銘傳大學八十八學年度資訊管理研究所碩士班招生考試

第二節

微積分 試題

所有答案請填寫於答案內禁止使用電子計算機

壹、 填充題：(每題五分共五十分，填入答案即可不需過程)

(a) $\lim_{x\to 0}\frac{e^{h+x}-e^{h}}{2x}$ = ___(a)___

(b) $\lim_{x\to 0}\frac{1-\cos(x)}{x^2}$ = ___(b)___

(c) $\lim_{n\to\infty}(1+\frac{t}{n})^{n}$ = ___(c)___

(d) $\frac{d3^{x}}{dx}$ = ___(d)___

(e) $\frac{dy}{dx}=(1+y^2)e^{x}$, Then y = ___(e)___

(f) $\int_{0}^{\pi/2}\sin(x)^5\cos(x)dx$ = ___(f)___

(g) $\int\frac{x+1}{x^2-x}dx$ = ___(g)___

(h) $\int_{0}^{4}\int_{x=0.5y}^{x=0.5y+1}\frac{2x-y}{2}dxdy$ = ___(h)___

(i) Let $f(x) = x^3\sin(x)$, find $f^{(6)}(0)$ = ___(i)___

(j) $\int_{-0.5\pi}^{1.5\pi}(x-0.5\pi)^4\cos(x)dx$ = ___(j)___

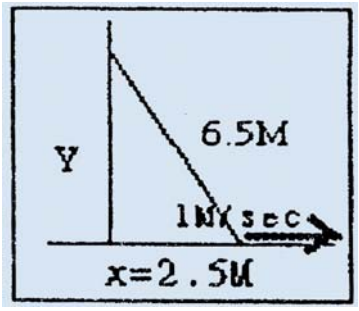
貳、 計算機：(每題十分共五十分，必須詳細寫下過程，否則不予計分)

(A) Find the centroid of the region in the first quadrant that is bounded above by the line y=x and below by the parabola $y = x^2$.

(B) Let $f(x) = (x^3 + x) / x^2$. Provide the necessary information and graph the function f.

(C) Determine whether $\sum_{n=1}^{\infty}\frac{1}{n(n+1)}$ converges. If it does, find the sum.

(D) A ladder 6.5M long rests on horizontal ground and leans against a vertical wall. The foot of the ladder is pulled away from the wall at the rate of 1M/sec. How fast is the top sliding down the wall when the foot is 2.5M from the wall.



(E) Use Taylor's formula to find a quadratic polynomial that approximates f(x, y) = sin(x)sin(y) near the origin. How accurate is the approximation if $|x| < 0.1$?

試題完