

$$\#1. \quad 2^{\frac{1}{x}} = 4 - 2^{\frac{1}{x}}$$

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

$$2 \cdot 2^{\frac{1}{x}} = 4$$

$$2^{\frac{1}{x}} = 2 \quad \Rightarrow \quad \frac{1}{x} = 1 \quad \boxed{x=1}$$

$$\#2 \quad (a) \quad (2 \cdot 4^x + 4^{-x} = 3) \wedge 4^x$$

$$2 \cdot (4^x)^2 + 1 = 3 \cdot 4^x$$

$$2 \cdot (4^x)^2 - 3 \cdot 4^x + 1 = 0$$

$$2 \cdot 4^x \quad \quad \quad -1$$

$$4^x \quad \quad \quad -1$$

$$(2 \cdot 4^x - 1)(4^x - 1) = 0$$

$$4^x = \frac{1}{2} \quad 4^x = 1$$

$$(2)^{2x} = 2^{-1} \quad \boxed{x=0}$$

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

$$\# 2. (b) 4^{x-1} = 2^x + 8$$

(2)

$$(2)^{2(x-1)} = 2^x + 8$$

$$\left(\frac{2^{x+2}}{4} = 2^x + 8 \right) \times 4$$

$$(2^x)^2 = 4 \cdot 2^x + 32$$

$$(2^x)^2 - 4 \cdot 2^x - 32 = 0$$

	+4
2^x	
2^x	-8

$$(2^x + 4)(2^x - 8) = 0$$

$$2^x = -4 \quad 2^x = 8$$

No solution

$$\boxed{x = 3}$$

#3. $C(t) = 2.5 - 2^{-t}$

(a) $C(10) = 2.5 - 2^{-10} = 0.5$

(b) $C(t) = 2.5 \iff C = 2.5 - \frac{1}{2^t}$

As $t \rightarrow \infty \quad \frac{1}{2^t} \rightarrow \frac{1}{2^\infty} \rightarrow 0$

Approach to 0

(c) $2.4 = 2.5 - 2^{-t}$

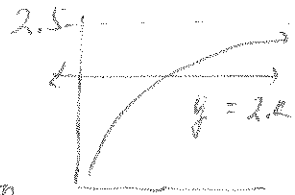
$2.4 - 2.5 = -2^{-t}$

$\Rightarrow +0.1 = -2^{-t}$

$-t = \frac{\log 0.1}{\log 2} \Rightarrow t = \frac{-\log 0.1}{\log 2}$

$t \approx 7.649 \text{ hr}$

$\approx \boxed{459 \text{ min}}$



#4 (a) $V = 100(1 + 0.05)^{20}$

$V = \$265$

$A = P \cdot \left(1 + \frac{r}{n}\right)^{nt}$

t: # of yrs.
A: \$ after t yrs.

(b) $A = 265 = 100(1 + 0.41\bar{6})^t$

where t is (months)

$\frac{265}{100} \left(1 + \frac{5}{12}\right)^t$

P: Initial Investment.

r: Interest rate in decimal

n: #s of compounds

#4 (b)

$$\log 2.65 = \log \left(1 + \frac{5}{1200} \right)^t$$

$$t = \frac{\log 2.65}{\log \left(1 + \frac{5}{1200} \right)} \approx 234.381$$

≈ 235 months

#5

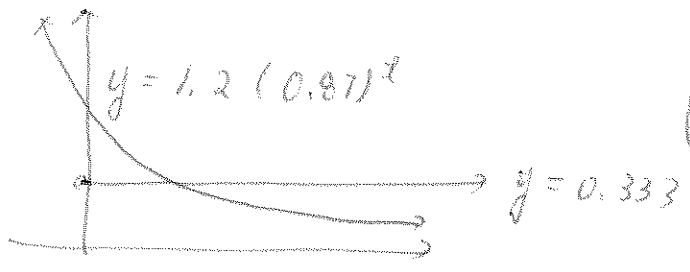
$$D(t) = 1.2 [0.87]^t \quad t \geq 0$$

D: mg/l. t: hrs.

(a) $t = 0$ $D = 1.2 \frac{\text{mg}}{\text{l}}$

(b) $t = 3$ $D = (1.2)(0.87)^3 \approx 0.79 \frac{\text{mg}}{\text{l}}$

(c) $0.333 = 1.2 [0.87]^t$



$t = 9.21$ hrs.