

## Unit 5 - Week 3 :

Register for  
Certification exam

### Course outline

How to access the  
portal

Week 0 :

Week 1 :

Week 2 :

Week 3 :

● Lecture 11 :  
Derivative &  
Differentiability

● Lecture 12 :  
Differentiability of  
Functions of Two  
Variables

● Lecture 13 :  
Differentiability of  
Functions of Two  
Variables (Cont.)

● Lecture 14 :  
Differentiability of  
Functions of Two  
Variables (Cont.)

● Lecture 15 :  
Composite and  
Homogeneous  
Functions

○ Quiz : Assignment 3

○ Feedback for Week  
3

Week 4 :

Week 5 :

Week 6 :

Week 7 :

Week 8 :

Week 9 :

## Assignment 3

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

**Due on 2019-02-20, 23:59 IST**

1) The total differential of the function  $w(x, y) = \sin^{-1}\left(\frac{x}{y}\right)$  is 1 point

- a.  $dw = \frac{x dx + y dy}{\sqrt{x^2 + y^2}}$   
 b.  $dw = \frac{y dx + x dy}{\sqrt{x^2 + y^2}}$   
 c.  $dw = \frac{y dx - x dy}{y\sqrt{y^2 - x^2}}$   
 d.  $dw = \frac{y dx + x dy}{x\sqrt{y^2 - x^2}}$

- a.  
 b.  
 c.  
 d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

c.

2) 1 point

The function  $f(x, y) = \begin{cases} \frac{xy(x^2 - y^2)}{x^2 + y^2}, & (x, y) \neq (0, 0) \\ 0, & (x, y) = (0, 0) \end{cases}$  is a differentiable function.

Check whether the above statement is true or false.

- a. True  
 b. False

- a.  
 b.

No, the answer is incorrect.

Score: 0

Accepted Answers:

DOWNLOAD  
VIDEOS

Assignment Solution

Which of the options hold(s) true for the function  $f(x, y) = \sqrt{|xy|}$

- a.  $f_x$  exists at  $(0,0)$ , but  $f_y$  does not exist at  $(0,0)$
- b.  $f_x(0,0) = 0$ ,  $f_y(0,0) = 1$
- c.  $f_x = f_y$  at  $(0,0)$
- d.  $f$  is not differentiable at  $(0,0)$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

- c.
- d.

4)

1 point

If  $z = xy^2 + x^2y$  and  $y = \ln x$ , then which of the following options hold(s) true?

- a.  $\frac{dz}{dx} = (\ln x)^2 + 2(1+x) \ln x + x$
- b.  $\frac{dz}{dy} = e^y(y^2 + 2y - e^y)$
- c.  $\frac{dz}{dx} = (\ln x)^2 - 2(1-x) \ln x + e^x$
- d.  $\frac{dz}{dy} = e^y\{y^2 + 2y(1 + e^y) + e^y\}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

- a.
- d.

5)

1 point

Given that  $z = f(st^2, te^s)$ , with  $f_x(0,2) = -10$ ,  $f_y(0,2) = 5$ . Then the values of  $Z_s$  and  $Z_t$   $s = 0, t = 2$  respectively are

- a. -30, 5
- b. -5, 30
- c. 0, 5
- d. 5, 0

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

- a.

6)

1 point

If  $x^y + y^x = c$ , then  $\frac{dy}{dx}$  is equal to

- a.  $\frac{x^y \log x}{y^x \log y}$
- b.  $-\frac{y^x \log y + yx^{y-1}}{x^y \log x + xy^{x-1}}$
- c.  $-\frac{y^x \log y - yx^{y-1}}{x^y \log x + xy^{x-1}}$
- d.  $-\frac{x^y + \log y}{y^x + \log x}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b.

7) Which of the options holds true for the function  $f(x, y) = \frac{\sqrt{x^6 + y^6}}{x + y}$

1 point

- a.  $f$  is not a homogeneous function
- b.  $f$  is a homogeneous function of degree 0
- c.  $f$  is a homogeneous function of degree 1
- d.  $f$  is a homogeneous function of degree 2

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

d.

8) For the function  $W = f\left(\frac{y-x}{xy}, \frac{z-y}{zy}\right)$ , the value of the expression  $x^2 \frac{\partial w}{\partial x} + y^2 \frac{\partial w}{\partial y} + z^2 \frac{\partial w}{\partial z}$

1 point

- a. 0
- b.  $\frac{x+y+z}{xyz}$
- c. -1
- d.  $\frac{xyz}{x+y+z}$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

a.

9) 1 point

If  $u = z \exp(ax + by)$ , where  $Z$  is a homogeneous function in  $x$  and  $y$  of degree  $n$ , then the value of  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$  is

- a.  $nu$
- b.  $0$
- c.  $n(n-1)(ax+by)u$
- d.  $(ax+by+n)u$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$d$ .

10)

1 point

Let  $z(x, y) = \frac{(x^2+y^2)^n}{2n(2n-1)} + x\phi\left(\frac{y}{x}\right) + \psi\left(\frac{y}{x}\right)$ . Then the value of the expression  $x^2 z_{xx} + 2xyz_{xy} + y^2 z_{yy}$  is

- a.  $(x^2 + y^2)^{\frac{n}{2}}$
- b.  $0$
- c.  $(x^2 + y^2)^n$
- d.  $n(x^2 + y^2)$

- a.
- b.
- c.
- d.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$c$ .

Previous Page

End