

HW5

P.16 3, 5, 6(a,b), 7, 8

$$\left. \begin{array}{l} 4+5 \\ 7+10 \end{array} \right\}$$

$$11+15$$

P.31 1(c,e,f), 2(c,e,h,j), 5, 6

P.16 (6) a. $a_{n+1} - a_n = -0.2a_n$ or $a_{n+1} = 0.8a_n$, $a_0 = 640$

$$\therefore a_n = 640(0.8)^n$$

b. Time drug is effective, solves $100 = 640(0.8)^n \Rightarrow n \ln(0.8) = \ln(\frac{5}{32})$

$$\therefore n = \frac{\ln(\frac{5}{32})}{\ln(0.8)} = 8.32 \text{ hr. Thus, drug is effective for 8 hrs.}$$

P.31 (2) h. $a_{n+1} = 0.8a_n - 100$. Equil. $a_e = 0.8a_e - 100 \Rightarrow 0.2a_e = -100$
 $\therefore a_e = -500$. Since derivative < 1 ($f'(a_n) = 0.8$), this equil. is stable.

P.31 (5) $P_{n+1} = P_n + 0.005P_n + 200 \therefore P_{n+1} = 1.005P_n + 200$, $P_0 = 5000$

General solution is $P_n = 1.005^n \cdot c + \frac{200}{-0.005} = 1.005^n \cdot c - 40000$. From initial condition $c = 45000 \Rightarrow P_n = 45,000(1.005)^n - 40000$. solving $P_n = 20000$, $60,000 = 45,000(1.005)^n \Rightarrow \frac{4}{3} = (1.005)^n \therefore n = \frac{\ln(\frac{4}{3})}{\ln(1.005)} = 57.68$. Exceeds \$20,000 in 58 months.