**Chapter five**

**Integration**

Integration is the reversal of differentiation hence functions can be integrated by indentifying the anti-derivative.

**Terminology**

**Indefinite** and **Definite** integrals

There are two types of integrals: Indefinite and Definite.

Indefinite integrals are those with no limits and definite integrals have limits.

When dealing with indefinite integrals you need to add a constant of integration. For example, if integrating the function f(x) with respect to x:



where  is the integrated function.

**C** is an arbitrary constant called the constant of integration.

**dx** indicates the variable with respect to which we are integrating, in this case, *x*.

The function being integrated, f(*x*), is called the **integrand**.

**The Rule**

1. **Constant Rule**  where a is constant

**EXAMPLE: 1.** 

**2.**  

**3.** 

1. **Sum Rule** 

**EXAMPLE: 1.** 

1. **The Power Rule**  

**EXAMPLE: 1.** 

**2.** 

1. **The Substitution Rule**

If is a differentiable function whose range is an interval *I* and ƒ is continuous on *I*, then



**EXAMPLES: 1.** 

**2.** 

**3.** 

**4.** 

**5.** 



**6.** 



**Root function integral**

**EXAMPLES: 1.** 





**2.** 



**3.** 





**4.** 





**5.** 











Or 

**6.** 











**7.** 











***H.W* Evaluate**

1. 
2. 
3. 

**تكامل الدوال المثلثية**

**Trigonometric function integral **

1.  



1.  



**EXAMPLES: 1. **

**2. **

**3. **

**اذا كانت الدالة اسية ومشتقة داخل القوس متوفرة عندها نستخدم القوانين التالية**

1. 
2. 

**EXAMPLE: 1.** 

**2.** 

**3.** 

**اذا كانت الدالة اسية والمشتقة غير متوفرة نتبع مايلي**

1. **اذا كانت الدالة اسية والمشتقة غير متوفرة وكان الاس عدد زوجي**





**EXAMPLES: 1.** 





**2.** 





1. **اذا كانت الاس عدد فردي نستخدم القانون**







**EXAMPLE 1** 









**EXAMPLE 2** 







