科目：微積分　　　　　　　　　　系所組：企業管理學系管理學碩士班乙組

Notice: Please list your computation in details on answer sheet; scientific or financial calculators can not be used; round off to 2 th decimal place.

1. If a bullet from a 9-millimeter pistol is fired straight up from the ground, its height t seconds after it is fired will be $s(t) = 40t + \dfrac{1000}{t+3}$ feet (neglecting air resistance) for $0 \le t \le 20$.

   (a) Find the velocity function. (8%)

   (b) Find the time t when the bullet will be at its maximum height. (8%)

   (c) Find the maximum height the bullet will reach. (8%)

2. $p = 3 - \ln 2x$ is a company's price function, where p is the price (in dollars) at which quantity x (in thousands) will be sold.

   (a) Find the revenue function $R(x)$. (8%)

   (b) Find the quantity and price that will maximize revenue. (8%)

3. Find each indefinite integral.

   (a) $\displaystyle\int \frac{x^3 + x^2 - x + 1}{x^2} dx$　(8%)

   (b) $\displaystyle\int \frac{(\sqrt{x} - 1)^2}{x^2} dx$　(8%)

   (c) $\displaystyle\int \frac{\ln(x+1)}{\sqrt{x+1}} dx$　(9%)

   (d) $\displaystyle\int \frac{e^{\frac{1}{x}}}{x^2} dx$　(8%)

4. Find each definite integral.

   (a) $\displaystyle\int_0^{\ln e} e^{2x} dx$　(9%)

   (b) $\displaystyle\int_1^2 \frac{(x+1)^3}{x^2} dx$　(9%)

   (c) $\displaystyle\int_0^1 \sqrt{2x}(\sqrt{x} + \sqrt{2}) dx$　(9%)