**Final exam (201 Math ) Math Department**

**First term 1434-1435 ) Duration : 3 Hours ( 8-11 a.m.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**[ 8 marks ]**

**1. Test the following series for convergence or divergence**

**a) “ by using the integral test “**

**b) “ by using the limit comparison test by taking “**

**c) Show that is absolutely convergent. “ by using the ratio test ”**

**d) “ by using the alternating series test “**

**2. Find the power series representation for the function and its radius**

**of convergence.**

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**[ 12 marks ]**

**a) Use the definition of partial derivatives as limits to find for**

**b) If , then show that:**

**i) ii) –**

**c)** Find the local maximum or local minimum values and saddle points of the

following function

**d) Find if**

**e) Find , if**

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**[ 10 marks ]**

**1. i) Tell me please when we say that is continuous at the point ?**

**ii) Find all the points where is continuous.**

**iii) What does the domain of represent?**

**2. Find Taylor series for and find the radius of convergence.**

**3. Show that**

**[Hint : use the definition of the limit ( if for every**

**there corresponds a such that : whenever ]**

**4. Let**

**a) Find the domain of b) Sketch the domain of**

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**[ 10 marks]**

**1. Use the Midpoint Rule to estimate the volume of the solid that lies below the**

**surface and above the rectangle  *,* with**

**2. Evaluate the double integral ,**

**3. Find the volume of the solid under the surface and above the region**

**bounded by and . ( End… )**

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