If the volume of the solid bounded by the plane $z = 4$ and the paraboloid $z = 5 - x^2 - y^2$ is given by $V = \int_0^{a\pi} \int_0^b (c - r^2) r \, dr d\theta$, then $a + b + c =$

Select one:

- 4
- 6
- 7
- 8
- 9

Which of the following statement(s) is/are TRUE ?

(I) For any vector $\vec{u}$ and $\vec{v}$, $|\vec{u}+\vec{v}|=|\vec{u}|+|\vec{v}|$

(II) For any vector $\vec{u}$ and $\vec{v}$, $(\vec{u}\times\vec{v})\cdot\vec{u}=0$

(III) If $\vec{u}\times\vec{v}=\vec{0}$, then $\vec{u}=\vec{0}$ or $\vec{v}=\vec{0}$

Select one:

- ○ (III) only
- ○ (I) and (II)
- ◉ (II) only
- ○ (I) only
- ○ (I)and (III)

Clear my choice

If $\int_0^2 \int_{y/2}^1 f(x,y)\,dx dy = \int_0^a \int_b^{cx} f(x,y)\,dy dx$, then $a+b+c=$

By converting to polar coordinates,

$$\int_{-5}^{5}\int_{0}^{\sqrt{25-x^2}}(x^2+y^2)^{3/2}\,dy\,dx=$$

Select one:

- ○ $5^5\pi$
- ○ $\frac{4^5\pi}{5}$
- ○ $2(5)^4\pi$
- ○ $\frac{\pi}{5}$
- ◉ $5^4\pi$

Clear my choice

The integral $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{2-\sqrt{4-x^2-y^2}}^{2+\sqrt{4-x^2-y^2}}(x^2+y^2+z^2)^{5/2}\,dz\,dy\,dx$ can be written as $\int_0^{2\pi}\int_0^{a\pi}\int_0^{b\cos\phi}\rho^{c}\sin\phi\,d\rho\,d\phi\,d\theta$, then $a+b+\frac{c}{2}=$

Select one:

- (●) 8
- ( ) 11
- ( ) 9
- ( ) 7
- ( ) 10

Clear my choice

The Jacobian of the transformation $u=\frac{1}{2}(x+y)$ and $v=\frac{1}{2}(y-x)$ is $J(u,v)=$

Select one:

- ( ) 4
- ( ) 8
- ( ) −2
- ( ) 1
- (●) 2

The integral $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{2-\sqrt{4-x^2-y^2}}^{2+\sqrt{4-x^2-y^2}}(x^2+y^2+z^2)^{5/2}\,dz\,dy\,dx$ can be written as $\int_0^{2\pi}\int_0^{a\pi}\int_0^{b\cos\phi}\rho^c\sin\phi\,d\rho\,d\phi\,d\theta$, then $a+b+\frac{c}{2}=$

Select one:

- 11
- 9
- 7
- 10
- 8

Clear my choice

The length of the curve $r(t)=t\,\mathrm{i}+\frac{2}{3}t^{3/2}\,\mathrm{j},\ \ 0\leq t\leq 3,$ is

Select one:

- $\frac{22}{3}$

Let $f(x, y) = 2y\cos(xy)$. Then the directional derivative of f at the point $(0, 1)$ in the direction of a unit vector making an angle $\theta = \frac{\pi}{4}$ with the $x-$axis is

Select one:

- ○ $\frac{1}{\sqrt{2}} + \frac{1}{2}$
- ○ $-\sqrt{2}$
- ○ $-\frac{1}{\sqrt{2}} - \frac{1}{2}$
- ● $\sqrt{2}$
- ○ $\frac{\sqrt{2}}{2}$

Clear my choice

If $\int_0^2 \int_{y/2}^1 f(x,y)\, dx dy = \int_0^a \int_b^{cx} f(x,y)\, dy dx$, then $a+b+c=$

Select one:

- ○ 2
- ○ 1
- ◉ 3
- ○ $\frac{1}{2}$
- ○ $\frac{3}{2}$

Clear my choice

By **converting to polar coordinates,**

$\int_{-5}^{5} \int_0^{\sqrt{25-x^2}} (x^2+y^2)^{3/2}\, dy\, dx =$

Select one:

- ○ $5^5 \pi$
- ○ $\frac{4^5 \pi}{5}$

Given that f is a differentiable function with $f(1,1) = 2.1,\ f_x(1,1) = 3$, and $f_y(1,1) = 4$, use a **linear approximation** to estimate $f(1.1, 0.9)$

Select one:

- (selected) 2
- 2.1
- 1.9
- 2.2
- 1.8

Clear my choice

Using the transformation $x = \frac{u+v}{2}, \ y = \frac{u-v}{2}$, if $\int_R \int e^{\frac{x+y}{x-y}} \, dA = \frac{1}{2} \int_a^b \int_{cv}^{v} e^{\frac{u}{v}} \, du \, dv$, where R is the region in the xy–plane bounded by the lines $x - y = 2$, $x - y = 1$, $x = 0$, and $y = 0$, then $a + b - c =$

Select one:

- 2
- 3
- 0
- 4
- 1

Clear my choice

The tangential component of the acceleration of $r(t) = \cos^3 t\,\mathrm{i} + \sin^3 t\,\mathrm{j},\ \ 0 \le t \le \frac{\pi}{2}$, is

Select one:

- ○ $a_T = 3\sin t$
- ○ $a_T = 3\cos t$
- ◉ $a_T = 3\sin t\cos t$
- ○ $a_T = 3\cos 2t$
- ○ $a_T = 3\sin 2t$

Clear my choice

Let $\nabla f(1, -1, 1) = 2\mathrm{i} + 3\mathrm{j} + \mathrm{k}$ for a function $f(x, y, z)$. If the equation of the tangent plane at the point $(1, -1, 1)$ is given by $ax + by + z = d$, then $a + b + d =$

Select one:

- ○ 5
- ○ 6
- ○ -5

The maximum value of $f(x, y, z) = x + y - z$, subject to the constraint $z = 4x^2 + y^2$ is equal to

Select one:

- $\frac{5}{16}$
- -2
- $\frac{17}{48}$
- 5
- 0

Next page

By converting to polar coordinates, $\int_{-5}^{5} \int_{0}^{\sqrt{25-x^2}} (x^2+y^2)^{3/2}\, dy\, dx =$

Select one:

- $\frac{4^5\pi}{5}$
- $5^4\pi$
- $5^5\pi$
- $\frac{\pi}{5}$
- $2(5)^4\pi$

... $5 - x^2 - y^2$ is given by

The absolute maximum of $f(x, y) = x^2 + 2xy - 2y$ on the closed triangular region bounded by the lines $y = 2x,\ y = 0,\ x = 2$, is equal to

Select one:

- -10
- -6
- 12
- 4
- 1

Clear my choice

The equation $y^2 - x^2 - z^2 + 2 = 0$ has a graph of hyperboloid of

Select one:

- two sheets and $z-$axis as an axis of symmetry
- two sheets and $y-$axis as an axis of symmetry
- two sheets and $x-$axis as an axis of symmetry
- one sheet and $y-$axis as an axis of symmetry
- one sheet and $x-$axis as an axis of symmetry

If $u = xz^2 + y\ln(xy + z)$, $x = s^2 + t$, $y = e^{st}$, $z = s\tan^{-1}t$, then the value of $\frac{\partial u}{\partial t}$ at $(s, t) = (0, 1)$ i

Select one:

- ○ 3
- ◉ 1
- ○ 4
- ○ 2
- ○ 0

Clear my choice

The tangential component of the acceleration of $\mathbf{r}(t) = \cos^3 t\,\mathbf{i} + \sin^3 t\,\mathbf{j},\ \ 0 \le t \le \frac{\pi}{2}$, is

Select one:

- ○ $a_T = 3\cos 2t$
- ○ $a_T = 3\sin 2t$
- ◉ $a_T = 3\sin t\cos t$
- ○ $a_T = 3\cos t$
- ○ $a_T = 3\sin t$

Clear my choice

Which of the following points is in the domain of $f(x, y) = \ln(x + y + 1)e^{1-y^2}$

Select one:

- $(0, -1)$
- $(-2, -1)$
- $(-1, 0)$
- $(-1, 1)$
- $(-2, 1)$

Evaluate the following integral by **reversing the order of integration** $\int_0^4 \int_{1-\frac{y}{4}}^1 \cos(x^2)\, dx\, dy =$

Select one:

- ○ $\sin(1)$
- ○ $2 - \sin(1)$
- ◉ $2\sin(1)$
- ○ $3\cos(1)$
- ○ π

Clear my choice

Let $f(x, y) = 2y\cos(xy)$. Then the directional derivative of f at the point $(0, 1)$ in the direction of a unit vector making an angle $\theta = \frac{\pi}{4}$ with the x−axis is

Select one:

- $\frac{\sqrt{2}}{2}$
- $-\sqrt{2}$
- $\frac{1}{\sqrt{2}} + \frac{1}{2}$
- $\sqrt{2}$
- $-\frac{1}{\sqrt{2}} - \frac{1}{2}$

If $f(x,y)=\begin{cases}\frac{y^2\sin^2 x}{x^4+y^4} & , \quad (x,y)\neq(0,0)\\ k & , \quad (x,y)=(0,0),\end{cases}$ then $f(x,y)$ is

Select one:

- (selected) not continuous at $(0,0)$ for all values of k
- continuous at $(0,0)$ if $k=1$
- continuous at $(0,0)$ if $k=0$
- continuous at $(0,0)$ if $k=\frac{1}{2}$
- continuous at $(0,0)$ for any real number k

Clear my choice

The function $f(x, y) = y^3 - 6y^2 + 3x^2y - 6x^2$ has

Select one:

- ○ two local minima and one saddle point
- ○ three local minima
- ○ two local maxima
- ◉ four critical points only
- ○ three saddle points

Clear my choice

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Evaluate the following integral by **reversing the order of integration** $\int_0^4 \int_{1-\frac{y}{4}}^1 \cos(x^2)\, dx\, dy =$

Select one:

- (selected) $2\sin(1)$
- $\sin(1)$
- $2 - \sin(1)$
- $3\cos(1)$
- π

Clear my choice

Evaluate the following integral by **reversing the order of integration** $\int_0^2 \int_{1-\frac{y}{2}}^1 \cos(x^2)\, dx\, dy =$

Select one:

- π
- $2\sin(1)$
- $2 - \sin(1)$
- $\sin(1)$
- $3\cos(1)$

Clear my choice

If θ is the obtuse angle between the two planes $x - y + 2z = 1443$ and $x + 2y - z = 2021$, then $\cos\theta =$

Select one:

- -1
- $-\frac{2}{\sqrt{3}}$
- $-\frac{1}{6}$
- $-\frac{1}{2}$
- $-\frac{2}{3}$

The absolute maximum of $f(x, y) = x^2 + 2xy - 2y$ on the closed triangular region bounded by the lines $y = 2x$, $y = 0$, $x = 2$, is equal to

Select one:

- 12
- 1
- -10
- -6

If the volume of the solid bounded by the plane $z = 4$ and the paraboloid $z = 5 - x^2 - y^2$ is given by $V = \int_0^{a\pi} \int_0^b (c - r^2) r \, dr d\theta$, then $3a + b - c =$

Select one:

- (selected) 6
- 9
- 7
- 8
- 4

Clear my choice

If the vectors $\vec{u} = \mathrm{i} + 2\mathrm{j} + 3\mathrm{k}$, $\vec{v} = \mathrm{j} + \mathrm{k}$ and $\vec{w} = \mathrm{i} + x\mathrm{k}$ are coplaner (located in the same plane), then $2x =$

Select one:

- (selected) 2
- 3
- 0
- 1
- -1

Clear my choice

Question **3**

Not yet answered

Marked out of 2.00

Flag question

Evaluate the following integral by **reversing the order of integration** $\int_0^2 \int_{1-\frac{y}{2}}^{1} \cos(x^2)\, dx\, dy =$

Which of the following limits does not exist ?

(1) $\lim_{(x,y)\to(0,0)} \frac{x^4+y^4}{x^2+y^2}$

(2) $\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$

(3) $\lim_{(x,y)\to(0,0)} \frac{x+y}{\sqrt{x^2+y^2}}$

Select one:

- (1) and (2) only
- (1) only
- (2) and (3) only
- (3) only
- (2) only

Clear my choice

The integral $\int_{-2}^{2}\int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}}\int_{2-\sqrt{4-x^2-y^2}}^{2+\sqrt{4-x^2-y^2}} (x^2+y^2+z^2)^{3/2}\, dz\, dy\, dx$ can be written as $\int_0^{2\pi}\int_0^{a\pi}\int_0^{b\cos\phi} \rho^c \sin\phi\, d\rho\, d\phi\, d\theta$, then $a+b+\frac{c}{2}=$

Select one:

- 9
- 8
- 7
- 10
- 11

7

Evaluate the following integral by **reversing the order of integration** $\int_0^2\int_{\frac{y}{2}}^{1} \cos(x^2)\, dx\, dy =$

Select one:

- $\sin(1)$
- $2-\sin(1)$
- π
- $3\cos(1)$
- $2\sin(1)$

Using the transformation $x = \frac{u+v}{2}$, $y = \frac{u-v}{2}$, if $\int_R \int e^{\frac{x+y}{x-y}} \, dA = \frac{1}{2} \int_a^b \int_{cv}^{v} e^{\frac{u}{v}} \, du \, dv$, where R is the region in the xy–plane bounded by the lines $x - y = 2$, $x - y = 1$, $x = 0$, and $y = 0$, then $a - b - c =$

Select one:

- ○ 2
- ○ 3
- ○ 4
- ◉ 0
- ○ 1

Clear my choice

Given that f is a differentiable function with $f(1,1) = 2.1$, $f_x(1,1) = 3$, and $f_y(1,1) = 4$, use a **linear approximation** to estimate $f(1.1, 0.9)$

The absolute maximum of $f(x, y) = x^2 + 2xy - 2y$ on the closed triangular region bounded by the lines $y = 2x,\ y = 0,\ x = 2$, is equal to

Select one:

- ◉ 12
- ○ -6
- ○ 4
- ○ 1
- ○ -10

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Which of the following limits does not exist ?

(1) $\lim_{(x,y)\to(0,0)} \frac{x^4+y^4}{x^2+y^2}$

(2) $\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$

(3) $\lim_{(x,y)\to(0,0)} \frac{x+y}{\sqrt{x^2+y^2}}$

Select one:

- ○ (1) and (2) only
- ◉ (2) and (3) only
- ○ (1) only
- ○ (3) only
- ○ (2) only

Clear my choice

The domain of $f(x,y)=\sqrt{x^2-y^2}$ is

Select one:

- closed
- bounded
- neither closed nor open
- open

The tangential component of the acceleration of $\mathbf{r}(t)=\cos^3 t\,\mathbf{i}+\sin^3 t\,\mathbf{j},\ 0\le t\le \frac{\pi}{2}$, is

Select one:

- $a_T=3\cos 2t$
- $a_T=3\sin 2t$
- $a_T=3\sin t\cos t$
- $a_T=3\cos t$
- $a_T=3\sin t$

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Given that f is a differentiable function with $f(1,1) = 2.1$, $f_x(1,1) = 3$, and $f_y(1,1) = 4$, use a **linear approximation** to estimate $f(1.1, 0.9)$

Select one:

- (selected) 2
- 2.1
- 1.9
- 2.2
- 1.8

Clear my choice

If $f(x,y)=\begin{cases}\frac{y^2\sin^2 x}{x^4+y^4} & , \quad (x,y)\neq(0,0)\\ k & , \quad (x,y)=(0,0),\end{cases}$ then $f(x,y)$ is

Select one:

- continuous at $(0,0)$ if $k=1$
- continuous at $(0,0)$ for any real number k
- not continuous at $(0,0)$ for all values of k
- continuous at $(0,0)$ if $k=\frac{1}{2}$
- continuous at $(0,0)$ if $k=0$

Clear my choice

Let $f(x,y)=xy$. The slope of the tangent line at the point $(2,4)$ to the level curve of f that passes through the point $(2,4)$ is

Select one:

- 8

of

Let $f(x, y) = xy$. The slope of the tangent line at the point $(2, 4)$ to the level curve of f that passes through the point $(2, 4)$ is

Select one:

- ○ 8
- ○ -2
- ○ $-\frac{1}{2}$
- ○ 2
- ◉ $\frac{1}{2}$

Clear my choice

If $f(x,y) = \begin{cases} \frac{y^2 \sin^2 x}{x^4+y^4} & , \quad (x,y) \neq (0,0) \\ k & , \quad (x,y) = (0,0), \end{cases}$ then $f(x,y)$ is

Select one:

- ○ continuous at $(0,0)$ if $k = 1$
- ○ continuous at $(0,0)$ for any real number k
- ○ not continuous at $(0,0)$ for all values of k
- ● continuous at $(0,0)$ if $k = \frac{1}{2}$
- ○ continuous at $(0,0)$ if $k = 0$

The function $f(x, y) = y^3 - 6y^2 + 3x^2y - 6x^2$ has

Select one:

- ○ two local minima and one saddle point
- ○ two local maxima
- ○ three local minima
- ○ three critical points only
- ◉ two saddle points

Clear my choice

If (a, b, c) is the point of intersection between the two line
$x = 1 - t,\ y = 1,\ z = 1 + t$ and
$x = 1 + s,\ y = 1 + s,\ z = 1$, then $2a - b + c =$

Select one:

- ○ 2
- ◉ 0
- ○ 1
- ○ 3
- ○ -1

Clear my choice

Which of the following limits does not exist ?

(1) $\lim_{(x,y)\to(0,0)} \frac{x^4+y^4}{x^2+y^2}$

(2) $\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$

(3) $\lim_{(x,y)\to(0,0)} \frac{x+y}{\sqrt{x^2+y^2}}$

Select one:

- ○ (1) and (2) only
- ◉ (2) and (3) only
- ○ (1) only
- ○ (3) only
- ○ (2) only

Clear my choice