招生學年度	104	招生類別	碩士班
系所班別	運籌管理研究所碩士班（乙組）		
科目名稱	微積分		
注意事項	本考科可使用掌上型計算機		

一、Given

$$\pi_P(P_1,P_2,\theta_1,\theta_2,t)=\max_{P_1,P_2} V_P(P_1,P_2,\theta_1,\theta_2,t) \text{ for } \theta_1,\theta_2>0,\ t=1,\dots,T$$

$$\begin{aligned}
&V_P(P_1,P_2,\theta_1,\theta_2,t)\\
&=\lambda(1-\beta_1)\overline{F}(P_1)\left[P_1+\pi_P(\theta_1-1,\theta_2,t-1)\right]\\
&+\lambda(1-\beta_1)F(P_1)(1-\beta_2)\overline{F}(P_2)\left[P_2+\pi_P(\theta_1,\theta_2\text{-}1,t-1)\right]\\
&+\lambda(1\text{-}\beta_1)F(P_1)\beta_2\left\{\int_{P_2}^{R}\left[\alpha P_2+(1-\alpha)c_2\right]f(x)dx+\int_{c_2}^{P_2}\left[\alpha P_2+(1-\alpha)c_2\right]f(x)dx+\overline{F}(c_2)\times\pi_P(\theta_1,\theta_2\text{-}1,t-1)\right\}\\
&+\lambda\beta_1\left\{\int_{P_1}^{R}\left[\alpha P_1+(1-\alpha)c_1\right]f(x)dx+\int_{c_1}^{P_1}\left[\alpha P_1+(1-\alpha)c_1\right]f(x)dx+\overline{F}(c_1)\pi_P(\theta_1-1,\theta_2,t-1)\right\}\\
&+\lambda\beta_1F(c_1)(1-\beta_3)\overline{F}(P_2)\left[P_2+\pi_P(\theta_1,\theta_2-1,t-1)\right]\\
&+\lambda\beta_1F(c_1)\beta_3\left\{\int_{P_2}^{R}\left[\alpha P_2+(1-\alpha)c_2\right]f(x)dx+\int_{c_2}^{P_2}\left[\alpha P_2+(1-\alpha)c_2\right]f(x)dx+\overline{F}(c_2)\pi_P(\theta_1,\theta_2-1,t-1)\right\}\\
&+\left\{1-\lambda\left[(1-\beta_1)\left[\overline{F}(P_1)+(1-\beta_2)F(P_1)\overline{F}(P_2)+\beta_2F(P_1)\overline{F}(c_2)\right]\right.\right.\\
&\left.\left.-\beta_1\left[\overline{F}(c_1)+(1-\beta_3)F(c_1)\overline{F}(P_2)+\beta_3F(c_1)\overline{F}(c_2)\right]\right]\right\}\pi_P(\theta_1,\theta_2,t-1)
\end{aligned}$$

Here $\overline{F}(x)$ is assumed as the Weibull distribution with shape parameter 2 and scale parameter 80. (1) Try to calculate the Hessian matrix and (2) State the optimal V occurred under which conditions of P_1 and P_2.（25/25 分，共 50 分）

二、 $\int_a^b (|x-k|+|x+k|)dx$ （15 分）

三、何謂黎曼和(Riemann sum)數列？（15 分）

四、Find the area of the region bounded by $y = x^2$ and the line passing through (5, 3) and (-3, 0) （20 分）