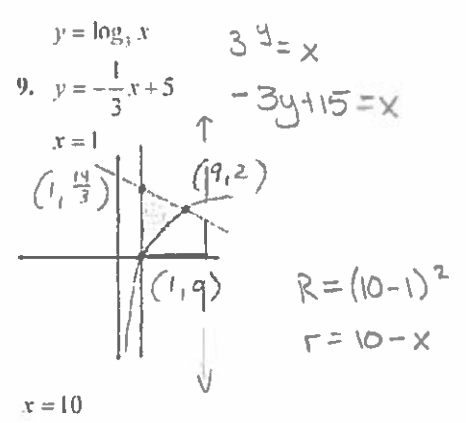
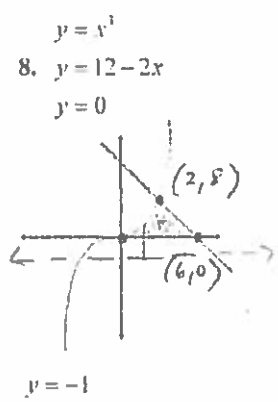
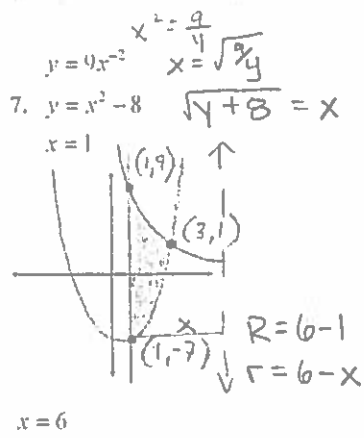
6. $y = 9 - x^2$ $\sqrt{9 - y} = x$
6. $y = x + 3$ $y - 3 = x$
 $x = 0$



- a. $x = -6$
b. $y = 10$

(A) $V = \pi \int_3^5 (y + 3)^2 - (6)^2 dy$
 $+ \pi \int_5^9 (\sqrt{9 - y} + 6)^2 - (6)^2 dy$

(B) $V = \pi \int_0^2 (7 - x)^2 - (1 + x^2)^2 dx$



$$V = \pi \int_{-7}^1 (5)^2 - (6 - \sqrt{y+8})^2 dy$$

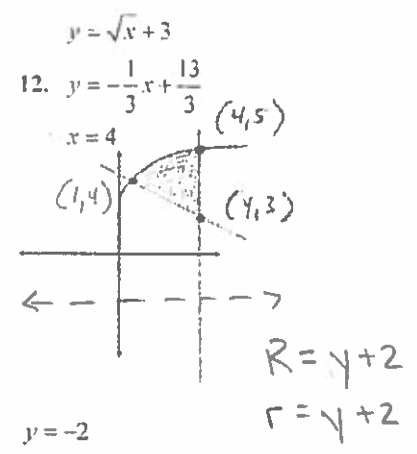
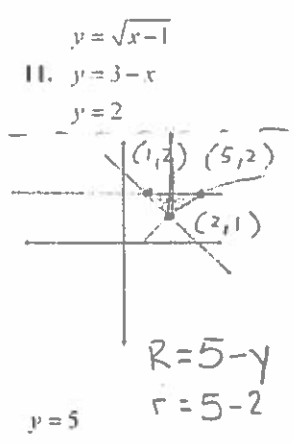
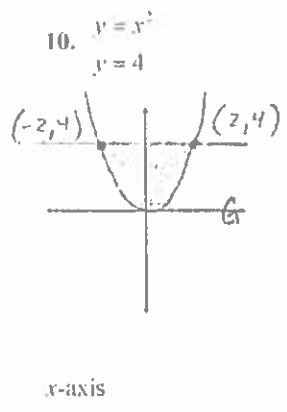
$$+ \pi \int_1^9 (5)^2 - (6 - \sqrt{\frac{y}{9}})^2 dy$$

$$V = \pi \int_0^2 (x^3 + 1)^2 - (1)^2 dx$$

$$+ \pi \int_2^6 (12 - 2x)^2 - (1)^2 dx$$

$$V = \pi \int_0^2 (9)^2 - (10 - 3^y)^2 dy$$

$$+ \pi \int_2^{\frac{14}{3}} (9)^2 - (3y - 5)^2 dy$$



$$V = \pi \int_{-2}^2 (4)^2 - (x^2) dx$$

$$V = \pi \int_1^2 (2+x)^2 - (3)^2 dx$$

$$+ \pi \int_2^5 (5 - \sqrt{x-1})^2 - (3)^2 dx$$

$$V = \pi \int_4^5 (\sqrt{x+3})^2 - (-\frac{1}{3}x + \frac{13}{3})^2 dx$$