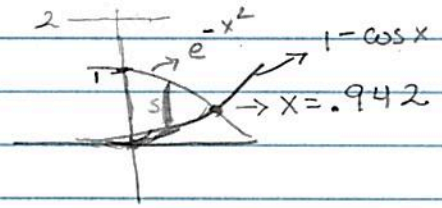


AP Review 2 NON-Calc

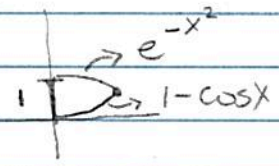
* Calc 14. $R = 2 - (1 - \cos x)$ $r = 2 - e^{-x^2}$

a) $V = \pi \int_0^{.942} (R^2 - r^2) dx = \boxed{5.680}$



b) $A = \int_0^{.942} s^2 dx$ $s = e^{-x^2} - (1 - \cos x) \rightarrow$ Top - bottom
 $V = \int_0^{.942} s^2 dx = \boxed{.461}$

c) $f(x) = y = e^{-x^2}$ $g(x) = y = 1 - \cos x$
 $f'(x) = -2xe^{-x^2}$ $g'(x) = \sin x$



Perimeter = $1 + \int_0^{.942} \sqrt{1 + (-2xe^{-x^2})^2} dx + \int_0^{.942} \sqrt{1 + (\sin x)^2} dx$

B 15. $y = xy + x^2 + 1$ $y = -y + 1 + 1$ $2y = 2$ $y = 1$ $(-1, 1)$

$dy/dx = y + x dy/dx + 2x$

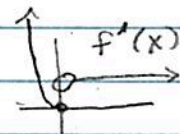
$dy/dx(1-x) = y + 2x \rightarrow dy/dx = \frac{y+2x}{1-x}$ $(-1, 1)$

$dy/dx = \frac{1-2}{1-1} = \boxed{-1/2}$

A 16. $f'(x) = \frac{|4-x^2|}{x-2} \rightarrow$ always + $\rightarrow f(x)$ decreasing when $f'(x) < 0$

$\frac{+}{-2} = \frac{+}{2}$

E 17. $f(x) = \begin{cases} x^3 & x \leq 0 \\ x & x > 0 \end{cases}$ $f'(x) = \begin{cases} 3x^2 & x < 0 \\ 1 & x > 0 \end{cases}$

A 18. f' changes - to + in 2 places \rightarrow rel min by 1st der test
 f' changes + to - in 1 place \rightarrow rel max by 1st der test

*Calc 19. $v(t) = -1 + e^{1-t}$ $t \geq 0$

a) $a(t) = v'(t)$ $a(3) = -1.35$ (Math 8)

b) $v(3) = -.865$ Since $a(3)$ & $v(3)$ are both negative, speed is increasing at $t=3$.

c) $v(t)$ changes signs @ $t=1$, so

Particle changes direction at $t=1$

d) $\int_0^1 v(t) dt = .718$ $\int_1^3 v(t) dt = -1.135$
 \hookrightarrow Rt $\quad \quad \quad \hookrightarrow$ Left

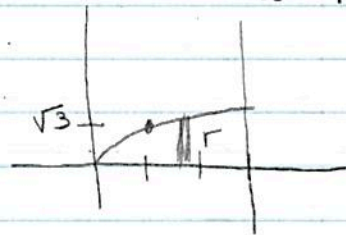
total distance traveled = $.718 + |-1.135| = 1.853$

E 20. $\int \frac{1}{x^2-2x+2} dx = \int \frac{1}{x^2-2x+1+1} dx = \int \frac{1}{(x-1)^2+1} dx \rightarrow$ form:
 $\int \frac{1}{u^2+a^2} = \frac{1}{a} \arctan(\frac{u}{a})$

$\arctan(x-1)$ $u = (x-1)$
 $a = 1$

C 21. $V = \pi \int_0^3 (\sqrt{x})^2 dx$

$= \pi \int_0^3 x dx = \pi \left(\frac{x^2}{2} \right) \Big|_0^3$
 $= 9\pi/2$



A 22. $\int_0^{\sqrt{3}} \frac{1}{\sqrt{4-x^2}} dx$ form: $\arcsin(\frac{u}{a})$ $u=x$ $a=2$

$\arcsin(\frac{x}{2}) \Big|_0^{\sqrt{3}} = \arcsin \frac{\sqrt{3}}{2} - \arcsin 0$
 $\pi/3 - 0$

B 23. $\frac{dy}{y^2} = 2 dx$

(1,-1) $-\frac{1}{y} = 2x + C$
 $1 = 2 + C$ $C = -1$

$-\frac{1}{y} = 2x - 1$

$y = \frac{-1}{2x-1}$

$y = \frac{-1}{2(2)-1} = -1/3$

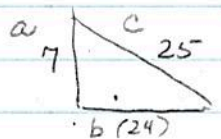
D 24. $2a \frac{da}{dt} + 2b \frac{db}{dt} = 0$

$2(7)(-3) + 2(24) \frac{db}{dt} = 0$

$48 \frac{db}{dt} = 42$

$\frac{db}{dt} = 42/48$

$= 7/8 \text{ ft/min}$



F: $\frac{db}{dt}$

W: $a = 7$

G: $\frac{da}{dt} = -3$

E: $a^2 + b^2 = c^2$

($\frac{d}{dt} = 0$)