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Suppose $f(x, y) = x^3 e^{xy}$. Which one of the following is correct?

$$\frac{\partial f}{\partial x} = 3x^2 e^{xy} + x^3 y e^{xy}$$

$$\frac{\partial f}{\partial x} = 3x^2 y e^{xy}$$

$$\frac{\partial f}{\partial x} = 3x^2 e^{xy} + x^4 e^{xy}$$

$$\frac{\partial f}{\partial x} = 3x^2 e^{xy}$$

Let R be a closed region in two dimensional space. What does the double integral over R calculates?

Area of R.

Radius of inscribed circle in R.

Distance between two endpoints of R.

None of these

What is the distance between points (3, 2, 4) and (6, 10, -1)?

$$7\sqrt{2}$$

$$2\sqrt{6}$$

$$\sqrt{34}$$

$$7\sqrt{3}$$

----- planes intersect at right angle to form three dimensional space.

Three

8

12

There is one-to-one correspondence between the set of points on co-ordinate line and

Set of real numbers

Set of integers

Set of natural numbers

Set of rational numbers

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Let the function $f(x, y)$ has continuous second-order partial derivatives
 $(f_{xx}, f_{yy} \text{ and } f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let
 $D = f_{xx}(x_0, y_0) f_{yy}(x_0, y_0) - f_{xy}^2(x_0, y_0)$

If $D = 0$ then -----

f has relative maximum at (x_0, y_0)

f has relative minimum at (x_0, y_0)

f has saddle point at (x_0, y_0)

No conclusion can be drawn.

If $R = \{(x, y) / 0 \leq x \leq 2 \text{ and } 0 \leq y \leq 3\}$, then

$$\iint_R (1 - ye^{xy}) dA =$$

$$\int_0^2 \int_0^3 (1 - ye^{xy}) dy dx$$

$$\int_0^2 \int_0^3 (1 - ye^{xy}) dx dy$$

$$\int_2^3 \int_0^0 (1 - ye^{xy}) dx dy$$

$$\int_0^2 \int_2^3 (4xe^{2y}) dy dx$$

Suppose $f(x, y) = 2xy$ where $x = t^2 + 1$ and $y = 3 - t$. Which one of the following is true?

$$\frac{df}{dt} = 6t - 4t^2 - 2$$

$$\frac{df}{dt} = 6t - 2$$

$$\frac{df}{dt} = 4t^3 + 6t - 6$$

$$\frac{df}{dt} = -6t^2 + 12t - 2$$

Let i , j and k be unit vectors in the direction of x-axis, y-axis and z-axis respectively.

Suppose that $\vec{a} = 2i + 5j - k$. What is the magnitude of vector $\vec{a}$?

6

30

$\sqrt{30}$

$$\sqrt{28}$$

A straight line is ----- geometric figure.

One-dimensional

Two-dimensional

Three-dimensional

Dimensionless

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If $R = \{(x, y) / 0 \leq x \leq 2 \text{ and } 1 \leq y \leq 4\}$, then

$$\iint_R (6x^2 + 4xy^3) dA =$$

$$\int_1^4 \int_0^2 (6x^2 + 4xy^3) dy dx$$

$$\int_0^2 \int_1^4 (6x^2 + 4xy^3) dx dy$$

$$\int_1^4 \int_0^2 (6x^2 + 4xy^3) dx dy$$

$$\int_2^4 \int_0^1 (6x^2 + 4xy^3) dx dy$$

Which of the following formula can be used to find the Volume of a parallelepiped

with adjacent edges formed by the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$?

$$\left| \vec{a} \times (\vec{b} \times \vec{c}) \right|$$

$$\left| \vec{a} \cdot (\vec{b} \cdot \vec{c}) \right|$$

$$\left| \vec{a} \cdot (\vec{b} \times \vec{c}) \right|$$

$$\left| a \times \left(b \times c \right) \right|$$

The function $f(x, y) = \sqrt{y-x}$ is continuous in the region ----- and discontinuous elsewhere.

$$x \neq y$$

$$x \leq y$$

$$x > y$$

What is the relation between the direction of gradient at any point on the surface to the tangent plane at that point ?

parallel

perpendicular

opposite direction

No relation between them.

Suppose $f(x, y) = x^3 e^{xy}$. Which one of the statements is correct?

$$\frac{\partial f}{\partial y} = 3x^3 e^{xy}$$

$$\frac{\partial f}{\partial y} = x^3 e^{xy}$$

$$\frac{\partial f}{\partial y} = x^4 e^{xy}$$

$$\frac{\partial f}{\partial y} = x^3 y e^{xy}$$

Two surfaces are said to intersect orthogonally if their normals at every point common to them are -----

perpendicular

parallel

in opposite direction

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Let the function $f(x, y)$ has continuous second-order partial derivatives

$(f_{xx}, f_{yy} \text{ and } f_{xy})$ in some circle centered at a critical point (x_0, y_0) and let

$$D = f_{xx}(x_0, y_0) f_{yy}(x_0, y_0) - f_{xy}^2(x_0, y_0)$$

If $D > 0$ and $f_{xx}(x_0, y_0) < 0$ then f has -----

Relative maximum at (x_0, y_0)

Relative minimum at (x_0, y_0)

Saddle point at (x_0, y_0)

No conclusion can be drawn.

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If $R = \{(x, y) / 0 \leq x \leq 2 \text{ and } -1 \leq y \leq 1\}$, then

$$\iint_R (x + 2y^2) dA =$$

$$\int_{-1}^1 \int_0^2 (x + 2y^2) dy dx$$

$$\int_0^2 \int_1^{-1} (x + 2y^2) dx dy$$

$$\int_{-1}^1 \int_0^2 (x + 2y^2) dx dy$$

$$\int_1^2 \int_{-1}^0 (x + 2y^2) dx dy$$

If $f(x, y, z) = \frac{x^2 y}{z} + xyz$

then what is the value of $f(1, 1, 1)$?

$$f(1, 1, 1) = 1$$

$$f(1, 1, 1) = 2$$

$$f(1, 1, 1) = 3$$

$$f(1, 1, 1) = 4$$

If $R = \{(x, y) / 0 \leq x \leq 4 \text{ and } 0 \leq y \leq 9\}$, then

$$\iint_R (3x - 4x\sqrt{xy}) dA =$$

$$\int_0^9 \int_0^4 (3x - 4x\sqrt{xy}) dy dx$$

$$\int_0^4 \int_4^9 (3x - 4x\sqrt{xy}) dx dy$$

$$\int_4^9 \int_0^0 (3x - 4x\sqrt{xy}) dx dy$$

$$\int_0^4 \int_0^9 (3x - 4x\sqrt{xy}) dy dx$$

$$\text{Let } f(x, y) = 2 + x^2 + \frac{y^2}{4}$$

Q- Find the gradient of f

2MARKS

Q - Let the function $f(x, y)$ is continuous in the region R , where R is a rectangle as shown below.

complete the following equation

$$\iint_R f(x, y) \, dA = \int \int f(x, y) \, \underline{\hspace{2cm}}$$

2MARKS

Q.Find all critical points of the function

$$f(x, y) = 4xy - x^3 - 2y^2$$

Evaluate $\int_1^4 \int_0^2 (6x^2 + 4xy^3) \, dx \, dy$

Q-Evaluate the following double integral.

$$\iint (3 + 2x - 3y^2) \, dx \, dy$$

3MARKS

Q- Let $y = \frac{1}{x^2}$. If x changes from 3 to 3.3, find the approximate change in the value of y using differential dy .
3MARKS

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