**Colorado Technical University**

**Course:** MATH205 – Differential Calculus

## Unit 9 Part 17 Readings – Definite Integrals and

## Area Under a Curve

**Area Under a Curve**

This is the geometric interpretation of an integral

The area A under a curve *y* = *f*(*x*) from *x* = *a* to *x* = *b* is

 lim

 *n*→∞

A = sum of the *n* rectangles between *a* and *b*

 = *∫ab* *f ’*(*x*) *dx*

 *b*

 *a*

 = F(*x*) |

 = F(*b*)  F(*a*)

 where F(*x*) = *∫* *f* ' (*x*) *dx*

 note: no constant of integration!

### **Definite Integral**

If *f* (*x*) is a continuous function between *x* = a and *x* = b and the

derivative of F(*x*) is *f* '(*x*) then

*∫ab* *f* '(*x*) *dx* = F(*b*)  F(*a*

 *b*

 *a*

= F(*x*) |

 *Factoid: ∫ab* *f* '(*x*) *dx* = *∫ba* *f* '(*x*) *dx*