

VIRTUAL UNIVERSITY OF PAKISTAN

A Good Education is a Foundation For a Better Future

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Best of luck!



Question No : 1 of 26

Marks: 1 (Budgeted Time 1 Min)

An ordered pair corresponds to ----- on the plane

Answer (Please select your correct option)

- ☐ A unique point
- ☐ A point in each quadrant
- ☐ Two points
- ☐ Infinite number of points



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Question No : 2 of 26

Marks: 1 (Budgeted Time 1 Min)

Plane is a special type of -----.

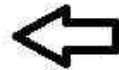
Answer (Please select your correct option)

☐ Curve

☐ Surface

☐ Sphere

☐ Cone



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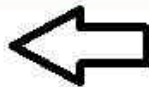
Question No : 3 of 26

Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

☐ Set of real numbers



☐ Set of integers

☐ Set of natural numbers

☐ Set of rational numbers

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Question No : 4 of 26

Marks: 1 (Budgeted Time 1 Min)

What is the general equation of parabola whose axis of symmetry is parallel to y-axis?

Answer (Please select your correct option)

☐ $y = ax^2 + b \quad (a \neq 0)$

☐ $x = ay^2 + b \quad (a \neq 0)$

☐ $y = ax^2 + bx + c \quad (a \neq 0)$

☐ $x = ay^2 + by + c \quad (a \neq 0)$



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Question No : 5 of 26

Marks: 1 (Budgeted Time 1 Min)

If the spherical coordinates of a point are $\left(2, \frac{\pi}{4}, 0\right)$, then z-coordinate in rectangular coordinate system is

Answer (Please select your correct option)

☐ 0

☐ -2

☐ 2

☐ $\sqrt{2}$

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Question No : 6 of 26

Marks: 1 (Budgeted Time 1 Min)

The function $z = \frac{1}{\sqrt{x+y}}$ is discontinuous at origin because at the point (0,0), it

Answer (Please select your correct option)

☐ has a jump

☐ has a hole

☐ approaches towards infinity

☐ approaches towards zero



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Question No : 7 of 26

Marks: 1 (Budgeted Time 1 Min)

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

Answer (Please select your correct option)

☐ $x \geq y$

☐ $x \neq y$

☐ $x \leq y$

☐ $x > y$

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Question No : 8 of 26

Marks: 1 (Budgeted Time 1 Min)

Let $w = f(x, y, z)$ and $x = g(r, s)$, $y = h(r, s)$, $z = t(r, s)$ then by chain rule $\frac{\partial w}{\partial r} = \dots\dots\dots$

Answer (Please select your correct option)

☐ $\frac{\partial w}{\partial x} \frac{\partial x}{\partial r} + \frac{\partial w}{\partial y} \frac{\partial y}{\partial r} + \frac{\partial w}{\partial z} \frac{\partial z}{\partial r}$

☐ $\frac{\partial w}{\partial r} \frac{\partial x}{\partial r} + \frac{\partial w}{\partial r} \frac{\partial y}{\partial r} + \frac{\partial w}{\partial r} \frac{\partial z}{\partial r}$

☐ $\frac{\partial w}{\partial x} \frac{\partial x}{\partial r} \frac{\partial x}{\partial s} + \frac{\partial w}{\partial y} \frac{\partial y}{\partial r} \frac{\partial y}{\partial s} + \frac{\partial w}{\partial z} \frac{\partial z}{\partial r} \frac{\partial z}{\partial s}$

☐ $\frac{\partial w}{\partial r} \frac{\partial r}{\partial x} + \frac{\partial w}{\partial r} \frac{\partial r}{\partial y} + \frac{\partial w}{\partial r} \frac{\partial r}{\partial z}$

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Question No : 9 of 26

Marks: 1 (Budgeted Time 1 Min)

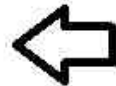
Every differentiable function is always

Answer (Please select your correct option)

☐ Piece wise continuous

☐ Discontinuous

☒ Continuous



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Question No : 10 of 26

Marks: 1 (Budgeted Time 1 Min)

The vector $\vec{a} \times \vec{b}$ is to both $\vec{a}$ and $\vec{b}$.

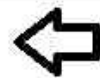
Answer (Please select your correct option)

☐ Opposite

☐ Equal

☒ Parallel

☐ Orthogonal



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Question No : 11 of 26

Marks: 1 (Budgeted Time 1 Min)

Gradient of a scalar function always results in a function.

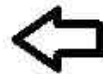
Answer (Please select your correct option)

☐ Scalar

☐ Continuous

☒ Vector

☐ Constant



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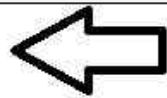
Question No : 12 of 26

Marks: 1 (Budgeted Time 1 Min)

The direction of gradient at any point on the surface is to the tangent plane at that point.

Answer (Please select your correct option)

- ☐ parallel
- ☐ perpendicular
- ☐ opposite direction
- ☐ None of these.



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Question No : 13 of 26

Marks: 1 (Budgeted Time 1 Min)

$f_x(p_0)(x - x_0) + f_y(p_0)(y - y_0) + f_z(p_0)(z - z_0) = 0$ is the equation of

Answer (Please select your correct option)

☐ Normal plane

☐ Point slope form of line

☐ Gradient of function $f(x, y, z)$

☒ Tangent plane

correct

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Question No : 14 of 26

Marks: 1 (Budgeted Time 1 Min)

For a function $z = f(x, y)$, the total differential is defined as

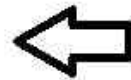
Answer (Please select your correct option)

☐ $dz = f_x(x, y)dx - f_y(x, y)dy$

☐ $dz = f_x(x, y)dx + f_y(x, y)dy$

☐ $dz = f_x(x, y)dy - f_y(x, y)dx$

☐ $dz = f_x(x, y)dy + f_y(x, y)dx$



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Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

For a function $f(x, y)$ to have both absolute maximum and minimum, it must be Continuous on set R.

Answer (Please select your correct option)

☐ a closed and bounded

correct

☐ an open and bounded

☐ a closed and unbounded

☐ an open and unbounded

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Question No : 16 of 26

Marks: 1 (Budgeted Time 1 Min)

The volume of parallelepiped with dimensions x, y, z is

Answer (Please select your correct option)

☐ $V = x^2 y^2 z^2$

☐ $V = x + y + z$

☐ $V = \sqrt{xyz}$

☐ $V = xyz$

correct

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Question No : 17 of 26

Marks: 1 (Budgeted Time 1 Min)

Let x be the length, width and height of a cube. The area of bottom will be

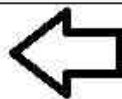
Answer (Please select your correct option)

☐ $A = x^2$

☐ $A = x^3$

☐ $A = xz$

☐ $A = x + x^2$



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Question No : 18 of 26

Marks: 1 (Budgeted Time 1 Min)

A double integral and iterated integral become identical provided that the integrand is over the given rectangular region.

Answer (Please select your correct option)

☐ Bounded

correct

☐ Discontinuous

☐ Continuous

☐ Defined

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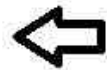
Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x, y) : 2 \leq x \leq 4 \text{ and } 0 \leq y \leq 1\}$, then $\iint_R (4xe^{2y}) dA =$

Answer (Please select your correct option)

☐ $\int_0^1 \int_2^4 (4xe^{2y}) dy dx$

☐ $\int_0^1 \int_2^4 (4xe^{2y}) dx dy$



☐ $\int_1^4 \int_0^2 (4xe^{2y}) dx dy$

☐ $\int_1^4 \int_0^2 (4xe^{2y}) dy dx$

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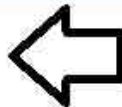
Question No : 20 of 26

Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x, y) : 0 \leq x \leq 2 \text{ and } 0 \leq y \leq 3\}$, then $\iint_R (1 - ye^{xy}) dA =$

Answer (Please select your correct option)

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



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

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

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

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Question No : 21 of 26

Marks: 2 (Budgeted Time 4 Min)

Write down the equation of a plane passing through the point $(2, -3, 1)$ and perpendicular to the vector $\vec{n} = 16\hat{i} + 6\hat{j} + 6\hat{k}$.

Answer (Please [click here to Add Answer](#))



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Question No : 22 of 26

Marks: 2 (Budgeted Time 4 Min)

State the condition when $\iint_R f(x, y) dA = \int_c^d \int_a^b f(x, y) dx dy = \int_a^b \int_c^d f(x, y) dy dx$ where R is the region of integration.

Answer (Please [click here to Add Answer](#))



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Question No : 23 of 26

Marks: 3 (Budgeted Time 6 Min)

Find the critical points for the function $f(x, y)$ where as $f_x = 2x + y$ and $f_y = 2y + x$.

Answer (Please [click here to Add Answer](#))



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Question No : 24 of 26

Marks: 3 (Budgeted Time 6 Min)

Evaluate the following double integral

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

Answer (Please [click here to Add Answer](#))



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Question No : 25 of 26

Marks: 5 (Budgeted Time 10 Min)

Consider a function $f(x, y) = x^3 - 3xy + y^3$. One of its critical point is $(1, 1)$. Find, whether $f(x, y)$ has relative maxima, relative minima or saddle point at $(1, 1)$.

Answer (Please [click here to Add Answer](#))



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Question No : 26 of 26

Marks: 5 (Budgeted Time 10 Min)

Use double integral in rectangular co-ordinates to compute area of the region bounded by the curves $y = x^2$ and $y = x + 2$.



Answer (Please [click here to Add Answer](#))



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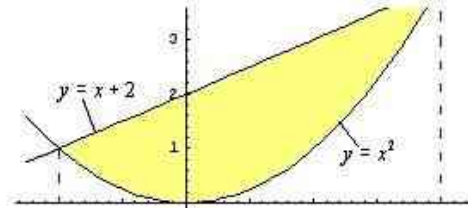
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Answer (Please [click here to Add Answer](#))

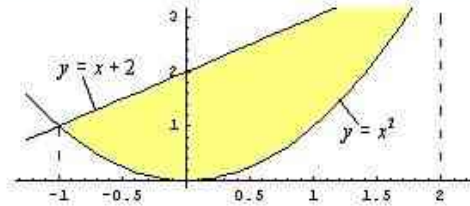


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Question No : 26 of 26

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Answer (Please [click here to Add Answer](#))



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