

# Learning4help by Waqas

Asslam-o-Alaikum! In this file we'll provide you **MTH631 Important Final term MCQs. Must Prepare before Final term Exams.** I am not responsible for any answer. Verify Answers yourself too. If you found mistake then inform me.

If you found mistake then let us know.

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MTH631 - Real Analysis II (Quiz 3) Quiz Start Time: 09:28 PM, 24 December 2024

Question # 1 of 10 (Start time: 09:28:13 PM, 24 December 2024) Total Marks: 1

In  $\mathbb{R}^n$ , which of the following is true about  $\phi = \{\}$  and  $A = \{(a_1, a_2, \dots, a_n), a_i \in \mathbb{R}, 1 \leq i \leq n, i \in \mathbb{N}\}$ ?

Select the correct option Reload Math Equations

- $\phi$  is Connected and  $A$  is Disconnected
- Both are Connected
- $\phi$  is Disconnected and  $A$  is Connected
- Both are Disconnected

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MTH631 - Real Analysis II (Quiz 3) Quiz Start Time: 09:28 PM, 24 December 2024

Question # 2 of 10 (Start time: 09:28:48 PM, 24 December 2024) Total Marks: 1

If  $f$  is continuous on a compact set  $S$  in  $\mathbb{R}^n$ , then  $f$  \_\_\_\_\_ on  $S$ .

Select the correct option Reload Math Equations

- All above are equally valid
- is also defined on all the limit points of "S"
- attains all its bounds
- is also uniformly continuous

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**MTH631 - Real Analysis II (Quiz 3)** Quiz Start Time: 09:28 PM, 24 December 2024

**Question # 3 of 10 ( Start time: 09:29:15 PM, 24 December 2024 )** Total Marks: 1

Let the function  $f(s) = \begin{cases} \frac{\sin s}{s}, & s \neq 0 \\ 1, & s = 0 \end{cases}$  is continuous over domain \_\_\_\_\_.

Select the correct option Reload Math Equations

Both a & b

(c)  $(0, \infty)$

(a)  $\mathbb{R}$

(b)  $(-\infty, \infty)$

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**MTH631 - Real Analysis II (Quiz 3)** Quiz Start Time: 09:28 PM, 24 December 2024

**Question # 4 of 10 ( Start time: 09:29:40 PM, 24 December 2024 )** Total Marks: 1

Analogous to the derivative of a function of one variable in  $\mathbb{R}^2$ , the directional derivative of a function  $f$  at  $X_0$  in  $\mathbb{R}^n$  has ----- value(s).

Select the correct option Reload Math Equations

infinite many

unique

integral

multiple

Question # 5 of 10 ( Start time: 09:29:59 PM, 24 December 2024 ) Total Marks: 1

$\text{In } \mathbb{R}^n, \lim_{X \rightarrow X_0} f(X) = -\infty, \text{ if}$

Select the correct option Reload Math Equations

<input checked="" type="radio"/>	$\lim_{X \rightarrow X_0} (-f)(X) = \infty$
<input type="radio"/>	$\lim_{X \rightarrow -X_0} f(X) = \infty$
<input type="radio"/>	$\lim_{X \rightarrow X_0} f(-X) = \infty$
<input type="radio"/>	$\lim_{-X \rightarrow X_0} f(X) = \infty$

Click to Save Answer & Move to Next Question

MTH631 - Real Analysis II (Quiz 3) Quiz Start Time: 09:28 PM, 24 December 2024

Question # 6 of 10 ( Start time: 09:30:36 PM, 24 December 2024 ) Total Marks: 1

$\text{In } \mathbb{R}^3, \text{ the lines } L_1 : X = (2, -1, 5) + \alpha(2, -1, 3) \text{ and } L_2 : X = (2, -1, 5) + \beta\left(-5, \frac{5}{2}, -\frac{15}{2}\right) \text{ are traversed}$   
 $\text{in } \text{-----} \text{ directions, where } -\infty < \alpha, \beta < \infty.$

Select the correct option Reload Math Equations

<input type="radio"/>	perpendicular
<input type="radio"/>	same
<input type="radio"/>	opposite
<input checked="" type="radio"/>	oblique

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**MTH631 - Real Analysis II (Quiz 3)**
Quiz Start Time: 09:28 PM, 24 December 2024

**Question # 7 of 10 ( Start time: 09:31:00 PM, 24 December 2024 )**
Total Marks: 1

How many *third* order partial derivatives of  $g(x, y) = xy + x^2y^3$  exist in  $\mathbb{R}^3$ ?

Select the correct option
 Reload Math Equations

- 3
- 6
- 8
- 9

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**Question # 8 of 10 ( Start time: 09:31:39 PM, 24 December 2024 )**
Total Marks: 1

Let  $f$  be defined and continuous on a region  $S$  in  $\mathbb{R}^n$ . Suppose that  $X_1$  and  $X_2$  are in  $S$  and  $f(X_1) < Y < f(X_2)$ .  
 Then  $f(X) = Y$  -----  $X$  in  $S$ .

Select the correct option
 Reload Math Equations

- for all
- for some

For the function

$$f(x, y) = \frac{xy}{x^2 + y^2}$$

the limit of

$$f(x, y)$$

as

$$(x, y) \rightarrow (0, 0)$$

along the line

$$y = -x$$

is

Select the correct option

Reload Math Equations

1

0

$\frac{1}{2}$

$-\frac{1}{2}$

Click to Save Answer & Move to Next Question

Question # 10 of 10 (Start time: 09:33:01 PM, 24 December 2024) Total Marks: 1

For a non empty closed and bounded subset  $S$  in  $\mathbb{R}^n$ , if  $H$  is the collection open sets such that  $S \subset \cup \{H : H \in H\}$ , then by Heine - Borel theorem,

Select the correct option

Reload Math Equations

All above are equally valid

$S \subset \bigcup_{\alpha=1}^n \{H_\alpha : H_\alpha \in H\}$

$S \subset \bigcup_{\alpha=1}^{\infty} \{H_\alpha : H_\alpha \in H\}$

$S \subset \bigcup_{\lambda \in \Lambda} \{H_\lambda : H_\lambda \in H\}$

Click to Save Answer & Move to Next Question

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**Question # 1 of 10 ( Start time: 11:30:37 PM, 06 January 2025 )** **Total Marks: 1**

Which expression represents the differential of a function of n variables at the point  $X_0$  ?

Select the correct option [Reload Math Equations](#)

$L(X) = f(X_0)x_1 + f(X_0)x_2 + \dots + f(X_0)x_n$

None of these

$L(X) = f_{x_1}(X_0)x_1 + f_{x_2}(X_0)x_2 + \dots + f_{x_n}(X_0)x_n$

$L(X) = f_{x_1}(X_0) + f_{x_2}(X_0) + \dots + f_{x_n}(X_0)$

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**Question # 2 of 10 ( Start time: 11:31:51 PM, 06 January 2025 )** **Total Marks: 1**

If  $f$  and  $g$  are diferentiable at  $X_0$  in  $\mathbb{R}^n$ , and  $g(X_0) \neq 0$ , then  $d_{X_0} \left( \frac{f}{g} \right) = \dots$

Select the correct option [Reload Math Equations](#)

$\frac{g(X_0) d_{X_0} f - f(X_0) d_{X_0} g}{[g(X_0)]^2}$

$d_{X_0}^{-1} \left( \frac{g}{f} \right)$

$\frac{d_{X_0} f}{d_{X_0} g}$

$d_{X_0}^{-1} \left( \frac{f}{g} \right)$

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**Question # 3 of 10 ( Start time: 11:32:11 PM, 06 January 2025 )** **Total Marks: 1**

Let  $u$  and  $v$  be functions of two variables with continuous second - order partial derivatives in a region  $S$ .  
Suppose that  $u_x = v_y$  and  $u_y = -v_x$  in  $S$ . Then,  $u_{xx} + u_{yy} = \dots$

Select the correct option [Reload Math Equations](#)

- $>0$  but  $<1$
- $=1$
- $>0$
- $=0$

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**Question # 4 of 10 ( Start time: 11:32:58 PM, 06 January 2025 )** **Total Marks: 1**

Let  $u$  and  $v$  be functions of two variables with continuous second - order partial derivatives in a region  $S$ .  
Suppose that  $u_x = v_y$  and  $u_y = -v_x$  in  $S$ . Then,  $v_{xx} + v_{yy} = \dots$

Select the correct option [Reload Math Equations](#)

- $>0$  but  $<1$
- $=0$
- $>0$
- $=1$

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**Question # 4 of 10 ( Start time: 11:32:58 PM, 06 January 2025 )** **Total Marks: 1**

Let  $u$  and  $v$  be functions of two variables with continuous second - order partial derivatives in a region  $S$ .  
 Suppose that  $u_x = v_y$  and  $u_y = -v_x$  in  $S$ . Then,  $v_{xx} + v_{yy} = \dots$

Select the correct option [Reload Math Equations](#)

- $>0$  but  $<1$
- $=0$
- $>0$
- $=1$

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**Question # 5 of 10 ( Start time: 11:33:35 PM, 06 January 2025 )** **Total Marks: 1**

In  $\mathbb{R}^2$ , if  $g(x, y) = \frac{1}{x-y}$ , then  $g$  is continuously differentiable in  $\dots$

Select the correct option [Reload Math Equations](#)

- $\mathbb{R}^2$
- $\mathbb{R}^2 - \{(0, 0)\}$
- $\mathbb{R}^2 - \{(x, y) | x \neq y\}$
- $\mathbb{R}^2 - \{(x, y) | x = y\}$

Question # 7 of 10 ( Start time: 11:36:21 PM, 06 January 2025 ) Total Marks: 1

Let  $u$  and  $v$  be functions of two variables with continuous second - order partial derivatives in a region  $S$ .  
 Suppose that  $u_x = v_y$  and  $u_y = -v_x$  in  $S$ . Then,  $u_{xx} - u_{yy} = \dots$

Select the correct option Reload Math Equations

=1

>0

none of these.

=0

Question # 8 of 10 ( Start time: 11:37:11 PM, 06 January 2025 ) Total Marks: 1

In  $\mathbb{R}^3$ , if the function of two variable is differentiable at  $(x, y) = (\alpha, \beta)$ ,  
 then the curve  $z = f(x, y)$  is approximated by -----

Select the correct option Reload Math Equations

$f(\alpha, \beta) + f_{xy}(\alpha, \beta)(x - \alpha) + f_{yx}(\alpha, \beta)(y - \beta)$

$f(\alpha, \beta) + f_y(\alpha, \beta)(x - \alpha) + f_x(\alpha, \beta)(y - \beta)$

$f(\alpha, \beta) + f_x(\alpha, \beta)(x - \alpha) + f_y(\alpha, \beta)(y - \beta)$

$f(\alpha, \beta) + f_{yx}(\alpha, \beta)(x - \alpha) + f_{xy}(\alpha, \beta)(y - \beta)$

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**Question # 9 of 10 ( Start time: 11:38:04 PM, 06 January 2025 )** **Total Marks: 1**

A sufficient condition for a function of several variables to be differentiable at point is

Select the correct option [Reload Math Equations](#)

- only the partial derivative should exists at that point.
- None of these
- only limit at that point should exists.
- All partial derivatives exists and are continuous at that point

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**Question # 10 of 10 ( Start time: 11:39:01 PM, 06 January 2025 )** **Total Marks: 1**

On a set  $S$  in  $\mathbb{R}^n$ , a function  $g$  is continuously differentiable, if  $S$  is contained in a(an) ----- set on which  $g_{x_1}, g_{x_2}, \dots, g_{x_n}$  are-----.

Select the correct option [Reload Math Equations](#)

- Open, continuous
- Open, differentiable
- Closed, continuous
- Closed, differentiable