**King Saud University**

**Department Of Mathematics.**

**M-203 [Final Examination]**

**(Differential and Integral Calculus)**

(I-Semester 1441)

Max. Marks: 40 Time: 3 hrs

**Marking Scheme: Q1[4+4+4]; Q2[4+4+4]; Q3[4+4+4+4].**

**Q. No: 1 (a)** Determine whether the sequence converges or diverges and if it converges, find its limit.

 **(b)** Find the interval of convergence and radius of convergenceof the power series:

 **(c)** Find the MacLaurin series for and use its first three non-zero terms to approximate the integral .

**Q. No: 2 (a)** Evaluate the integral

 **(b)** Find the moment of inertia about the *x*-axisof the lamina with shape of the region bounded by .

 **(c)** Evaluate the triple integral:

**Q. No: 3 (a)** Show that the following integral is independent of path and find its value:

 **(b)** Use Green’s theorem to evaluate the line integral where *C* is the path from along the graph and from along the graph

 **(c)** Use Divergence theorem to evaluate the surface integral where and *S* is the surface of the region bounded by the cylinder , the *xy*-plane, and the paraboloid

. (Provided *S* is oriented by the unit normal directed upward).

 **(d)** Use Stoke’s theorem to evaluate for the vector field , *S* is the surface of the paraboloid and C is the trace of S in the *xy*-plane with counterclockwise direction.