



**AP<sup>®</sup> Calculus AB  
2004 Sample Student Responses  
Form B**

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B,

**CALCULUS AB**  
**SECTION II, Part A**  
**Time—45 minutes**  
**Number of problems—3**

**A graphing calculator is required for some problems or parts of problems.**

Work for problem 1(a)

$$\text{Area} = \int_1^{10} (\sqrt{x-1}) dx = \int_0^9 u^{1/2} du = \left. \frac{2}{3} u^{3/2} \right|_0^9 = 17.999 \text{ units}^2 \approx 18 \text{ units}^2$$

let  $u = x-1$   
 $\frac{du}{dx} = 1$   
 $dx = du$

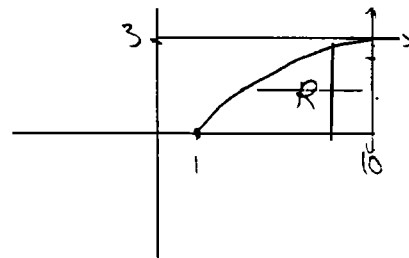
Work for problem 1(b)

Washer's method (strip +)

$$R(x) = 3$$

$$r(x) = 3 - y = 3 - \sqrt{x-1}$$

$$V = \pi \int_1^{10} (3^2 - (3 - \sqrt{x-1})^2) dx = 212.058 \text{ units}^3$$



Continue problem 1 on page 5.

Work for problem 1(c)

Washer's method (strip  $\perp$  to  $X=10$ )

$$R(y) = 10 - X = 10 - 1 - y^2 = 9 - y^2$$

$$r(y) = 0$$

$$y^2 = X - 1$$
$$X = 1 + y^2$$

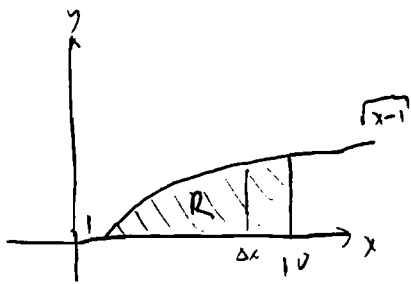
$$V = \pi \int_0^3 (9 - y^2)^2 dy = 407.150 \text{ units}^3$$

GO ON TO THE NEXT PAGE.

**CALCULUS AB**  
**SECTION II, Part A**  
**Time—45 minutes**  
**Number of problems—3**

**A graphing calculator is required for some problems or parts of problems.**

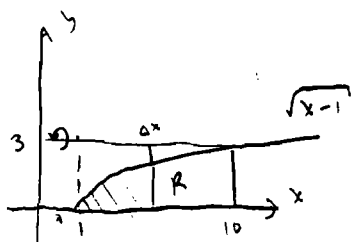
Work for problem 1(a)



$$A_R = \int_1^{10} \sqrt{x-1} dx$$

$$A_R = 18.000 \text{ units}^2$$

Work for problem 1(b)

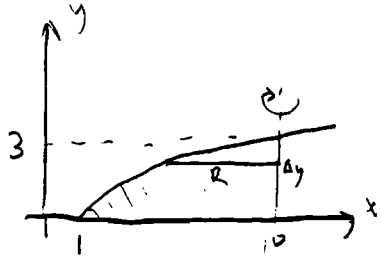


$$V_R = \pi \int_1^{10} (3)^2 - (3 - \sqrt{x-1})^2 dx$$

$$V_R = 212.058 \text{ units}^3$$

Continue problem 1 on page 5.

Work for problem 1(c)



$$V_{R_1} = \pi \int_0^3 (y^2 + 1)^2 dy$$

$$V_{R_1} = 218.655 \text{ units}^3$$

$$y = \sqrt{x - 1}$$

$$y^2 = x - 1$$

$$x = y^2 + 1$$

GO ON TO THE NEXT PAGE.