**Review for test 2**

**Multivariable Calculus**

**Types of integrals:**

**Double integrals**:

To change into iterated integrals

Describe :

Rectangular coordinates

Polar coordinates:

Change in coordinates: Change ellipses to circles or rectangles

Change parallelograms to squares

Use a given transformation

Calculate Jacobian in each case

**Triple integrals**:

To change into iterated integrals

Describe :

Rectangular coordinates

Cylindrical coordinates:

Spherical coord’s:

**Line integrals**:

To change into definite integral

Describe :

is the graph of for :

; and

is part of circle of radius :

and ; bounds given by central angles

is line segment through along

and ; for

Describe :

Use given parametrization:

and

is line segment through along

and ; for

**Surface integrals**:

To change into double integral

Describe S :

is the graph of over

and

is part of the sphere of radius

is part of a cylinder of radius

**Applications**

Area of :

Volume under graph of over :

Volume of :

Arc Length of :

Surface area of :

Average value: or

Center of mass: (you will need to calculate at most 2 integrals)

Given and density function

Mass:

Moments: ; ;

Then, center of mass is where ; ;

**Know**: Statement of Fubini’s (for double integral over a rectangle)

Definition of double integral

Definition of line integral