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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)

\[
\text{Area} = \int_1^9 (x^2 - 1) \, dx = \int_1^9 u^2 \, du = \frac{2}{3} u^3 \bigg|_1^9 = 17.999 \text{ units}^2
\]

let \( u = x - 1 \)
\[
\frac{du}{dx} = 1
\]
\[
dx = du
\]

Work for problem 1(b)

Washer's method (strip)

\[
\begin{align*}
R(x) &= 3 \\
r(x) &= 3 - y = 3 - \sqrt{x - 1} \\
V &= \pi \int_1^3 \left(3^2 - (3 - \sqrt{x - 1})^2\right) \, dx = 212.058 \text{ units}^3
\end{align*}
\]

Continue problem 1 on page 5.
Work for problem 1(c)

Washer's method (strip 0 to x=10)

\[ f(y) = 10 - x = 10 - 1 - y^2 = 9 - y^2 \]

\[ r(y) = 0 \]

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

\[ A_R = \int_1^0 \frac{1}{x-1} \, dx \]

\[ A_R = 18.000 \text{ units}^2 \]

Work for problem 1(b)

\[ V_R = \pi \int_1^0 (3)^2 - (3 - \sqrt{x-1})^2 \, dx \]

\[ V_R = 212.058 \text{ units}^3 \]

Continue problem 1 on page 5.
Work for problem 1(c)

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

\[ V_{R_1} = 218.655 \text{ units}^3 \]

\( y = \sqrt{x - 1} \)

\( y^2 = x - 1 \)

\( x = y^2 + 1 \)