***Solution*** ***Section* 2.3 – Partial Derivatives**

***Exercise***

Find  and  

***Solution***









***Exercise***

Find  and  

***Solution***









***Exercise***

Find  and  

***Solution***









***Exercise***

Find  and  

***Solution***









***Exercise***

Find  and  

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***Exercise***

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***Exercise***

Find  

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***Exercise***

Find  

***Solution***







***Exercise***

Find partial derivatives of the function with respect to each variable 

***Solution***





***Exercise***

Find partial derivatives of the function with respect to each variable



***Solution***













***Exercise***

Find partial derivatives of the function with respect to each variable 

***Solution***







***Exercise***

Find partial derivatives of the function with respect to each variable 

***Solution***

















***Exercise***

Find all the second-order partial derivatives of 

***Solution***





***Exercise***

Find all the second-order partial derivatives of 

***Solution***

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***Exercise***

Find all the second-order partial derivatives of 

***Solution***























***Exercise***

Find second-order partial derivatives of the function 

***Solution***



***Exercise***

Find second-order partial derivatives of the function 

***Solution***



***Exercise***

Find second-order partial derivatives of the function 

***Solution***



***Exercise***

Verify that the function satisfies Laplace’s equation 



***Solution***















 ***√***

∴ The given function satisfies Laplace’s equation

***Exercise***

Verify that the function satisfies Laplace’s equation 



***Solution***

















 ***√***

∴ The given function satisfies Laplace’s equation

***Exercise***

Let . Find the slope of the line tangent to this surface at the point  and lying in the **a**. plane  **b**. plane .

***Solution***

1. In the plane 



1. In the plane 



***Exercise***

Let  be a function of three independent variables and writs the formal definition of the partial derivative  at . Use this definition to find  at  for .

***Solution***













***Exercise***

Find the value of  at the point  if the equation  defines *x* as a function of the two independent variables *y* and *z* and the partial derivative exists.

***Solution***







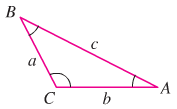




***Exercise***

Express *A* implicitly as a function of *a, b*, and *c* and calculate  and .

***Solution***





 → 







***Exercise***

An important partial differential equation that describes the distribution of heat in a region at time *t* can be represented by the one-dimensional heat equation



Show that  satisfies the heat equation for constants *α* and *β*. What is the relationship between *α* and *β* for this function to be a solution?

***Solution***







For 



⇒ 