Question 1

Not yet answered

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Time left 0:59:54

Change the integral $\int_0^{\pi}\int_0^{2}\int_r^{2} r^3\,dz\,dr\,d\theta$ **from cylindrical to Cartesian coordinates:**

(A) $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{\sqrt{x^2+y^2}}^{2}\sqrt{x^2+y^2}\;dzdydx$

(B) $\int_{-2}^{2}\int_{0}^{\sqrt{4-x^2}}\int_{\sqrt{x^2+y^2}}^{2}(x^2+y^2)dzdydx$

(C) $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{\sqrt{x^2+y^2}}^{2}(x^2+y^2)^{\frac{3}{2}}\;dzdydx$

(D) $\int_{-2}^{2}\int_{0}^{\sqrt{4-x^2}}\int_{\sqrt{x^2+y^2}}^{2}(x^2+y^2)^{\frac{3}{2}}\;dzdydx$

(E) $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{-\sqrt{x^2+y^2}}^{\sqrt{x^2+y^2}}(x^2+y^2)dzdydx$

Question **2**

Not yet answered

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Time left 0:55:31

Let $f(x,y) = \frac{4x^2 \tan^2 y}{x^2+2y^2}$. Then $\lim_{(x,y)\to(0,0)} f(x,y)$

A) does not exist since if (x,y) approaches $(0,0)$ along the line $x = 0$ the limit is 0 and if (x,y) approaches $(0,0)$ along the curve $x = y$ the limit is 2.

B) does not exist since $\frac{0}{0}$ is an indeterminate form.

C) exists and equals 0 by using Squeeze Theorem since $0 \le \frac{4x^2 \tan^2 y}{x^2+2y^2} \le 4\tan^2 y$ and $\lim_{(x,y)\to(0,0)} 4\tan^2 y = 0$.

D) does not exist since if (x,y) approaches $(0,0)$ along the line $x = 2$ the limit is 0 and if (x,y) approaches $(0,0)$ along the line $y = 3$ the limit is ∞.

E) exists and equals 0 since $f(x,y)$ approaches $(0,0)$ along any line of the form $y = mx$ the limit is 0.

Question 3

Not yet answered

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Time left 0:49:51

The volume of the solid region enclosed by the plane $2x + 3y + z = 120$, the cylinder $y = x^2$, and the planes $y = 9$, $z = 0, x = 0$, in the first octant is:

(A) $\int_0^3 \int_{x^2}^9 \int_0^{120+2x+3y} dzdydx$

(B) $\int_0^3 \int_{x^2}^9 \int_0^{120-2x-3y} dzdydx$

(C) $\int_{-3}^3 \int_{x^2}^9 \int_0^{120-2x-3y} dzdydx$

(D) $\int_{-3}^3 \int_9^{x^2} \int_0^{120-2x-3y} dzdydx$

(E) $\int_0^3 \int_{\sqrt{x}}^9 \int_0^{120-2x-3y} dzdydx$

To maximize and minimize $f(x,y) = e^{-xy}$, subject to the constraint $x^2 + 4y^2 = 1$ we need to solve these Lagrange equations:

(A)
$$-ye^{-xy} = 8\lambda y$$
$$-xe^{-xy} = 2\lambda x$$
$$x^2 + 4y^2 = 1$$

(B)
$$-ye^{xy} = 2\lambda x$$
$$-xe^{xy} = 8\lambda y$$
$$x^2 + 4y^2 = 1$$

(C)
$$-ye^{-xy} = 2\lambda x$$
$$-xe^{-xy} = 8\lambda y$$
$$x^2 + 4y^2 = 1$$

(D)
$$ye^{-xy} = 2\lambda x$$
$$xe^{-xy} = 8\lambda y$$
$$x^2 + 4y^2 = 1$$

(E)
$$e^{-xy} = \lambda x^2$$
$$e^{-xy} = 4\lambda y^2$$
$$x^2 + 4y^2 = 1$$

Time left 0:40:59

Question 5

Not yet answered

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The value of this integral $\int_{-2}^{2}\int_{0}^{\sqrt{4-x^2}} \frac{x^2}{x^2+y^2}\,dy\,dx$ **is:**

(A) $\frac{\pi}{4}$

(B) π

(C) $\frac{\pi}{2}$

(D) 2π

(E) 0

Time left 0:28:18

Question 7

Not yet answered

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The Directional derivative of the function $f(x, y) = \ln(x^8 + y^8)$ at $(1, -1)$ in the direction of the unit vector that makes an angle $\frac{3\pi}{4}$ with the positive $x-axis$.

A) $2\sqrt{2}$.

B) $-2\sqrt{2}$.

C) $4\sqrt{2}$.

D) $-4\sqrt{2}$.

E) $3\sqrt{2}$.

Time left 0:16:12

Question 8

Not yet answered

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The equation $\rho^2 = \sec 2\varphi$, is:

(A) a hyperboloid of one sheets.

(B) a hyperboloid of two sheet.

(C) a paraboloid.

(D) a hyperbolic paraboloid.

(E) a cone.

Not yet answered

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Change the integral

$$\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{\sqrt{3x^2+3y^2}}^{\sqrt{16-x^2-y^2}} \sin\sqrt{x^2+y^2+z^2}\,dzdydx$$

from Cartesian to spherical coordinates:

(A) $\int_0^{\frac{\pi}{6}}\int_0^{2\pi}\int_0^{4} \rho^2 \sin\rho \sin\varphi \, d\rho d\varphi d\theta$

(B) $\int_0^{2\pi}\int_0^{\frac{\pi}{6}}\int_0^{4} \rho^2 \cos\rho \sin\varphi \, d\rho d\varphi d\theta$

(C) $\int_0^{\pi}\int_0^{\frac{\pi}{6}}\int_0^{4} \rho^2 \sin\rho \sin\varphi \, d\rho d\varphi d\theta$

(D) $\int_0^{2\pi}\int_0^{\frac{\pi}{6}}\int_0^{4} \rho^2 \sin\rho \sin\varphi \, d\rho d\varphi d\theta$

(E) $\int_0^{2\pi}\int_0^{\frac{\pi}{3}}\int_0^{4} \rho^2 \sin\rho \sin\varphi \, d\rho d\varphi d\theta$

Time left 0:10:37

Question 10

Not yet answered

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Let $\vec{a}$ and $\vec{b}$ be two vectors such that $\|\vec{a}\| = 2$, $\|\vec{b}\| = 5$ and $\|\vec{a} - 2\vec{b}\| = \sqrt{40}$. Then $\vec{b} \cdot \vec{a}$ equals

A) 16

B) 10

C) 22

D) 5

E) 25

Time left 0:07:47

Question 11

Not yet answered

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The point of intersection between the plane $P: x + 2y + 6z = 6$ and the Line $L: x = 8 + 6t,\ y = -2t, z = 1 + t$ is

A) $(2,\ 2, 0)$.

B) $(-4, -4, 3)$.

C) $(10, -2, 0)$.

D) $(40, -\ 8, -3)$.

E) $(8,\ 8, -3)$.

Question 13

Not yet answered

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Time left 0:02:51

Let $C_1: \vec{r}_1(t) = \langle 3-t,\ t-2\ ,\ t^2 \rangle$ and $C_2:\ \vec{r}_2(k) = \langle k,\ 1-k,\ k^2+3 \rangle$ be two curves intersect at the point $P(1,0,4)$. Then the following vector $\vec{\boldsymbol{n}}$ is **perpendicular** to both of the tangent lines of C_1 and C_2 at $P(1,0,4)$.

A) $\vec{\boldsymbol{n}} = \langle 2, 6, -2 \rangle$.

B) $\vec{\boldsymbol{n}} = \langle 6, 6, 0 \rangle$.

C) $\vec{\boldsymbol{n}} = \langle 10, 6, -2 \rangle$.

D) $\vec{\boldsymbol{n}} = \langle -6, 6, 0 \rangle$.

E) $\vec{\boldsymbol{n}} = \langle -8, 8, 0 \rangle$.

Time left 0:02:11

Question **14**

Not yet answered

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The curvature of the function $y = \cos 3x$ is

(A) $\dfrac{-9\cos 3x}{(1+9\sin^2 3x)^{\frac{3}{2}}}$

(B) $\dfrac{3|\sin 3x|}{(1+9\cos^2 3x)^{\frac{3}{2}}}$

(C) $\dfrac{9\cos 3x}{(1+9\sin^2 3x)^{\frac{3}{2}}}$

(D) $\dfrac{9|\cos 3x|}{(1+9\sin^2 3x)^{\frac{3}{2}}}$

(E) $\dfrac{9|\cos 3x|}{(1-9\sin^2 3x)^{\frac{3}{2}}}$

Not yet answered

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Time left 0:00:32

$\int_0^{\ln 3}\int_{e^y}^{3} f(x,y)\,dx\,dy$, **when we reverse the order of integration, we will get:**

(A) $\int_{e^y}^{3}\int_0^{\ln 3} f(x,y)\,dy\,dx$

(B) $\int_1^{3}\int_0^{\ln x} f(x,y)\,dy\,dx$

(C) $\int_0^{\ln 3}\int_{e^x}^{3} f(x,y)\,dy\,dx$

(D) $\int_1^{3}\int_0^{\ln 3} f(x,y)\,dy\,dx$

(E) $\int_0^{3}\int_0^{\ln x} f(x,y)\,dy\,dx$

Not yet answered

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Time left 0:00:22

If $x = \dfrac{y^2 - x\ln z}{z}$ **, then** $\dfrac{\partial x}{\partial y}$ **is:**

(A) $\dfrac{2y}{z-\ln z}$

(B) $-\dfrac{z+\ln z}{2y}$

(C) $\dfrac{z+\ln z}{2y}$

(D) $-\dfrac{2y}{z+\ln z}$

(E) $\dfrac{2y}{z+\ln z}$

Time left 0:00:13

If $x = \frac{y^2 - x\ln z}{z}$ **, then** $\frac{\partial x}{\partial y}$ **is:**

(A) $\frac{2y}{z-\ln z}$

(B) $-\frac{z+\ln z}{2y}$

(C) $\frac{z+\ln z}{2y}$

(D) $-\frac{2y}{z+\ln z}$

(E) $\frac{2y}{z+\ln z}$