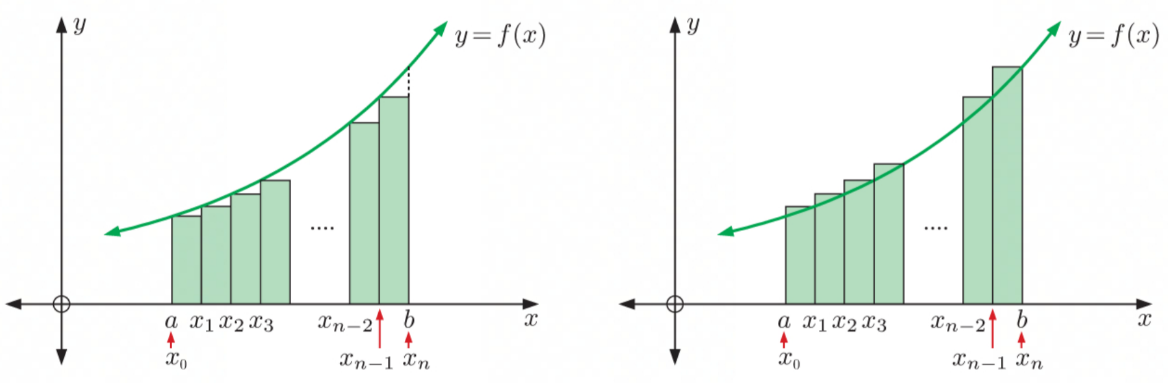
|  |
| --- |
| **INTEGRATION** |

**KEY FACTS AND CONCEPTS**

**4A ESTIMATING THE AREA UNDER A CURVE**

* The area under the curve between and can be estimated using lower and upper rectangles.
* Using more rectangles improves the accuracy of the estimate.



**4B ANTIDIFFERENTIATION**

* The process of finding from , or from is the reverse process of differentiation and is called **antidifferentiation**.
* If is a function where we say that:
  + The **derivative** of is and
  + The **antiderivative** of is

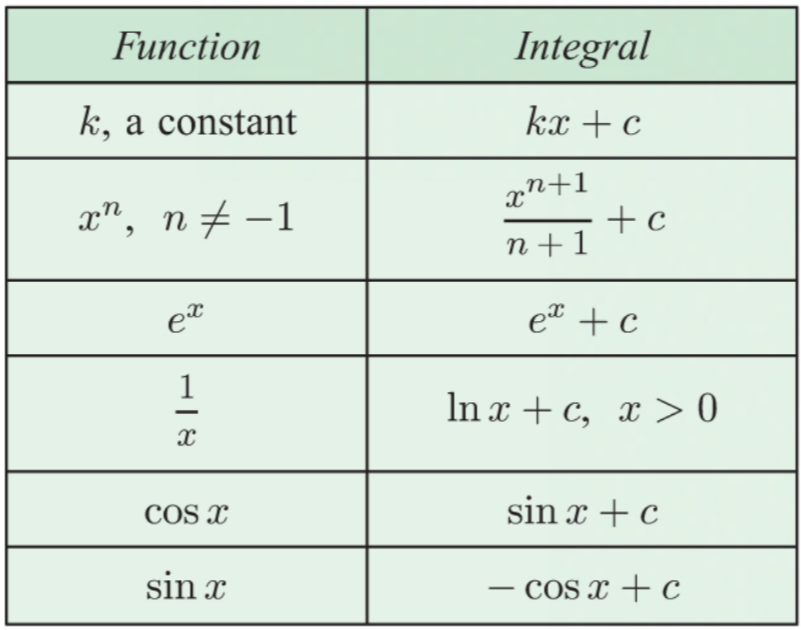
**4C THE FUNDAMENTAL THEOREM OF CALCULUS**

* If is the antiderivative of then the **signed area function** from to is
* The following properties of definite integrals can be deduced from the Fundamental Theorem of Calculus:
  + { is a constant}
  + { is a constant}

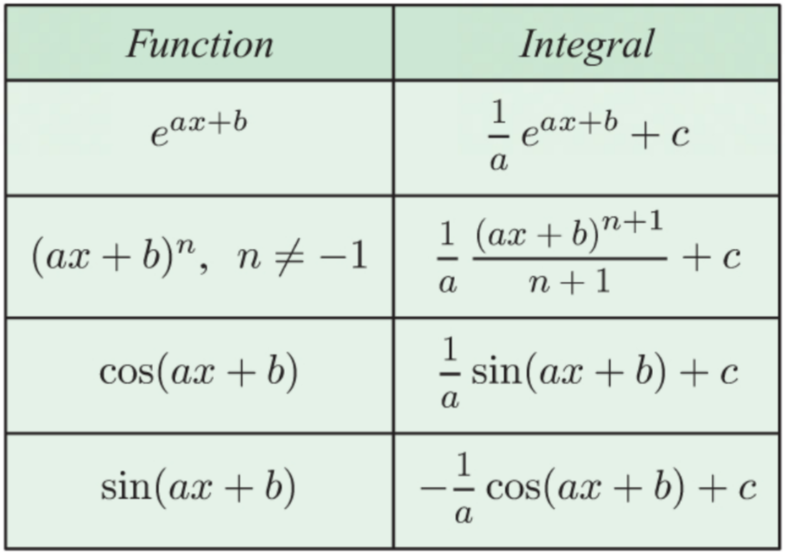
**4D INTEGRATION**

* If then where is the **indefinite integral** of with respect to .

**4E RULES FOR INTEGRATION**



**4F INTEGRATING**



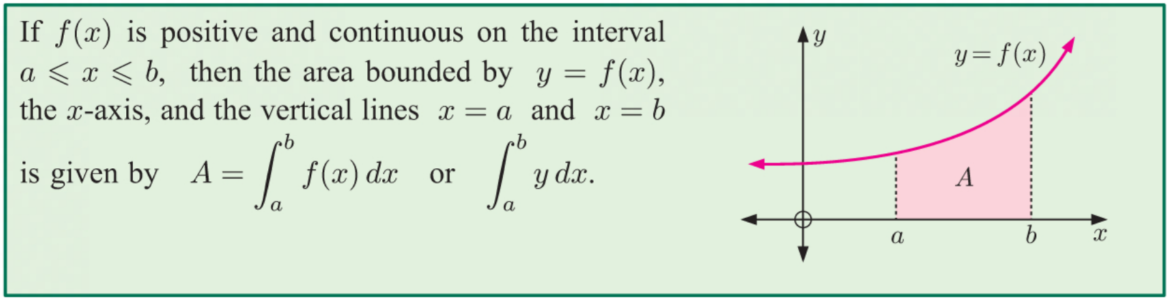
**4G DEFINITE INTEGRALS**

* If is the antiderivative of then the **definite integral** on the interval is

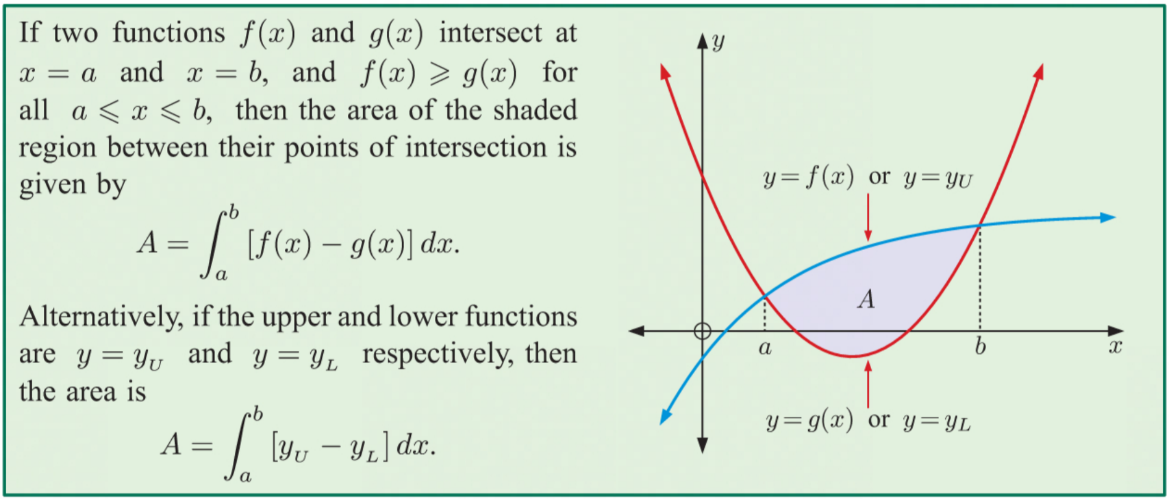
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| **APPLICATIONS OF INTEGRATION** |

**KEY FACTS AND CONCEPTS**

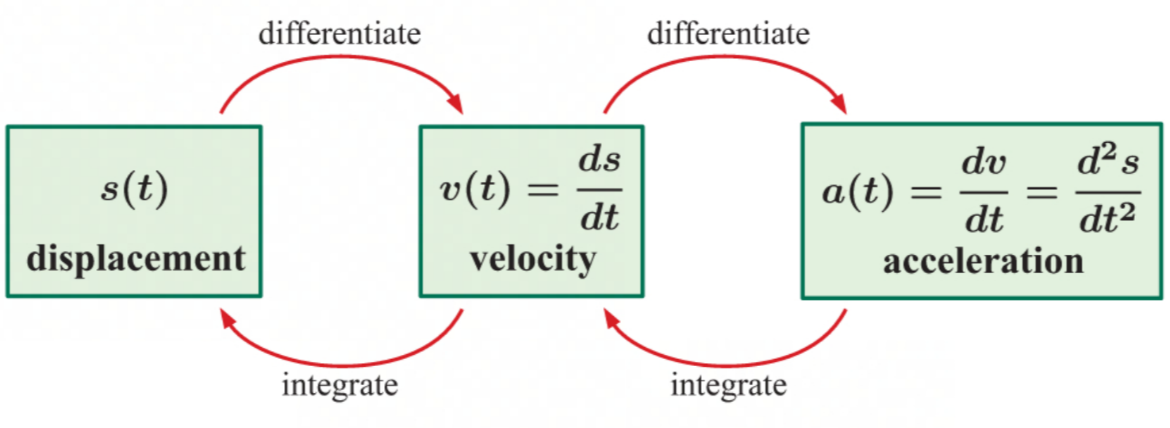
**5A THE AREA UNDER A CURVE**



**5B THE AREA BETWEEN TWO FUNCTIONS**



**5C KINEMATICS**



**5D PROBLEM SOLVING BY INTEGRATION**

* In practical situations it is often easier to measure the rate of change of a variable, and then use integration to find a function for the quantity concerned.
* If is the rate at which quantity is changing at time :
  + gives the change in over the interval