

VIRTUAL UNIVERSITY OF PAKISTAN

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TEAM HADI(VU LAHORE)

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WARNING: Team HADI is not responsible for any mistake or wrong answer. All students reading and using this document may check and confirm the answers at their own.



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Best of luck!



Question No : 1 of 26

Marks: 1 (Budgeted Time 1 Min)

Which of the following is geometrical representation of set of real numbers?

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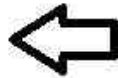
Answer (Please select your correct option)

☐ Co-ordinate line

☒ xy-plane

☐ Sphere

☐ Circular cylinder



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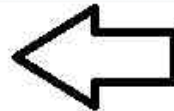
Question No : 2 of 26

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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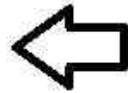
Question No : 3 of 26

Marks: 1 (Budgeted Time 1 Min)

An ordered triple corresponds to ----- in a three dimensional space.

Answer (Please select your correct option)

- ☐ A unique point
- ☐ A point in each octant
- ☐ Three points
- ☐ Infinite number of points



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Question No : 4 of 26

Marks: 1 (Budgeted Time 1 Min)

If the positive directions of x and y axes are known then ----- the positive direction of z-axis.

Answer (Please select your correct option)

☐ Horizontal rightward direction is

☐ Horizontal leftward direction is

☐ Left hand rule tells

☐ Right hand rule tells

correct not shoure

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Question No : 5 of 26

Marks: 1 (Budgeted Time 1 Min)

If a function is not defined at some point, then its limit ----- exist at that point.

Answer (Please select your correct option)

Always

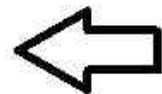
☐

Never

☐

May

☐



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Question No : 6 of 26

Marks: 1 (Budgeted Time 1 Min)

A composition of continuous functions

Answer (Please select your correct option)

☐ is always continuous

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☐ may or may not be continuous

☐ is discontinuous

☐ is piece-wise continuous

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Question No : 7 of 26

Marks: 1 (Budgeted Time 1 Min)

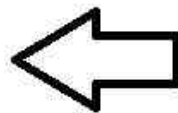
According to the Euler's theorem, the order of partial differentiation can be changed, provided the function and all of its partial derivatives are

Answer (Please select your correct option)

☐ Piece-wise continuous

☐ Continuous

☐ Discontinuous



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Question No : 8 of 26

Marks: 1 (Budgeted Time 1 Min)

If $x = f(r, s)$ and $r = g(t)$, $s = h(t)$, then derivative of x with respect to t is written as

Answer (Please select your correct option)

☐ $\frac{\partial x}{\partial t}$

☐ (x, t)

☐ $\frac{\partial^2 x}{\partial t^2}$

☐ $\frac{dx}{dt}$

correct

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Question No : 9 of 26

Marks: 1 (Budgeted Time 1 Min)

A vector in a plane is always represented by a

Answer (Please select your correct option)

Line

☐

Curve

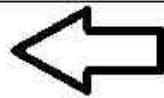
☐

Line segment

☒

None of these.

☐



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If two vectors $\vec{a}$ and $\vec{b}$ have the relation $\vec{a} = \lambda \vec{b}$ where λ is a none-zero scalar then $\vec{a}$ and $\vec{b}$ are to each other.

Answer (Please select your correct option)

☐ Orthogonal

☐ Non-parallel

☐ Parallel

☐ None of these

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The function decreases most rapidly in the direction of

Answer (Please select your correct option)

☐ $-\nabla f$

☐ $-\|\nabla f\|$

☐ $\nabla f \times \hat{a}$

☐ $\|\nabla f\|$

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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)

$2x^2 + y^2 = 4$ is the form of equation of a curve.

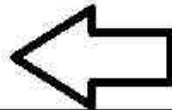
Answer (Please select your correct option)

☐ Parametric

☒ Implicit

☐ Symmetric

☐ Explicit



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If $f(x, y)$ has a relative extremum at a point (x_0, y_0) and both the first partial derivatives of f exist at this point, then

Answer (Please select your correct option)

☐ $f_x(x_0, y_0) = 0$ and $f_y(x_0, y_0) \neq 0$

☐ $f_x(x_0, y_0) \leq 0$ and $f_y(x_0, y_0) \leq 0$

☐ $f_x(x_0, y_0) \geq 0$ and $f_y(x_0, y_0) \geq 0$

☐ $f_x(x_0, y_0) = 0$ and $f_y(x_0, y_0) = 0$

correct

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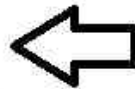
Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

For a function $f(x)$, if $f'(x)$ is equal to some non-zero constant, then $f(x)$ will have

Answer (Please select your correct option)

☐ At least one critical point



☐ No critical point

☐ Non-zero critical points

☐ None of these

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Question No : 16 of 26

Marks: 1 (Budgeted Time 1 Min)

Let x, y, z be the length, width and height of an open rectangular box. The surface area of the box will be

Answer (Please select your correct option)

☐ $A = xy + 2yz + 2xz$

☐ $A = yz + 4$

☐ $A = xz + yz + zx$

☐ $A = xyz$



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Question No : 17 of 26

Marks: 1 (Budgeted Time 1 Min)

Double integral of a function $f(x, y)$ represents of the region between the surface defined by the function and the plane which contains its domain.

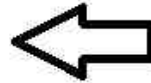
Answer (Please select your correct option)

☐ Perimeter

☐ Volume

☐ Area

☐ Circumference



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Question No : 18 of 26

Marks: 1 (Budgeted Time 1 Min)

For the double integral $\int_c^d \int_a^b f(x, y) dx dy$, order of integration does not matter provided that $f(x, y)$ is

Answer (Please select your correct option)

☐ Bounded

☐ Discontinuous

☐ Defined

☐ Continuous

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

Answer (Please select your correct option)

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

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

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

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



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Question No : 20 of 26

Marks: 1 (Budgeted Time 1 Min)

If $R = \{(x, y) : 0 \leq x \leq 4 \text{ and } 0 \leq y \leq 9\}$, then $\iint_R (3x - 4x\sqrt{xy}) dA = \dots\dots\dots$

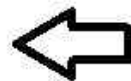
Answer (Please select your correct option)

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

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

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

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



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Question No : 21 of 26

Marks: 2 (Budgeted Time 4 Min)

Given that $f_{xx} = -6x$, $f_{yy} = -6y$, $f_{xy} = 3$ for some $f(x, y)$. Check whether $f(x, y)$ has relative maximum, relative minimum or a saddle point at $P(1, 1)$.

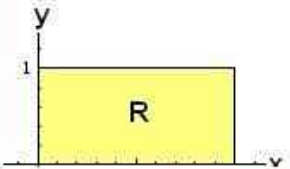
Answer ([Please click here to Add Answer](#))



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



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



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Question No : 23 of 26

Marks: 3 (Budgeted Time 6 Min)

Let $y = 3x^2 - 5$. If x changes from 2 to 2.1, find the approximate change in the value of y using differential dy .

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



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If the order of integration for the integral $\int_0^1 \int_x^1 e^{x^2} dx dy$ is changed. Find the change in the limits of new integral.

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



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Question No : 25 of 26

Marks: 5 (Budgeted Time 10 Min)

Find equation of normal line (in parametric form) to the surface $f(x, y, z) = xy + 2yz - xz^2 + 10$ at the point $(-5, 5, 1)$.

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



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

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



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