$\int_0^2 \int_0^{\sqrt{y}} \exp(-x^5 - y^4)dxdy =$

A) $\int_0^4 \int_{x^2}^4 \exp(-x^5 - y^4)dydx$; B) $\int_0^2 \int_{\sqrt{x}}^{\sqrt{2}} \exp(-x^5 - y^4)dydx$;

C) $\int_0^{\sqrt{2}} \int_{x^2}^2 \exp(-x^5 - y^4)dydx$; D) $\int_0^2 \int_{x^2}^2 \exp(-x^5 - y^4)dydx$.

Evaluate $\int_0^2 \int_{-\sqrt{4-y^2}}^{\sqrt{4-y^2}} e^{-x^2-y^2}\, dx\, dy =$ __(9)__ .

Let $D=\{(x,y) \mid x^2 + y^2 \le 3, y \ge 0\}$ be a lamina with density $\rho(x,y) = y$. Then, the center of mass $(\bar{x}, \bar{y}) =$ __(5)__.

$$\int_0^2 \frac{\cos x}{\sin x + \sin(2-x)}\, dx = ?$$

Let $x = r\cos\theta$ and $y = r\sin\theta$. Then $\frac{\partial x}{\partial r}\cdot\frac{\partial y}{\partial \theta} - \frac{\partial x}{\partial \theta}\cdot\frac{\partial y}{\partial r} =$ ____(2)____

已知 $\lim\limits_{x\to 0}[\alpha \arctan\frac{1}{x} + (1+|x|)^{\frac{1}{x}}]$ 存在，求 α 的值.

$$\left(1-\frac{1}{4}\right)\left(1-\frac{1}{9}\right)\left(1-\frac{1}{16}\right)\cdots\left(1-\frac{1}{n^2}\right)\cdots = ?$$

(a) Given $\varepsilon = 0.1$, find a number $\delta > 0$ such that if $0 < |x-3| < \delta$, then $|1/(x+1) - 1/4| < 0.1$. (*4 points*)

(b) Use ε, δ languages to show that $\lim\limits_{x\to 3} 1/(1+x) = 1/4$. (*8 points*)

If $f(x)=e^{x^3}$, then $f^{(3n)}(0)=$

(A) 0; (B) $n!$; (C) $(3n)!$; (D) $\frac{(3n)!}{n!}$.

令 $f(x,y)=(x+y)\sin\frac{1}{x}\sin\frac{1}{y}$。討論以下兩極限是否存在; 若存在, 則求其值:

(a) $\lim_{x\to 0}\left(\lim_{y\to 0} f(x,y)\right)$, 答：___(2a)___。

(b) $\lim_{(x,y)\to(0,0)} f(x,y)$, 答: ___(2b)___。

(4) 设函数 $f(x)$ 在区间 $[0,1]$ 上连续，则 $\int_0^1 f(x)dx=$

(A) $\lim_{n\to\infty}\sum_{k=1}^{n} f\left(\frac{2k-1}{2n}\right)\frac{1}{2n}$.

(B) $\lim_{n\to\infty}\sum_{k=1}^{n} f\left(\frac{2k-1}{2n}\right)\frac{1}{n}$.

(C) $\lim_{n\to\infty}\sum_{k=1}^{2n} f\left(\frac{k-1}{2n}\right)\frac{1}{n}$.

(D) $\lim_{x\to 0}\sum_{k=1}^{2n} f\left(\frac{k}{2n}\right)\cdot\frac{2}{n}$.

$$\int_0^x\left(\int_0^u f(t)dt\right)du=\int_0^x f(u)(x-u)du.$$

已知曲线 $C:\begin{cases} x^2+2y^2-z=6 \\ 4x+2y+z=30 \end{cases}$，求 C 上的点到 xoy 坐标面距离的最大值.

(6 %) Find the slope of tangent to the curve $x^3 + y^3 - 9xy = 0$ at the point $(2, 4)$.

Find the Maclaurian series for the function $f(x) = x\sin(x^2+1)$ and also indicate the interval of convergence. (*10 points*)

由方程組 $\begin{cases} u = x^2 + xy - y^2 \\ v = 2xy + y^2 \end{cases}$，定義求在 $(x, y) = (2, -1)$ 的 $(\frac{\partial x}{\partial u})_v$ 及 $(\frac{\partial x}{\partial v})_y$