Unit 6 5n1 Practice:

1) $\frac{dH}{dt} = -0.05(H-70)$ $\quad H(0)=120$, $H(10)=?$

$\int \frac{1}{H-70} = \int (-.05)dt$

$\ln|H-70| = -.05t + C \xrightarrow{OR} |H-70| = e^{-.05t+C}$

$\ln|120-70| = -.05(0)+C$ $\quad H-70 = Ce^{-.05t}$

$C = \ln 50$ $\quad 120-70 = Ce^{-.05(0)}$

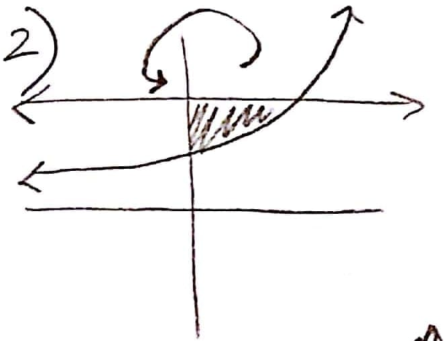
$50 = C$

$\ln|H-70| = -.05t + \ln 50$ $\quad H-70 = 50e^{-.05t}$

$\ln|H-70| = -.05(10) + \ln 50$ $\quad H = 50e^{-.05t}+70$

$H-70 = e^{-.05(10)+\ln 50}$ $\quad H = 50e^{-.05(10)}+70$

$H = 100.327 \rightarrow 100°F$ $\boxed{C}$

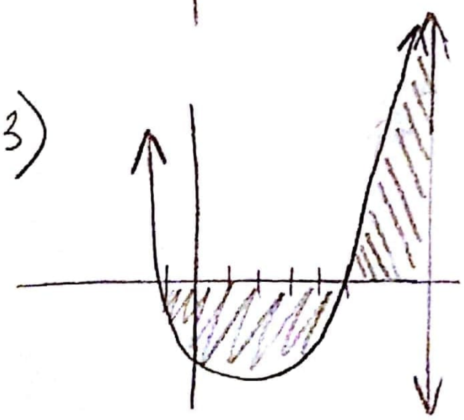
2) 

$y = e^x$

$x = \ln y$

$\pi \int_1^2 (\ln y)^2 dy$

$= .592$ $\boxed{C}$

3) 

$\int_{-1}^{5} (x^2-4x-5)dx = 36$

$\int_{5}^{K} (x^2-4x-5)dx = 36$

$\frac{x^3}{3} - 2x^2 - 5x \Big|_5^K = 36$

$\frac{K^3}{3} - 2K^2 - 5K - \left(-\frac{100}{3}\right) = 36$

$K = 8$ (calc)

$\boxed{B}$

4) $d = \sqrt[4]{4-2x}$

$r = \dfrac{\sqrt[4]{4-2x}}{2}$

$A = \frac{1}{2}\pi\left(\dfrac{\sqrt[4]{4-2x}}{2}\right)^2$

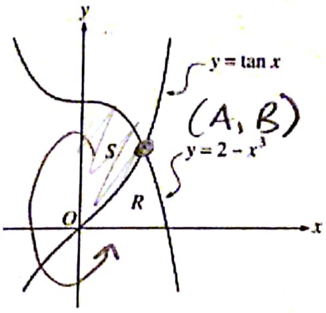
$$\frac{\pi}{8}\int_0^2 \left(\sqrt[4]{4-2x}\right)^2 dx = \frac{\pi}{8}\int_0^2 \sqrt{4-2x}\, dx$$

$\boxed{D}$

5) calculator

$\boxed{C}$

and S be the regions in the first quadrant shown in the figure to the right. Region R is bounded by the x-axis and the graphs of $y = tanx$ and $= 2 - x^3$. The Region S is bounded by the y-axis and the graphs of $y = tanx$ and $y = 2 - x^3$.



$\tan x = 2 - x^3$

at $(.902155, 1.26575) = (A, B)$

a) Find the area of R.

$$\text{Area} = \int_0^B \left(\left(\sqrt[3]{2-y}\right) - \tan^{-1} y \right) dy$$

$$= .729$$

$y = 2 - x^3$
$y - 2 = -x^3$
$2 - y = x^3$
$x = \sqrt[3]{2-y}$

1 limits
1 integrand
1 answer

b) Find the area of S.

$$\text{Area} = \int_0^A \left[(2 - x^3) - \tan x \right] dx$$

1.161

or

1.160

1 limits
1 integrand
1 answer

c) Find the volume of the solid generated when S is revolved around the x-axis.

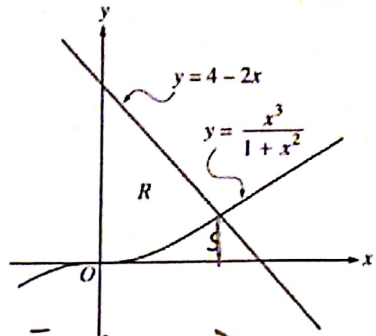
$$V = \pi \int_0^A \left[(2 - x^3)^2 - \tan^2 x \right] dx$$

2.652π or 8.332

8.331

1 limits
1 integrand
1 answer

Let R and S be the regions in the first quadrant shown in the figure to the right. The Region R is bounded by the y-axis and the graphs of $y = \frac{x^3}{1+x^2}$ and $y = 4 - 2x$. The Region S is bounded by the x-axis and the graphs of $y = \frac{x^3}{1+x^2}$ and $y = 4 - 2x$.



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

at $(1.487664, 1.024671) = (A, B)$

a) Find the area of R.

$$\text{Area} = \int_0^A \left[(4-2x) - \left(\frac{x^3}{x^2+1}\right)\right] dx$$

① integrand
① answer

3.214 or 3.215

b) Find the area of S.

$$\text{Area} = \int_0^A \frac{x^3}{1+x^2}\, dx + \int_A^2 (4-2x)\, dx$$

② integrand
① answer

$= .785$

c) Find the volume of the solid generated when R is revolved around the x-axis.

$$\pi \int_0^A \left[(4-2x)^2 - \left(\frac{x^3}{x^2+1}\right)^2\right] dx$$

② integrand
① answer

10.149π or 31.884
31.885

① correct limits in a, b, or c