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

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 $D = \left\{ (x, y) \middle| x^2 + y^2 \le 3, y \ge 0 \right\}$ be a lamina with density $\rho(x, y) = y$. Then, the center of mass $\left(\overline{x}, \overline{y}\right) =$ ____(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$\lim\limits_{x\to 0}[\alpha\arctan\dfrac{1}{x}+\left(1+|x|\right)^{\frac{1}{x}}]$存在，求$\alpha$的值.

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

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)____。

(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 $\lim_{x \to 3} 1/(1 + x) = 1/4$. (*8 points*)

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

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

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

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

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

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

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

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

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 $\left\{\begin{array}{l} u = x^2 + xy - y^2 \\ v = 2xy + y^2 \end{array}\right.$, 定義求在 $(x, y) = (2, -1)$ 的 $(\frac{\partial x}{\partial u})_v$ 及 $(\frac{\partial x}{\partial v})_y$。