***Lecture* R − Introduction to Differential Equation**

***Solution Section* R.1 – Derivative**

***Exercise***

Find the derivative of 

***Solution***



***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative of 

***Solution***





***Exercise***

Find the derivative of 

***Solution***





 

***Exercise***

Find the derivative of 

***Solution***

 





***Exercise***

Find the derivative of 

***Solution***

 



***Exercise***

Find the derivative of 

***Solution***

 



***Exercise***

Find the derivative of 

***Solution***













***Exercise***

Find the derivative of 

***Solution***









***Exercise***

Find the derivative to the following functions 

***Solution***





***Exercise***

Find the derivative to the following functions 

***Solution***





***Exercise***

Find the derivative to the following functions 

***Solution***



***Exercise***

Find the derivative to the following functions 

***Solution***



***Exercise***

Find the derivative to the following functions 

***Solution***

 

***Exercise***

Find the derivative to the following functions **

***Solution***



















 

***Exercise***

Find the derivative to the following functions 

***Solution***

 

***Exercise***

Find the derivative to the following functions 

***Solution***







***Exercise***

Find the derivative to the following functions 

***Solution***









***Exercise***

Find the derivative of 

***Solution***

 

 



***Exercise***

Find the derivative of 

***Solution***

 

***Exercise***

Find the derivative of 

***Solution***

 









***Exercise***

Find the derivative of 

***Solution***







***Exercise***

Find the derivative to the following functions 

***Solution***





















***Exercise***

Find the derivative to the following functions **

***Solution***

 



***Exercise***

Find the derivative to the following functions 

***Solution***

 

***Exercise***

Find the derivative to the following functions 

***Solution***

 

***Exercise***

Find the derivative to the following functions 

***Solution***

 





***Exercise***

Find the derivative to the following functions 

***Solution***





***Exercise***

Find the derivative to the following functions 

***Solution***





***Exercise***

Find the derivative to the following functions 

***Solution***

 





***Exercise***

Find the derivative to the following functions 

***Solution***







***Exercise***

Find the derivative to the following functions 

***Solution***









***Exercise***

Find the derivative to the following functions 

***Solution***









***Exercise***

Find the derivative to the following functions **

***Solution***







***Exercise***

Find the derivative to the following functions **

***Solution***











***Exercise***

Find the derivative to the following functions **

***Solution***





***Exercise***

Find the derivative to the following functions **

***Solution***











***Exercise***

Find the derivative to the following functions **

***Solution***









***Exercise***

Find the derivative to the following functions **

***Solution***

 ***Product Property***



 ***Power Property***

 ***Differentiate***



***Exercise***

Find the derivative to the following functions **

***Solution***







***Exercise***

Find the derivative to the following functions **

***Solution***











***Exercise***

Find the derivative to the following functions **

***Solution***





***Exercise***

Find the derivative to the following functions **

***Solution***







***Exercise***

Find the derivative of 

***Solution***

 



***Exercise***

Find the derivative of 

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Find the derivative of 

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Find the derivative of 

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Find the derivative of 

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Find the derivative of 

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Find the derivative of 

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***Exercise***

Find the derivative of 

***Solution***

 









***Exercise***

Find the derivative of 

***Solution***













***Solution Section* R.2 – Integration**

***Exercise***

Find each indefinite integral. 

***Solution***











***Exercise***

Find each indefinite integral 

***Solution***





***Exercise***

Find each indefinite integral 

***Solution***



***Exercise***

Find each indefinite integral 

***Solution***



***Exercise***

Find each indefinite integral 

***Solution***





***Exercise***

Find each indefinite integral 

***Solution***



***Exercise***

Find each indefinite integral 

***Solution***







***Exercise***

Find each indefinite integral 

***Solution***



***Exercise***

Find each indefinite integral 

***Solution***







***Exercise***

Evaluate the integral 

***Solution***

Let: 











***Exercise***

Evaluate the integral 

***Solution***

Let: 









|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

***Exercise***

Evaluate the integral 

***Solution***



|  |  |  |
| --- | --- | --- |
|  |  |  |
| + |  |  |
| − |  |  |
| + |  |  |

***Exercise***

Evaluate the integral 

***Solution***







***Exercise***

Evaluate the integral 

***Solution***

|  |  |  |
| --- | --- | --- |
|  |  |  |
| **+** |  |  |
| **-** |  |  |
| **+** |  |  |











***Exercise***

Find the general solution of the differential equation 

***Solution***





***Exercise***

Find the general solution of the differential equation 

***Solution***





***Exercise***

Find the general solution of the differential equation 

***Solution***





***Exercise***

Find the general solution of the differential equation: 

***Solution***













***Exercise***

Find the general solution of the differential equation: 

***Solution***







 Substitute for *x* and *dx*









***Exercise***

Find the general solution of the differential equation: 

***Solution***















***Exercise***

Find the general solution of the differential equation: 

***Solution***

 







***Exercise***

Find the general solution of the differential equation: 

***Solution***







***Exercise***

Find the general solution of the differential equation: 

***Solution***

 







***Exercise***

Find the general solution of the differential equation: 

***Solution***

 







***Exercise***

Evaluate the integrals 

***Solution***







***Exercise***

Evaluate the integrals 

***Solution***







***Exercise***

Evaluate the integrals 

***Solution***









***Exercise***

Evaluate the integrals 

***Solution***









***Exercise***

Evaluate the integrals 

***Solution***













***Exercise***

Evaluate the integrals 

***Solution***











***Exercise***

Evaluate the integrals 

***Solution***













***Exercise***

Evaluate: 

***Solution***

 













***Exercise***

Evaluate the integral 

***Solution***

Let 













***Exercise***

Find the general solution of , and find the particular solution that satisfies the initial condition *F*(1) = 8.

***Solution***













***Exercise***

Find the general solution of the differential equation: 

***Solution***











***Exercise***

A ball is thrown into the air from an initial height of 6 *m* with an initial velocity of 120 *m/s*. What will be the maximum height of the ball and at what time will this event occur?

***Solution***























 





***Exercise***

Derive the position function if a ball is thrown upward with initial velocity of 32 *ft* per *second* from an initial height of 48 *ft.* When does the ball hit the ground? With what velocity does the ball hit the ground?

***Solution***





















 







The ball hits the ground in **3** seconds

The velocity: 

