AP Calculus AB

Volume of Solids (Cross Section)

1) $y_1 = \frac{x^3}{1+x^2}$ $y_2 = 4-2x$

$y_1 = y_2$ @ $x = 1.487 \rightarrow B$

$V = \int$ Area of a Square
$= \int side^2$

$V = \int_0^B [y_2 - y_1]^2 dx$

$= 8.997$

2) $y_1 = f(x)$ $y_2 = g(x)$

$y_1 = y_2$ @ $x = 0$ & $x = 1.135 \rightarrow B$

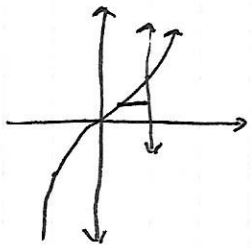
$V = \int$ Area of a Semicircle $= \frac{\pi}{8} \int DIAM^2$

$d = y_1 - y_2$

$V = \frac{\pi}{8} \int_0^B [y_1 - y_2]^2 dx$

$= 0.07766$

3) dy
$y = x^3$
$x = y^{1/3}$



$V = \int$ Area of a Square
$= \int side^2$

$side = 1 - y^{1/3}$

$V = \int_0^1 [1 - y^{1/3}]^2 dy$

$= \int_0^1 [1 - 2y^{1/3} + y^{2/3}] dy$

$\left[y - \frac{3}{2}y^{4/3} + \frac{3}{5}y^{5/3} + C\right]_0^1$

$\boxed{1 - \frac{3}{2} + \frac{3}{5}}$

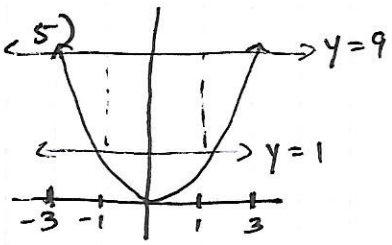
4) $f(x) = x \ln x$

$f'(x) = x \cdot \frac{1}{x} + \ln x = 1 + \ln x$

$f''(x) = \frac{1}{x}$

$f'''(x) = -\frac{1}{x^2}$ $f'''(e) = -\frac{1}{e^2}$ **C**

5)



$Area = \int_{-3}^{-1} (9 - x^2) dx + \int_{-1}^{1} (9 - 1) dx + \int_{1}^{3} (9 - x^2) dx$

6) $\lim_{x \to 3} \frac{x+3}{x^2-9} \rightarrow \frac{6}{0}$

DNE

7) $F(x) = 4 + \int_0^x (3t^2 + 2t + 1) dt$

$F(3) = 4 + \int_0^3 (3t^2 + 2t + 1) dt$

$= 4 + \left[t^3 + t^2 + t\right]\Big|_0^3$

$= 4 + (27 + 9 + 3)$

$= 43$