

30 Unit 3 Quiz 2

① a) $8^{3x-1} = 16^{4-x}$
 $(2^3)^{3x-1} = (2^4)^{4-x}$
 $2^{9x-3} = 2^{16-4x}$
 $\therefore 9x-3 = 16-4x$
 $13x = 19$
 $x = \frac{19}{13}$

b) $2(5^{4x-1}) + 7 = 9$
 $2(5^{4x-1}) = 2$
 $5^{4x-1} = 1$
 $5^{4x-1} = 5^0$
 $\therefore 4x-1 = 0$
 $4x = 1$
 $x = \frac{1}{4}$

c) $3^{x+1} - 3^{x+4} = -2106$
 $3^x(3^1) - 3^x(3^4) = -2106$
 $3^x(3 - 3^4) = -2106$
 $3^x(-78) = -2106$
 $3^x = 27$
 $3^x = 3^3$
 $\therefore x = 3$

② Givens

$A_0 = 13000$

$A = ?$

$b = 1 - 0.35$

$= 0.65$

Let t represent # of years

Let A represent the value of the car.

$A = 13000(0.65)^t$

③ Givens

$b = \frac{1}{2}$

$t = 21$ hours

$A = 87.5$

$a_0 = 700$

$h = ?$

$A = a_0 \left(\frac{1}{2}\right)^{\frac{t}{h}}$
 $87.5 = 700 \left(\frac{1}{2}\right)^{\frac{21}{h}}$

$\frac{87.5}{700} = \left(\frac{1}{2}\right)^{\frac{21}{h}}$

$\frac{875}{7000} = \left(\frac{1}{2}\right)^{\frac{21}{h}}$

$\frac{1}{8} = \left(\frac{1}{2}\right)^{\frac{21}{h}}$

$\left(\frac{1}{2}\right)^3 = \left(\frac{1}{2}\right)^{\frac{21}{h}}$

$\therefore 3 = \frac{21}{h}$

$h = 7$

\therefore half-life is 7 hours

$$\textcircled{4} f(x) = -2^{\frac{x}{4}} + 3 = -2^{\frac{1}{4}x} + 3 \quad (x, y) \rightarrow (4x, -y + 3)$$

Base is $y = 2^x \therefore$

$(-1, \frac{1}{2})$	\rightarrow	$(-4, 2.5)$
$(0, 1)$	\rightarrow	$(0, 2)$
$(1, 2)$	\rightarrow	$(4, 1)$
$(2, 4)$	\rightarrow	$(8, -1)$

