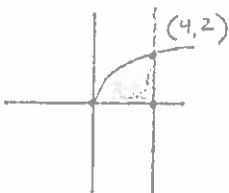


Disc Method  
AP CALCULUS

Key  
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.  $y = \sqrt{x}$   
 $x = 4$   
 $y = 0$       left-right

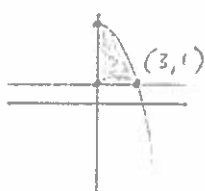


- a. x-axis  
b. x=4

a.  $\pi \int_0^4 (\sqrt{x})^2 dx$

b.  $\pi \int_0^2 (4-y^2)^2 dy$

2.  $y = 10 - x^2$   
 $y = 1$   
 $x = 0$       Top-bottom

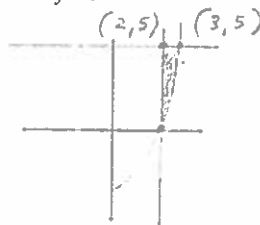


- a. y-axis  
b. y=1

a.  $V = \pi \int_1^{10} (\sqrt{10-y})^2 dy$

b.  $V = \pi \int_0^3 (10-x^2-1)^2 dx$

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

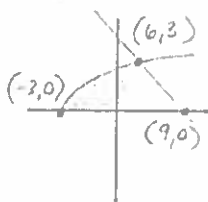


- a. x=2  
b. y=5

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

b.  $V = \pi \int_2^3 (5 - (x^2 - 4))^2 dx$

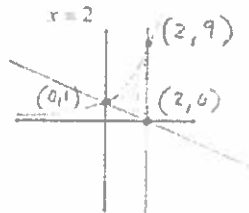
4.  $y = \sqrt{x+3}$   
 $y = 9-x$



x-axis

④  $\pi \int_{-3}^6 (\sqrt{x+3})^2 dx + \pi \int_6^9 (9-x)^2 dx$

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



x=2

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

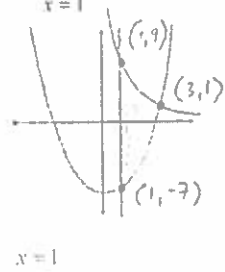
⑤  $\pi \int_1^9 (2 - \log_3 y)^2 dy + \pi \int_0^1 (2 - (-2y+2))^2 dy$

6.  $y = 9 - x^2$   
 $y = x + 3$   
 $x = 0$

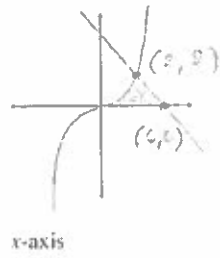


y-axis

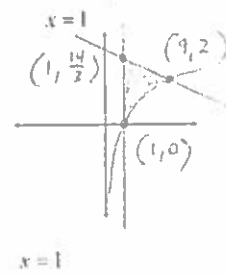
$y = 9x^2$       $x^2 = \frac{y}{9}$   
 7.  $y = x^2 - 8$   
 $x = 1$



$y = x^3$   
 8.  $y = 12 - 2x$   
 $y = 0$



$y = \log_3 x$       $3^4 = x$   
 9.  $y = -\frac{1}{3}x + 5$       $-3y + 15 = x$

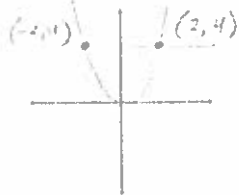


⑦  $\pi \int_{-1}^1 (\sqrt{y+8} - 1)^2 dy + \pi \int_1^9 (\sqrt{\frac{y}{9}} - 1)^2 dy$

⑨  $\pi \int_0^2 (3^y - 1)^2 dy + \pi \int_2^{14/3} (-3y + 14)^2 dy$

⑧  $\pi \int_0^2 (x^3)^2 dx + \pi \int_2^6 (12 - 2x)^2 dx$

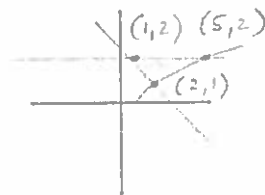
10.  $y = x^2$   
 $y = 4$



$y = 4$

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

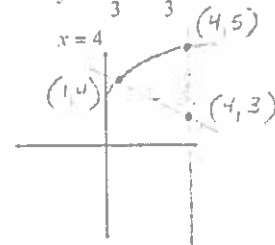
$y = \sqrt{x-1}$   
 11.  $y = 3 - x$   
 $y = 2$



$y = 2$

$\pi \int_1^2 (2 - (3 - x))^2 dx +$   
 $\int_2^5 (2 - \sqrt{x-1})^2 dx$

$y = \sqrt{x-3}$       $(y-3)^2 = x$   
 12.  $y = -\frac{1}{3}x + \frac{13}{3}$       $13 - 3y = x$   
 $x = 4$



$x = 4$

$\pi \left( \int_3^4 (4 - (13 - 3y))^2 dy + \int_4^5 (4 - (y-3)^2)^2 dy \right)$