

* Calc on # 34, 39, 43 & 45

AP Review 4

* Calc 34. a) $x = \sqrt[3]{2-y}$ $x = \tan^{-1} y$ intersect @ 1.266
 $\int_0^{1.266} (\sqrt[3]{2-y} - \tan^{-1} y) dy = .729$

area of R is .729

b) $\int_0^{.902} (2-x^3 - \tan x) dx = 1.161$

area of S is 1.161

c) $R = 2-x^3$ $r = \tan x$
 $V = \pi \int_0^{.902} (R^2 - r^2) dx = 8.332$

C 35. $f(1) = 2$ $f(3) = 7$ $\sqrt{I} AOC = \frac{7-2}{3-1} = \frac{5}{2}$
 $x \text{ II Avg val: } \frac{1}{2} \int_1^3 f(x) dx = \frac{9}{2}$ only if f is line.
 \checkmark III MUT!!! \smile $AOC = IROC$

A 36. $\int \frac{1}{(x-1)(x+3)} dx = \int \left(\frac{A}{x-1} + \frac{B}{x+3} \right) dx$ $A(x+3) + B(x-1) = 1$
 $x=3: -4B=1 \quad B=-1/4$
 $x=1: 4A=1 \quad A=1/4$

$= \int \left(\frac{1}{4(x-1)} - \frac{1}{4(x+3)} \right) dx$

$= \frac{1}{4} \ln|x-1| - \frac{1}{4} \ln|x+3| + C$

$= \frac{1}{4} \ln \left| \frac{x-1}{x+3} \right| + C$

B 37. $y = 2-x^2$ $V = \int_0^2 (\sqrt{2-y})^2 dy$
 $x^2 = 2-y$
 $x = \sqrt{2-y}$ $= \int_0^2 (2-y) dy$



B 38. $\lim_{h \rightarrow 0} \frac{\tan(3(x+h)) - \tan(3x)}{h} \rightarrow$ asking for deriv. of $\tan(3x)$

$= 3 \sec^2(3x)$

*Calc A 39. $F(x) = \cos(2x) + e^{-x}$
 $\star F'(x) = -2\sin(2x) - e^{-x} \rightarrow y_1$

AROC: $\frac{(\cos(6) + e^{-3}) - (\cos(0) + e^0)}{3-0} = \frac{\cos 6 + e^{-3} - 2}{3} \star$
 $\searrow y_2$
 intersects @ $x = 1.542$

40. a) $\frac{dy}{dx} = y^2(6-2x) \rightarrow (3, 1/4) \quad \frac{dy}{dx} = \frac{1}{16}(10) = 0$
 $\frac{d^2y}{dx^2} = 2y \frac{dy}{dx} (6-2x) - 2y^2$
 $(3, 1/4): \frac{d^2y}{dx^2} = 0 \rightarrow 2(1/16) = -1/8$

b) $\frac{dy}{dx} = y^2(6-2x) \rightarrow \frac{-1}{y} = 6x - x^2 + C \quad (3, 1/4)$
 $\int \frac{dy}{y^2} = \int (6-2x) dx \rightarrow -4 = 18 - 9 + C \quad C = -13$
 $\frac{-1}{y} = 6x - x^2 - 13$
 $y = \frac{-1}{6x - x^2 - 13} \quad \text{OR} \quad \frac{1}{x^2 - 6x + 13} \quad \text{!!}$

C 41. $f(3) = 2 \quad f'(3) = 5 \quad \star \rightarrow$ (a zero of f)
 $f(x) = 0$
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 0}{3 - x} = 5 \quad 2 = 5(3 - x)$
 $2 = 15 - 5x$
 $5x = 13 \quad x = 13/5 = 2\frac{3}{5} = 2.6$

B 42. $\frac{1}{2}((3+3) + (3+5) + (5+8) + (8+13))$
 $\frac{1}{4}(48) = 12$

*Calc D 43. $f'(x) = \frac{x^2}{1+x^5} \quad f(1) = 3, \text{ find } f(4)$
 $\int_1^4 \frac{x^2}{1+x^5} dx = f(4) - f(1)$
 $3.376 = f(4) - 3 \quad f(4) = 3.376$

E 44. $\int_2^6 f(2x) dx = \frac{1}{2}(F(6) - F(2))$

*Calc C 45. RRAM = $14(180) + 9(200) + 12(280) + 15(350) + 10(400)$
 $16,930$