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Courses » Basic Calculus for Engineers, Scientists and Economists Announcements Course Ask a Question Progress



# Unit 5 - Unit 4 - Week - 04 - Function of Two Variables, Limits, Continuity, Differentiability, Unconstrained and Constrained minimization

## Course outline

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Week 01 - Numbers, Functions, Sequences and Limits of Functions

Week- 02-Continuity, Derivative, Maxima and Minima and Taylor's expansion

Week 03-Integration Of Real Functions

Unit 4 - Week - 04 - Function of Two Variables, Limits, Continuity, Differentiability, Unconstrained and Constrained minimization

- Lecture 19 - Functions of Two or More Variables
- Lecture 20 - Limits And Continuity Of Functions Of Two Variables
- Lecture 21 - Differentiation Of Functions Of Two Variables - 1
- Lecture 22 - Differentiation Of Functions Of Two Variables - 2
- Lecture 23 - Unconstrained Minimization Of Functions Of Two Variables
- Lecture 24 - Constrained Minimization And Lagrange Multiplier Rules
- Quiz : Assignment-4
- Assignment-4 Solution

Week - 05 - Infinite Series, Multiple Integrals

## Assignment-4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

**Due on 2017-02-21, 23:59 IST.**

1) The domain of the function  $f(x) = \sqrt{2 - \sqrt{x}}$  is

1 point

- $\{x \in \mathbb{R} : x \geq 0\}$ .
- $\{x \in \mathbb{R} : x \leq 4\}$ .
- $\{x \in \mathbb{R} : 0 \leq x \leq 4\}$ .
- $\{x \in \mathbb{R} : 0 \leq x \leq 2\}$ .

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$\{x \in \mathbb{R} : 0 \leq x \leq 4\}$ .

2) The range of the function  $f(x, y) = e^{-\frac{1}{xy}}$  is given by

1 point

- $[0, \infty)$ .
- $[1, \infty)$ .
- $(0, \infty)$ .
- $[0, 1]$ .

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$[0, \infty)$ .

3)  $\lim_{(x,y) \rightarrow (0,0)} \frac{e^x \sin x}{x} =$

1 point

- undetermined.
- 0.
- 1.
- e.

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

1.

4) The point of discontinuities of the function  $f(x, y) = \sin\left(\frac{1}{xy}\right)$  are

1 point

- $\{(x, y) \in \mathbb{R}^2 : x \neq 0, y \neq 0\}$ .
- $\{(x, y) \in \mathbb{R}^2 : x = 0\} \cup \{(x, y) \in \mathbb{R}^2 : y = 0\}$ .
- $\{(x, y) \in \mathbb{R}^2 : x = 0, y = 0\}$ .
- $\{(x, y) \in \mathbb{R}^2 : -1 \leq x \leq 1, -1 \leq y \leq 1\}$ .

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\{(x, y) \in \mathbb{R}^2 : x = 0\} \cup \{(x, y) \in \mathbb{R}^2 : y = 0\}.$$

5) For the function  $f(x, y, z) = \sin^{-1}(xyz)$

- $\frac{\partial f}{\partial x} = -\frac{yz}{\sqrt{1-x^2y^2z^2}}$ .
- $\frac{\partial f}{\partial y} = \frac{xz}{\sqrt{1-x^2y^2z^2}}$ .
- $\frac{\partial f}{\partial z} = \frac{yx}{\sqrt{1+x^2y^2z^2}}$ .
- $\frac{\partial f}{\partial x} = -\frac{yz}{1-x^2y^2z^2}$ .

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{\partial f}{\partial y} = \frac{xz}{\sqrt{1-x^2y^2z^2}}.$$

6) Let  $w = 2ye^x - \ln z$ ,  $x = \ln(t^2 + 1)$ ,  $y = \tan^{-1} t$ ,  $z = e^t$ , then  $\frac{dw}{dt}$  at  $t = 1$  is

- $\pi/2 + 1$ .
- $\pi + 2$ .
- $\pi/2 + 2$ .
- $\pi + 1$ .

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\pi + 1.$$

7)

0 points

The derivative of the function  $f(x, y) = xy + yz + zx$  at  $(1, -1, 2)$  in the direction of  $P = 3\hat{i} + 6\hat{j} - 2\hat{k}$  is

- 3.
- 2.
- 1.
- 0.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$3.$$

8)

1 point

The direction in which the directional derivative of  $f(x, y) = x^2 + xy + y^2$  at  $(0, 1)$  is equal to zero is given by

- $\hat{i} + \hat{j}$ .
- $\hat{i} - \hat{j}$ .



1 point



$2\hat{i} - \hat{j}$ .

$2\hat{i} + \hat{j}$ .

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$2\hat{i} - \hat{j}$ .

9) For the function  $f(x, y) = x^3 - y^3 - 2xy + 6$

$(0, 0)$  is a local minimizer.

$(-2/3, 2/3)$  is a local minimizer.

$(-2/3, 2/3)$  is a local maximizer.

$(0, 0)$  is a local maximizer.

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$(-2/3, 2/3)$  is a local maximizer.

10) The value of  $a, b$  with  $a \leq b$  such that  $\int_a^b (2x - x^2)$  has its minimum value are given by

$a = 0, b = 0$ .

$a = 2, b = 2$ .

$a = 0, b = 2$ .

$a = 2, b = 0$ .

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$a = 0, b = 0$ .



1 point

0 points

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